

The American Society of Colon and Rectal Surgeons

Annual Meeting Abstracts

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May 19–23, 2018
Nashville Music City Center
Nashville, TN

GENERAL SURGERY RESIDENTS' FORUM

RECTAL CANCER IN YOUNGER PATIENTS: RARE, AGGRESSIVE AND DEADLY.

GS1

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Purpose/Background: Recently patients under 55 years of age have had an increased rate of rectal cancer. Our study aims to identify age-specific differences of rectal adenocarcinomas with respect to pathology, all therapy, and overall survival (OS).

Methods/Interventions: Patients ≥ 20 years old diagnosed with stage I-IV adenocarcinoma of the rectum or rectosigmoid junction were queried from the National Cancer Database (2004-2015) and were stratified into four age categories (20-29, 30-39, 40-49, and ≥ 50). Primary outcome was 5- and 10-year OS, analyzed using the Kaplan-Meier survival curves, log-rank test, and Cox proportional hazards model. Subgroup analysis was performed stratifying by stage and treatment type.

Results/Outcome(s): 273,377 cases were included [20-29: 1696 (0.62%); 30-39: 8211 (3.00%); 40-49: 30970 (11.33%); and ≥ 50 : 232500 (85.05%)]. The prevalence of rectal cancer significantly increased in all age groups except 20-29 (20-29: 6.25% in 2004 to 8.67% in 2015 ($p=0.077$); 30-39: 7.06% to 10.71%; 40-49: 7.20% to 9.24%; and ≥ 50 : 7.89% to 9.00% ($p<0.001$ for remaining categories). Patients <40 were more likely to be African-American, Hispanic, with lower median household income, have Medicaid, diagnosed with stage IV disease (26.77%, 23.54%, 21.28%, and 17.46%, respectively, $p<0.001$), have tumors ≥ 5.5 cm (32.49%, 31.64%, 29.66%, and 26.84%, respectively, $p<0.001$), poorly differentiated (19.69%, 15.16%, 13.22%, and 11.71%, respectively, $p<0.001$), and higher positive margins (8.84%, 7.81%, 6.72%, and 6.46% respectively, $p<0.001$). Patients <50 were more likely to receive the multi-modal therapy (48.96%, 52.91%, 52.28%, and 39.35% respectively, $p<0.001$). Patients ≥ 50 were more likely to receive surgery alone compared to younger patients (<50) (14.70%, 14.34%, 18.09%, and 33.27%, respectively, $p<0.001$). When stratified by age, these treatment patterns persisted across all 4 stages. In unadjusted analysis, patients ≥ 50 had significantly worse 5- and 10-year OS than the other groups. The 5- and 10-year OS among the younger categories were worse in 20-29 year-olds (5-yr OS: 59.62%, 67.46%, 68.70%, 56.23%, respectively; 10-yr OS: 48.37%, 56.90%, 56.66%, 38.17%, respectively; both $p<0.001$). Similar trends persisted when stratified by stage (FIGURE) and treatment type. Adjusted analysis showed similar results (≥ 50 -ref; 20-29: HR 0.90, 95% CI 0.83-98; 30-39: HR 0.79, 95% CI 0.76-0.82; 40-49: HR 0.78, 95% CI 0.77-0.80; all $p<0.001$). However, after stage and treatment type stratification, there was no significant difference in OS between patients in their 20s

and ≥ 50 , except for stage I patients and those treated with surgery alone or chemotherapy + radiation.

Conclusions/Discussion: Our study reveals a difference in patient and tumor characteristics, treatment modalities, and outcome between those younger and older than 50. Rectal cancer patients between 20-29 have more aggressive biology, are diagnosed at a later stage, and exhibit the worst OS among all patients <50 .

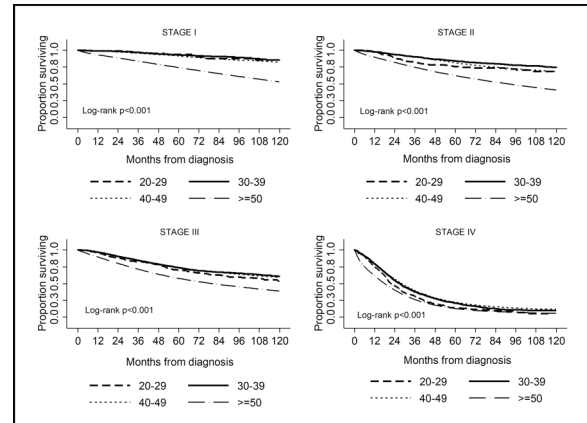


FIGURE. Kaplan-Meier curves of 10-year overall survival rates for rectal cancer patients stratified by stage and age group.

CARNOY'S SOLUTION FIXATION WITH COMPRESSION SIGNIFICANTLY INCREASES LYMPH NODE YIELDS COMPARED TO STANDARD MANUAL TECHNIQUE IN PATIENTS UNDERGOING RADICAL OPERATIONS FOR COLORECTAL CANCER.

GS2

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Purpose/Background: Lymph node evaluation is one of the most important prognostic factors in colorectal cancer and helps guide adjuvant therapy. Current NCCN guidelines recommend examination of a minimum of 12 lymph nodes for adequate staging. When patients with node negative disease fail to meet this minimum number, they are deemed high risk and may undergo adjuvant chemotherapy. Carnoy's fixation and compression represents a novel tool to enhance lymph node evaluation and accuracy of staging following radical resection for colorectal cancer. This technique can significantly increase specimen lymph node yields and possibly prevent the expense and morbidity of unnecessary treatments.

Methods/Interventions: This prospective study was performed in all adults undergoing colorectal cancer operations by Kaiser Permanente surgeons at Kaiser Permanente Zion Medical Center and at a contract facility (Scripps Mercy Hospital, San Diego) over a one-year period. Patients were randomly assigned to either location based

upon surgeon and patient availability. Patients undergoing resection at Scripps Mercy had their lymph nodes examined with current standard manual technique (MT), while patients undergoing resection at Kaiser Permanente Zion had their mesocolic specimens fixed with Carnoy's solution and then compressed (CT) to assess for lymph nodes.

Results/Outcome(s): A total of 157 patients were enrolled in this study. 78 patient specimens underwent MT [15 right colectomies (19%), 1 left colectomy (1%), 26 sigmoidectomies (33%), 34 proctectomies (44%), and 2 total abdominal colectomies (3%)] and 79 patient specimens underwent the new CT [49 right colectomies (62%), 17 sigmoidectomies (22%), 5 proctectomies (6%), 4 left colectomies (5%), and 4 transverse colectomies (5%)]. CT resulted in a statistically significant increase in total lymph node yield per specimen compared to MT (37.6 ± 18.5 nodes with CT vs 18.9 ± 8.8 nodes with MT, $p < 0.0001$). CT also resulted in sufficient lymph node sampling (>12 nodes) in all 79 patients in the group compared to 13 of 78 patients (17%) with an insufficient lymph node evaluation in the MT group ($p = 0.0002$).

Conclusions/Discussion: This study demonstrated that Carnoy's fixation with compression can significantly increase lymph node yields in colorectal cancer specimens and allow for a significantly higher rate of adequate lymph node sampling.

CAUTION! INCREASE IN ACUTE KIDNEY INJURY WITH ENHANCED RECOVERY AFTER SURGERY PROTOCOLS.

GS3

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Purpose/Background: Minimizing perioperative fluid administration is a key component of Enhanced Recovery after Surgery guidelines (ERAS). Acute kidney injury (AKI) is a major cause of short and long-term morbidity and mortality in hospitalized patients. Our aim was to assess the association of ERAS with the incidence and severity of AKI in patients undergoing elective colorectal surgery.

Methods/Interventions: Patients undergoing colorectal surgery managed with ERAS and non-ERAS protocols at a single institution from 2013-2017 were included. AKI was defined according to Kidney Disease: Improving Global Outcomes (KDIGO) criteria (Stage 1: ≥ 0.3 mg/dl increase or 1.5-1.9x baseline, Stage 2: 2-2.9x baseline, Stage 3: ≥ 3 x baseline). Primary endpoint was postoperative AKI. Secondary outcomes were hospital length of stay (LOS) and 30-day readmission.

Results/Outcome(s): Of the 309 pts included, 113 (36.5%) were managed with ERAS and 196 (63.5%) were not. Baseline demographics and procedure types were similar between groups. Compared to non-ERAS, ERAS pts received less intraoperative crystalloid (2161.8 vs 3037.2 ml; $p=0.005$), more postoperative ketorolac (38.9 vs 25.5%; $p=0.019$), had initiation of diet by POD 1 (94.5 vs 75%; $p<0.001$) and had discontinuation of IVFs by POD 1 (59.5 vs 40.5%; $p<0.001$). AKI was higher in the ERAS vs non-ERAS group (23 vs 9%; $p=0.002$), with the majority being KDIGO Stage 1 (16.8 vs 5.1%, $p=0.007$); KDIGO Stage 2 and 3 were similar between groups. Majority of Stage 1 AKI resolved within 2 days in both groups (84 vs 70%; $p=0.376$). Factors associated with an increased risk of AKI on univariate regression included presence of preoperative cardiovascular risk factors (HR 3.5; 95%CI 1.3-9.7; $p<0.01$), more complex colorectal operations (HR 5.1; 95%CI 1.6-16.1; $p<0.01$), increased operative time (HR 1.01; 95%CI 1.004-1.01; $p<0.01$), increased estimated blood loss (HR 1.01; 95%CI 1.001-1.003; $p<0.001$), and management with an ERAS pathway (HR 2.9; 95%CI 1.5-5.8; $p<0.01$). ERAS remained a significant risk factor for developing AKI (HR 3.44; 95%CI 1.5-7.7; $p<0.01$) on multivariable analysis when controlling for these other factors. Despite increased AKI, ERAS pts had a shorter hospital LOS (3.9 vs 5.9 days, $p<0.001$) compared to non-ERAS pts, with no difference in 30-day readmission (11.5 vs 10.7%; $p=0.98$).

Conclusions/Discussion: Although the incidence of AKI is higher in patients treated with ERAS protocols, the majority represent minor elevations in baseline serum creatinine (KDIGO 1) that resolve within 2 days and do not affect the reduction in hospital length of stay associated with ERAS. Given the potential association of AKI, with increased long-term morbidity and mortality, ERAS protocols should be optimized, particularly with respect

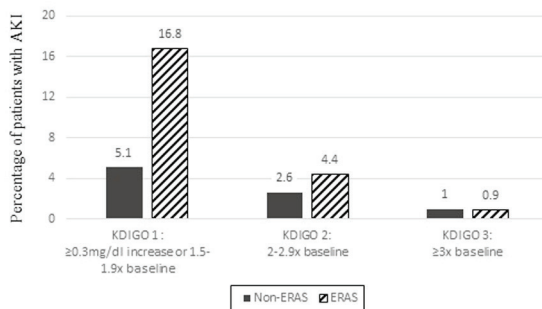
GS2

	Standard Manual Technique	Carnoy's Fixation with Compression Technique	P-Value
Total Patients	78	79	-
Total Lymph Nodes per Specimen	18.9 ± 8.8	37.6 ± 18.5	$P < 0.0001$
Patients with <12 Lymph Nodes	13	0	$P = 0.0002$

Table 1: Carnoy's fixation with compression resulted in a significantly increased number of lymph nodes examined per specimen and a decreased number of patients failing to meet the minimum standard of 12 lymph nodes

to fluid administration, to prevent postoperative AKI. Prospective trials are needed to define the optimal fluid balance for patients undergoing elective colorectal surgery managed with an ERAS protocol.

Frequency of Acute Kidney Injury by KDIGO Stage



RETRORECTUS BIOSYNTHETIC MESH REINFORCEMENT DURING STOMA CLOSURE REDUCES THE RATE OF STOMA SITE INCISIONAL HERNIAS.

GS4

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Purpose/Background: The reported rate of stoma reversal incisional hernias (SRIH) is up to 30%. Standard midline incisional hernias are frequently repaired with mesh reinforcement in the underlay or preperitoneal position. Mesh placement in a contaminated field at the time of stoma reversal has historically been considered risky with a high incidence of local infectious complications. However, recent efforts to reduce SRIH with prophylactic mesh reinforcement (PMR) have shown encouraging outcomes. The aim of this study is to assess the use of prophylactic biosynthetic mesh reinforcement during stoma closure on the rate of stoma site incisional hernias.

Methods/Interventions: A retrospective review of 73 consecutive patients who underwent PMR with biosynthetic mesh in the retrorectus plane between February 2015 and October 2017 was conducted. This group was case-matched to 73 consecutive patients who underwent stoma closure without mesh from September 2011 to January 2015. Four patients in the mesh group did not have mesh placed because of technical factors but were included in the treatment group for an intent to treat analysis. Stomas included diverting and end ileostomies and colostomies performed for a wide range of surgical pathologies. The primary endpoint was the presence of SRIH diagnosed on clinical exam and/or computed tomography.

Results/Outcome(s): One hundred and forty-six cases were reviewed with 73 patients in each arm. There were no differences in preoperative characteristics between the two groups including sex, age, BMI, ASA class, chemoradiation treatment, and medical comorbidities. There were

no differences in perioperative parameters (type of stoma, indication for stoma, operative time, estimated blood loss, hospital length of stay). In total, 14 patients developed SRIH, with 1 (1.4%) in the prophylactic mesh group and 13 (17.8%) in the no mesh group ($p=0.001$). The number needed to treat with PMR to prevent one hernia was 6.1. Median length of follow up was 16 months in the treatment group and 55 months in the no mesh group ($p=0.075$). The majority of hernias were repaired, 11 of 14 (78.6%). There was no mortality at 30 days. Morbidity was similar between the 2 groups except for wound abscess which was 7 (9.6%) in the no mesh group compared to 1 (1.4%) in the mesh group ($p=0.029$). There were no mesh explantations. On multivariate analysis, $CKD \geq 3$ was the only independent predictor of stoma site hernia (OR: 5.96, 95% CI 1.72-20.61; $p=0.004$) while mesh placement was protective (OR: 0.05, 95% CI 0.01-0.47; $p=0.008$).

Conclusions/Discussion: While this study has limitations, it supports the emerging body of evidence advocating PMR at the time of stoma closure to reduce SRIHs. This technique appears both safe and effective. Larger prospective studies with longer follow up will elucidate the utility of PMR in reducing SRIHs.

ADENOMA RISK IN THE RESIDUAL COLON VARIES BASED ON SITE OF PREVIOUS COLECTOMY FOR COLORECTAL CANCER.

GS5

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Purpose/Background: Scant data exist in the literature studying the prevalence of adenomas in the different sites of the residual colon after resection of colorectal cancer. We aimed to compare adenoma detection in patients with resections involving right versus left-sided colectomies.

Methods/Interventions: We performed a cross-sectional study analyzing the records of patients who underwent colon resections for cancer at our institution between January 1, 2006, and August 31, 2016, who then subsequently underwent colonoscopy. Patient characteristics, intraoperative findings, and colonoscopy pathological details were evaluated. We calculated the prevalence of adenomas on the first post-operative colonoscopy after right-sided colectomies (right and subtotal colectomies) or left-sided colectomies (including transverse segmental resections), using chi-square tests for categorical and student's t-test for continuous variables.

Results/Outcome(s): 450 patients were eligible for our study. Median time to colonoscopy from resection was 1 year (range 1 – 420 months). Polyp detection rate (PDR) and Adenoma detection rate (ADR) were 34% and 22% respectively. The mean number of adenomas per patient was 0.32. Mean number of adenomas was 0.27 and 0.37 ($p = 0.009$) for right and left-sided colectomies, respectively.

GS4 Table 1: Demographics, Perioperative Characteristics, Outcome Measures

	Mesh (n=73)	No Mesh (n=73)	p-value
<u>Sex</u>	-	-	0.315
Male	34 (46.6%)	28 (38.4%)	-
Female	39 (53.4%)	45 (61.6%)	-
Age (years, mean, SD)	59±15	57±16	0.271
BMI (kg/m ² , mean, SD)	27.34±6.80	28.13±7.59	0.275
<u>ASA</u>	-	-	0.722
Class I/II	51 (69.9%)	49 (67.1%)	-
Class III/IV	23 (30.1%)	24 (32.9%)	-
<u>Medical Comorbidities</u>	-	-	-
Diabetes	20 (27.4%)	17 (23.3%)	0.568
Hypertension	41 (56.2%)	48 (65.8%)	0.235
Smoking	6 (8.2%)	6 (8.2%)	1
COPD	8 (11.0%)	15 (20.5%)	0.112
CKD _{≥3}	15 (20.5%)	22 (30.1%)	0.183
Chronic Immunosuppression	4 (5.5%)	5 (6.8%)	0.731
Cancer	47 (64.4%)	45 (61.6%)	0.732
Neoadjuvant Chemoradiation	37 (50.7%)	27 (37.0%)	0.095
Adjuvant Chemotherapy or Radiation	38 (52.1%)	28 (38.4%)	0.096
<u>Type of Stoma</u>	-	-	1
Loop Ileostomy	49 (67.1%)	49 (67.1%)	-
End Colostomy	19 (26.0%)	19 (26.0%)	-
Loop Colostomy	3 (4.1%)	3 (4.1%)	-
End Ileostomy	2 (2.7%)	2 (2.7%)	-
<u>Indication for Stoma</u>	-	-	0.201
Rectal Cancer	38 (52.1%)	33 (45.2%)	-
Diverticulitis	12 (16.4%)	15 (20.5%)	-
Perineal Disease	10 (13.7%)	5 (6.8%)	-
IBD	8 (11.0%)	7 (9.6%)	-
Other	5 (6.8%)	13 (17.8%)	-
Operative Time (minutes, mean, SD)	142.00±92.06	131.75±93.39	0.480
Estimated Blood Loss (milliliters, mean, SD)	58.70±105.32	85.68±137.27	0.117
Hospital Length of Stay (days, mean, SD)	4.82±3.87	6.15±5.33	0.137
30-Day Mortality	0 (0.0%)	0 (0.0%)	1
<u>Post-Operative Morbidity</u>	-	-	-
Wound Abscess	1 (1.4%)	7 (9.6%)	0.029
Wound Hematoma	1 (1.4%)	0 (0.0%)	0.316
Small Bowel Obstruction	4 (5.5%)	3 (4.1%)	0.698
Anastomotic Leak	1 (1.4%)	0 (0.0%)	0.316
Medical Complication	8 (11.0%)	12 (16.4%)	0.336
<u>Stoma Site Hernia</u>	1 (1.4%)	13 (17.8%)	0.001
Loop Ileostomy	1 (100%)	7 (53.8%)	0.369
End Colostomy	0 (0.0%)	5 (38.5%)	0.439
Loop Colostomy	0 (0.0%)	1 (7.7%)	0.773
End Ileostomy	0 (0.0%)	0 (0.0%)	1
Time to Hernia (months, median, range)	15.2 (15.2-15.2)	17.0 (2.3-52.0)	0.297
Hernia Repaired	1 (100%)	10 (76.9%)	0.555
Length of Follow Up (months, median, range)	15.57 (1.1-33.5)	54.53 (36.1-75.5)	0.075

PDR in patients with right colectomy was 34.6% and in left-sided resections was 33.5% ($p = 0.8$) while ADR was 19.8% and 24% respectively ($p = 0.3$). After adjusting for age at colonoscopy, gender, and time to 1st colonoscopy after surgery, left-sided resection had higher odds (OR – 1.796 95% CI 1.016 – 3.033) of adenoma prevalence compared to right-sided resections. Also, males had higher odds of developing adenoma compared to female patients.

Conclusions/Discussion: Patients have higher odds of developing adenomas after left colon resection compared to those with right-sided resections. These data suggest current surveillance guidelines after colon cancer resection are too general and that a surveillance strategy that incorporates the segment of colon resected should be considered.

IMPLEMENTATION OF AN ENHANCED RECOVERY PROTOCOL IS ASSOCIATED WITH ON-TIME INITIATION OF ADJUVANT CHEMOTHERAPY IN COLORECTAL CANCER.

GS6

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Purpose/Background: Delayed initiation of adjuvant chemotherapy (AC) negatively impacts long-term survival in colorectal cancer patients. Prior studies associated complications and prolonged length of stay (LOS) with delayed initiation and lack of progression to AC after colorectal cancer resection. Colorectal enhanced recovery protocols (ERPs) have resulted in decreased complications and length of stay. This study aims to identify factors associated with on-time delivery of AC after colorectal cancer surgery with the hypothesis that ERP adoption may result in more patients receiving on-time AC.

Methods/Interventions: Non-emergent colorectal cancer resections performed for curative intent from January 2010 to June 2017 at a single institution were queried. Patients for whom AC was indicated were identified (Stage III/IV colorectal; Stage II rectal; Stage II colon with obstruction, perforation, or T4). A retrospective cohort study compared timing and delivery of AC before and after colorectal ERP implementation in 2013. AC was on-time if initiated ≤ 8 weeks postoperatively, and delayed/omitted if delayed (>8 weeks) or never received. Univariate analyses compared patients before and after ERP. Multivariable logistic regression identified factors associated with on-time AC initiation. Reasons for lack of receipt of AC were recorded for patients who did not receive AC.

Results/Outcome(s): Three hundred sixty-three patients were included in the analysis, with 189 (52.1%) undergoing resection following ERP implementation. The majority of patients in both groups had rectal cancer (61.5 vs 57.1%; $p=0.40$). Groups differed in laparoscopic approach (9.2 vs 38.6%; $p<0.001$) and median procedure duration (221.5 vs 260 minutes; $p<0.001$), both of which were higher after ERP due to adoption of robotic surgery for rectal neoplasm. Surgical site infections (19.0 vs 10.6%; $p=0.02$) and median LOS (7 vs 4 days; $p<0.001$) were decreased after ERP. Significantly more patients received on-time AC after ERP implementation (31.6 vs 45.5%; $p=0.007$). Logistic regression identified older age, prolonged LOS, and longer procedure duration as risk factors for delayed or omitted AC. The ERP was associated with receiving on-time AC ($p=0.02$), as were white race and higher stage disease (Table). Among the 108 patients who never received AC, patient preference was the primary reason for omission both before and after the ERP [26 (46.4%) vs 26 (50.0%); $p=0.54$].

Conclusions/Discussion: This study identified several risk-adjusted predictors of on-time AC delivery after

GS5 Multivariate regression analysis of the patients with Adenoma detection at the 1st colonoscopy

		p Value	Odds ratio (OR)	95% Confidence Interval for OR	
	Age at Colonoscopy	0.299	1.011	0.99	1.033
Time of the 1st colonoscopy from resection	> 3 years	0.123	0.418	0.138	1.266
	2 - 2.9 years	0.467	0.74	0.328	1.667
	1 - 1.9 years	0.367	0.695	0.315	1.533
	6 - 12 months	0.639	1.291	0.443	3.761
	< 6 months	Reference			
Site of resection	Right	Reference			
	Left	0.044	1.756	1.016	3.033
Gender	Females	Reference			
	Males	0.016	1.901	1.127	3.206

colorectal cancer surgery. Importantly, the ERP was associated with receiving on-time AC. As prompt initiation of AC has been shown to improve survival in colorectal cancer, future investigation of long-term oncologic outcomes is necessary to evaluate the potential impact of ERPs on survival.

DIVERTICULAR COMPLICATIONS: DO SEASON AND REGION REALLY HAVE AN IMPACT?

GS7

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Purpose/Background: Diverticulitis has been reported to have seasonal and regional variations. However, diverticular hemorrhage has not been previously examined in this context. Utilizing the largest available national patient database, we sought to determine the impact, if any, of the monthly and regional differences of diverticulitis and diverticulosis with hemorrhage.

Methods/Interventions: Utilizing the 2008-2014 National Inpatient Sample (NIS) database, we identified patients with diverticular complications using ICD-9-CM codes 562.11 for diverticulitis and 562.12 for diverticulosis with hemorrhage. Patients were assigned to specific months based on admission month (AMONTH). Monthly rates of cases were calculated by dividing number of cases by total number of admissions for that particular month. Cases were assigned to 4 major regions, West, Midwest (MW), Northeast (NE), and South, based on hospital ID (HOSPID) and hospital region (HOSP_REGION).

Results/Outcome(s): A total of 438,607 patients were identified as having diverticulitis of the colon and 110,802 patients were identified as having diverticulosis of the colon with hemorrhage. 409,370 (93.3%) of diverticulitis patients and 104,931 (94.7%) of diverticular hemorrhage patients had admission month information in the NIS database. For diverticulitis, the average across all months for the 7 years was 812 cases per 100,000 admissions. January ($p=0.003$), February ($p=0.011$), and December ($p=0.025$) had significantly below average

GS6 Multivariable Logistic Regression Results and Predictors of On-time Delivery of Adjuvant Chemotherapy for Colorectal Cancer

	OR (95% CI)	p value
Age (years)	0.96 (0.93-0.98)	0.0002
BMI (kg/m ²)	1.01 (0.96-1.05)	0.748
Male	1.03 (0.61-1.74)	0.918
White	2.30 (1.09-4.85)	0.030
Diabetes mellitus	1.14 (0.57-2.28)	0.709
Current smoker	0.79 (0.40-1.57)	0.507
Chronic steroid use	1.72 (0.36-8.15)	0.493
10% body weight loss	1.75 (0.73-4.20)	0.213
Independent functional status	0.56 (0.05-5.76)	0.624
Colon cancer	0.63 (0.20-2.04)	0.442
Neoadjuvant treatment	0.70 (0.24-2.10)	0.529
ERP	1.93 (1.10-3.40)	0.022
ASA class ≥ 3	0.62 (0.36-1.06)	0.081
Laparoscopic	1.19 (0.61-2.33)	0.613
Wound classification (ref=Clean/contaminated)		0.084
Clean	6.65 (0.57-77.8)	
Dirty/infected	2.31 (0.18-29.77)	
Procedure duration (minutes)	0.99 (0.98-1.00)	0.043
Final stage	1.89 (1.26-2.83)	0.002
Return to OR	1.19 (0.23-6.07)	0.837
Complication(s)	0.50 (0.22-1.16)	0.054
Length of stay (days)	0.93 (0.87-0.99)	0.041
30-day readmission	0.48 (0.21-1.10)	0.105

BMI=Body mass index; ERP=Enhanced recovery protocol; ASA class=American Society of Anesthesiologists Physical Status classification; OR=Operating room

rates of diverticulitis, while July ($p=0.008$) and August ($p=0.010$) had significantly above average rates of diverticulitis (Figure 1a). The increasing order of average percentage across the 7 years of diverticulitis patients (Figure 1b) is West (21.38%, $p<0.001$), South (25.23%, $p=0.193$), MW (25.45%, $p=0.045$), and NE (27.94%, $p<0.001$). For patients with diverticulosis with hemorrhage, the average across all months for the 7 years was 208 cases per 100,000 admissions. June (199, $p=0.039$) and July (196, $p=0.005$) had significantly below average rates of diverticulitis, while only November (222, $p=0.014$) had significantly above average rate of diverticulitis (Figure 1c). The increasing order of average percentage across the 7 years of diverticular hemorrhage patients (Figure 1d) was West (21.37%, $p<0.001$), MW (24.08%, $p<0.001$), South (26.58%, $p=0.001$), and NE (27.97%, $p<0.001$).

Conclusions/Discussion: Based on our review, there were significant seasonal trends for both diverticulitis and diverticular hemorrhage. However, the seasonal pattern of highest rates during the Summer months and lowest rates during the Winter months seen in diverticulitis was reversed for diverticular hemorrhage. The West region had consistently less than 25% of both types of complications of diverticulosis in contrast to both the South and NE regions having more than 25%. Interestingly, the MW region had greater than 25% of diverticulitis cases, but less than 25% of diverticular hemorrhage cases was observed.

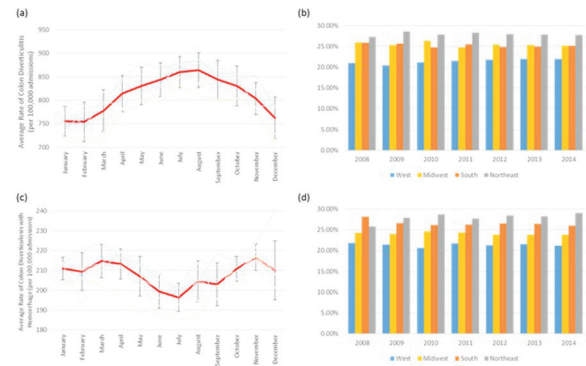


Figure 1. 2008-2014 NIS Cases of Colonic Diverticula Complications for (a) Average Monthly Rate of Colon Diverticulitis, (b) Annual Colon Diverticulitis Cases by Region, (c) Average Monthly Rate of Colon Diverticulosis with Hemorrhage, and (d) Annual Colon Diverticulosis with Hemorrhage by Region.

RESEARCH FORUM

SDF-1 PLASMID TO REGENERATE THE ANAL SPHINCTER: ARE WE CLOSER TO TRANSLATION?

RF1

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Purpose/Background: In a rat model, we have documented regeneration after a chronic large injury of the anal sphincter muscle at 4 and 8 weeks after treatment with a plasmid encoding stromal cell derived factor -1 (SDF-1) which is a cytokine that is chemotactic for stem cells and is responsible for aiding angiogenesis after injury. The aim of this study was to evaluate regeneration of a chronic large anal sphincter defect in a pig model after treatment with a plasmid encoding SDF-1.

Methods/Interventions: Under an institution of animal care and and use committee approved protocol 20 age and weight matched Sinclair minipigs were subjected to excision of the posterior half of the anal sphincter muscle and left to recover for 6 weeks. They were then randomly allocated to receive either saline treatment 1 ml (n=5), 1 injection of 1 ml of SDF-1 plasmid 2 mg/ml (n=10) or 2 injections of SDF-1, 2 mg/ml each at 2 week intervals (n=5) under anesthesia. Injections were made at the two ends of the incision in the region of the severed muscle. Animals were euthanized 8 weeks after treatment and subjected to histopathology. Outcomes included anal manometry and anal ultrasound done pre-injury, at time of injection and before euthanasia. Unpaired T-test followed by nonparametric tests were used for data analysis (mean±SD), p<0.05 was regarded as significant.

Results/Outcome(s): There were no treatment related complications. Two pigs in the control group died due to unrelated causes and are being replaced. Single injection treatment: The pressures in the control group were higher at the pre-injury time point and statistically significant (p=0.002). At pre-treatment the pressure in the control group was significantly higher (p=0.002). At 8 weeks after treatment, the difference in resting pressures in the control group was negative from pre-treatment pressures indicating that the pressures declined and did not return to pre-injury or pretreatment levels, while those in the SDF-1 treatment group increased significantly from pre -treatment

(p=0.002) when compared with the control group.(Table) Ultrasound imaging at 8 weeks after treatment revealed disruption of the muscle posteriorly in the control group with more complete muscle in the SDF-1 group compared to pre-injury. Histology qualitative analysis shows distortion of normal anatomy with patchy regeneration in the control group while muscle was more organized in the treatment group. Quantitative analysis is awaited. Results of the two injection group are awaited.

Conclusions/Discussion: Eight weeks after a single dose of SDF-1 injected 6 weeks after an excision of 50% of the circumference of the anal sphincter improved resting anal sphincter pressures, and regenerated muscle in the entire area of the defect. SDF-1 plasmid is safe and effective in treating chronic defects of the anal sphincter in a large animal and can be translated.

INTRATUMORAL HETEROGENEITY IN RECTAL CANCER – THE EFFECTS OF NEOADJUVANT CHEMORADIATION.

RF2

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Purpose/Background: Primary non-treated rectal tumors exhibit a complex clonal architecture and significant intratumoral genetic heterogeneity (ITGH). The degree of ITGH appears to increase with primary disease stage and progression. Ultimately, ITGH may be directly affected by neoadjuvant chemoradiation (nCRT). First, by eradicating sensitive subpopulations of cancer cells with the primary tumor, incomplete responders may harbor residual cancers with distinct degrees of ITGH when compared to their original baseline counterparts; Second, potential introduction of treatment-related (radiation-induced) mutations may further increase ITGH at the residual incomplete responses when compared to baseline cancer.

Methods/Interventions: An analysis of ITGH in rectal cancer by analyzing whole-exome sequencing (WES) and clinical data from 79 primary non-treated rectal cancers

RF1 Results of comparison of resting anal pressures between groups

Animal Group	Mean resting anal pressure (cm of H ₂ O)+/-SD		Mean Pressure difference
	Pre-treatment	8 weeks after treatment	+/- SD
Control (Saline)	15.9 +/- 5.9	5.6 +/- 1.1	-10.4 +/- 7.0
SDF-1 plasmid: 1 injection	6.9 +/- 2.1	15.1 +/- 6.6	8.1 +/- 6.3
p value	0.002	0.004	0.002
95% confidence interval	4.22 - 13.80	-18.37 - -0.6769	-28.17 - -8.987

obtained from The Cancer Genome Atlas (TCGA) was performed to correlate the degree of ITGH and disease stage. Also, we examined how nCRT affects the clonal architecture of rectal tumors and identified putative drivers of therapeutic resistance by performing WES of 7 matched sets of pre and post-treatment tumor samples. Finally, we determined the mutagenic effects of nCRT by comparing the mutational landscape of a matched set of primary baseline tumor tissue, peripheral blood cells, tumor-adjacent normal tissue exposed to nCRT and post-treatment tumor samples of a patients with incomplete clinical and pathological response to nCRT.

Results/Outcome(s): Primary rectal cancers exhibit a remarkable and continuous variability in the degree of ITGH, which is associated with disease stage and progression. Here, patients with stage I/II had significantly lower ITGH when compared to stage III/IV disease ($p=0.04$). Also, patients with nodal metastases were more likely to have higher degree of ITGH ($p=0.02$). Comparison of pre-treatment tumor tissue, peripheral blood, normal (irradiated) adjacent tissue and residual cancer revealed that treatment per se, does not introduce novel somatic mutations or significantly alters normal tissue clonal architecture. Finally, comparison of pre-treatment and post-treatment cancer mutations indicated an increase in the degree of ITGH ($p=0.02$) after nCRT. There was a significant increase in the allele frequency of numerous mutations in the residual cancer after nCRT.

Conclusions/Discussion: ITGH appears to be associated with primary disease stage and progression. There is an increase in ITGH among tumors that exhibit incomplete response to nCRT. nCRT itself, however, does not seem to increase ITGH by adding radiation-induced mutations to the primary rectal cancer. Instead, nCRT acts as a positive selective pressure, allowing the expansion of pre-existing resistant tumor cell subpopulations

IS THERE A ROLE FOR ENHANCED COLORECTAL CANCER SCREENING IN LUNG TRANSPLANT RECIPIENTS? : A SINGLE INSTITUTION RETROSPECTIVE REVIEW.

RF3

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Purpose/Background: The literature contains numerous reports that demonstrate an increased risk for non-cutaneous neoplasms, including colorectal cancer (CRC), in solid organ transplant recipients. This has been validated in several large international registries. With regard to CRC, patients may present younger and with more

aggressive forms of cancer. Over 25% of at-risk patients are not appropriately screened currently. While there have been calls for more stringent screening guidelines for these patients, formal recommendations have not been forthcoming. As one of the busiest lung transplant programs in the United States, we are uniquely positioned to study this population. All lung transplant patients undergo standard pre-transplant CRC screening (usually colonoscopy), as well as post-transplant colonoscopy at approximately 1 year. The purpose of this study is to assess for increase in adenomatous polyp formation and/or de novo CRC.

Methods/Interventions: A single institution retrospective analysis was performed, looking at all lung transplant recipients between 2013 and 2014. Our primary objective was to determine if patients had a statically significant increase in the number of adenomas detected on post-transplant colonoscopy as compared to pre-transplant colonoscopy; and/or if any patients developed de novo CRC. Patients who survived at least one year after lung transplant, and had complete documentation of both pre-transplant colonoscopy and one-year post-transplant colonoscopy were included in analysis.

Results/Outcome(s): Of the 164 patients who underwent lung transplant during the study period, 64 met the inclusion criteria. 39 (60%) patients were male, and the median age was 63. The indications for lung transplant were varied, and included chronic obstructive pulmonary disease (COPD), idiopathic pulmonary fibrosis (IPF), other interstitial lung diseases, and pulmonary hypertension. No patients had cystic fibrosis (CF). Fifteen (25.9%) patients had at least one adenomatous polyp found on their pre-transplant colonoscopy, and 25 (39%) had at least one adenomatous polyp found on their post-transplant colonoscopy ($P = 0.04$). No patients were found to have de novo CRC on either colonoscopy.

Conclusions/Discussion: Based on our results, there is a statistically significant increased incidence of adenomatous polyp formation in patients who have undergone lung transplant. The risk of adenomatous polyp detection in the average risk patient in the general population is approximately 25-30%, based on meta-analysis data. This is consistent with our findings in the pre-transplant population. Although de novo CRC was not found in our patients, the increased number of adenomas found on post-transplant colonoscopy suggests that an enhanced screening protocol may benefit this population. Further study is needed in this area.

SERUM CHITINASE ACTIVITY PREDICTS SURVIVAL AND METASTASIS OF COLORECTAL CANCER.

RF4

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Purpose/Background: This study aimed to evaluate the value of chitinase activity in predicting the occurrence of metastasis and prognosis in patients with colorectal cancer (CRC).

Methods/Interventions: Chitinase activity in blood serum was assayed using an enzyme-linked immunosorbent assay for 527 samples, including 386 patients with CRC, 100 age-matched healthy controls, and 40 patients with primary liver cancer. The clinicopathological data were collected, and all these patients were prospectively followed up.

Results/Outcome(s): The serum chitinase activity was significantly upregulated in patients with CRC compared with that in age-matched healthy controls ($P < 0.0001$). The Kaplan–Meier analysis showed that high chitinase activity ($P = 0.0012$) and carcinoembryonic antigen (CEA) ($P = 0.0009$) level were significantly associated with poor survival. The univariate analysis showed a significant association of chitinase activity, CEA level, and lymph node status with liver metastases. Further, the multivariate analysis revealed that chitinase activity was an independent risk factor predicting liver metastases (HR, 3.424, $P = 0.001$). The combination of chitinase activity and lymph node metastasis status increased the accuracy of prediction of liver metastases after radical

resection (sensitivity = 67.35%; specificity = 74.83%; $P = 0.454E-011$).

Conclusions/Discussion: Chitinase activity could predict the occurrence of metastasis in patients with CRC. Moreover, the combination of chitinase activity and N stage increased the power of predicting the occurrence of metastasis. Inhibiting chitinase activity may serve as a new strategy to treat metastases of CRC.

MANAGEMENT AND OUTCOMES OF DIVERTICULITIS AFTER LUNG TRANSPLANTATION: SINGLE-CENTER EXPERIENCE.

RF5

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Purpose/Background: Chronic immunosuppression predisposes lung transplantation (LTx) recipients to infectious complications, increasing morbidity and mortality. Most LTx patients are above 50 years of age, so complications from colonic diverticula are not uncommon. Limited data are available on the best management of post-LTx diverticulitis. We examined the incidence, risk factors, and outcomes of post-LTx diverticulitis at our center.

Methods/Interventions: We retrospectively reviewed patients who had LTx from 04/01/2007 to 12/31/2016. Acute colonic diverticulitis was verified with computed tomography and operative reports. Patients were grouped based on medical or surgical diverticulitis management.

RF3 Incidence of Adenomas found on colonoscopy

Demographics	Overall N=64	Post-Transplant (No Adenoma)	Post-Transplant (Adenoma)	P-value
Age, years (mean, SD)	61.8 (6.8)	61.1 (7.5)	62.7 (5.7)	0.38
Sex (% male)	39 (60.0)	20 (51.3)	18 (72.0)	0.12
Ethnicity (% Non-Hispanic)	55 (84.6)	33 (84.6)	21 (84.0)	1.0
Pre-Transplant BMI (mean, SD)	25.5 (4.2)	25.7 (4.3)	25.5 (4.0)	0.74
Diabetes (% yes)	32 (49.2)	25 (64.1)	6 (24.0)	0.002
Hypertension (% yes)	30 (46.2)	19 (48.7)	10 (40.0)	0.60
Smoking (% yes)	48 (73.8)	27 (69.2)	20 (80.0)	0.39
Hyperlipidemia (% yes)	17 (26.2)	11 (28.2)	5 (20.0)	0.56
Post-Op LOS (mean, SD)	16.4 (13.3)	16.9 (16.6)	15.5 (6.2)	0.24
Characteristics	Pre-Transplant Colonoscopy	Post-Transplant Colonoscopy	P-value	
Polyps (% yes)	29 (44.6)	33 (50.7)	0.44	
Number of polyps (mean, SD)	0.86 (1.3)	1.0 (1.4)	0.43	
Adenomas (% yes)	15 (25.9)	25 (39.0)	0.04	

Wilcoxon rank sum and Fisher exact tests were used to compare outcomes. Univariate logistic regression was used to ascertain independent associations between patient characteristics and recurrent diverticulitis.

Results/Outcome(s): Of 512 patients who underwent LTx during the study period, 17 (3.32%) developed 26 episodes of diverticulitis over a median follow up of 39 months (interquartile range [IQR], 26-52). Median age at diagnosis was 67 years (IQR, 59-69). Eight (47.1%) and 16 (94.1%) patients had diverticulitis within 1 and 4 years of LTx. 9 patients had diverticulosis on pre-LTx colonoscopy and all developed diverticulitis within 2 years of LTx. They had a higher incidence of surgical intervention, recurrence, and longer length of stay (LOS) than patients without pre-LTx diverticulosis (44.4% vs 20.0%, 44.4% vs 20.0%, median 11 [4-16] vs. 4 [1-15] days, respectively). Six patients (35.3%) required emergent surgery (ie, surgical group); 11 (64.7%) were treated with antibiotics (ie, medical group). Surgical patients presented earlier post-LTx (median 2.5 [0-7.5] vs 23 [12.5-40] months, $p=0.004$) and were on higher doses of tacrolimus (1.7 ± 0.6 vs 1.1 ± 0.6 mg; $p=0.03$) than the medical group (Table 1). Median hospital LOS was 15.5 days (IQR, 11-19) for surgical group patients. Three patients (17.6%) had pre-LTx diverticulitis; of these, 1 developed 2 recurrent episodes; 2 required surgical intervention post-LTx. There were no deaths due to diverticulitis in either group.

Conclusions/Discussion: Diverticulitis in the first 4 years post-LTx is uncommon but warrants a high index of diagnostic suspicion. Our reported incidence of diverticulitis (3.32%) is lower than the reported incidence of 10% to 25% in the general population. Surgically treated patients had higher doses of tacrolimus (an immunosuppressant with reported gastrointestinal perforation) and shorter intervals between LTx and initial diverticulitis. Patients with pre-LTx diverticulitis developed recurrent diverticulitis post-LTx and required surgical intervention. Patients with diverticulosis on pre-LTx colonoscopy experienced earlier, more complicated episodes of diverticulitis post-LTx than patients without. Still, most patients with diverticulitis after LTx can be managed medically.

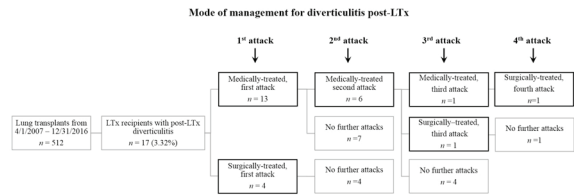


Table 1. Characteristics of 17 patients who developed diverticulitis after lung transplantation

Variable	Medical Management (n=11, 64.7%)	Surgical management (n=6, 35.3%)	p-value
Male sex, n (%)	8 (72.7)	3 (50.0)	0.60
Age at time of LTx	65 (60-70)	63 (54-66)	0.13
Caucasian race, n (%)	8 (72.7)	5 (83.3)	1.0
Tacrolimus dose (mg)	11.0±0.6	1.7±0.6	0.03
Mycophenolate mofetil dose (g)	0.7±0.3	1.3±0.6	0.07
Prednisone dose (mg)	12.7±12.5	14.2±10.2	0.34
Episodes of ACR	0.81±1.25	0.16±0.40	0.21
Number of pulse steroid therapies	1.45±1.4	1.5±1.2	0.82
Total hospital LOS (d)	4.0 (4-5)	15.5 (11-19)	0.08
Time between LTx and 1 st Attack (m)	23 (12.5-40)	2.5 (0-7.5)	0.004
Time between ACR and diverticulitis (d)	634 (109-783)	416 (416-416)	0.76
Pre-LTx diverticulitis, n (%)	1 (9.1)	2 (33.3)	0.51
Re-transplantation, n (%)	1 (9.1)	0 (0.0)	1.0
Death, n (%)	4 (36.4)	3 (50.0)	0.64
Survival post-LTx (m)	38.1±20.9	44.5±12.8	0.51
Cause of death, n (%)			
Rejection	2 (50.0)	2 (66.7)	0.42
Renal Failure	2 (50.0)	1 (33.3)	
Time between pulse steroid and diverticulitis (d)	259.5 (108-753)	81 (10-154)	0.14
Type of transplant, n (%)			
Single	2 (18.2)	0 (0.0)	0.51
Bilateral	9 (81.8)	6 (100.0)	
Underlying lung diagnosis, n (%)			1.0
COPD	6 (54.5)	3 (50.0)	
PF	5 (45.5)	3 (50.0)	
ILung allocation score (LAS)	40.2±17.7	38.4±12.4	0.68
Body Mass Index (BMI)	24.5±5.0	28.8±3.5	0.07
Systemic symptoms, n (%)			
Hypotension	0	0	N/A
Tachycardia	1 (9.1)	3 (50.0)	0.09
Fever	2 (18.2)	3 (50.0)	0.28
Leukocytosis	2 (18.2)	3 (50.0)	0.28
Time between symptom onset and treatment (d)	7 (1-10)	0 (0-2)	0.01

Wilcoxon Rank sum to compare continuous variables. Fisher's Exact to compare categorical variables. †Values expressed are mean ± SD ‡Values expressed are median (IQR). Abbreviations: ACR, acute cellular rejection; LOS, Length of stay; LTx, Lung transplantation; COPD, chronic obstructive pulmonary disease; PF, pulmonary fibrosis; N/A, non-applicable.

THE ROLE OF EXTRACELLULAR VESICLE CARRIED MIRNAS IN THE PROGRESSION OF COLORECTAL CANCER.

RF6

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Purpose/Background: Outcomes from colorectal cancer (CRC), the third most common malignancy worldwide, have been shown to be dependent on depth of tumor invasion, lymph node (LN) involvement, and the presence of extra-nodal metastasis. Previous studies suggest the LN stromal microenvironment plays a role in metastasis via extracellular vesicle (EV) mediated communication.

RF6 Delta Ct = miRNA of Interest - Reference (hsa-miR-191-5p)

	424-5p	30a-5p	130a-3p	145-5p	155-5p	199a-3p	214-3p	143-3p	199a-5p	382-5p
HT-29	5.33	9.25	16.98	18.99	5.90	10.79	9.01	14.02	12.73	10.95
HCT116	4.29	7.62	3.10	1.23	20.09	8.68	9.27	7.32	10.07	11.92
SW480	-2.14	10.14	15.54	16.00	19.92	9.30	7.91	8.64	12.18	7.67
DLD1	2.88	9.10	15.05	-	8.28	11.38	9.62	8.26	14.36	15.00
SW620	1.21	16.52	13.10	14.62	-	11.27	9.62	15.68	8.57	11.23
HK	-3.93	1.72	0.08	-4.34	-0.66	-3.24	-0.51	-4.03	-3.22	1.69
HK-EV	-3.87	3.88	-1.02	-3.83	1.18	-3.73	-2.01	-4.02	-2.78	0.26

qRT-PCR results for miRNAs of interest. Delta Ct represents the difference between the number of cycles for an miRNA of interest to reach a set threshold and the number of cycles for a reference miRNA to reach that threshold. Lower numbers represent higher expression. Dashes represent miRNAs undetectable at 45 cycles.

These vesicles carry various molecules including micro RNAs (miRNAs), small non-coding RNAs that can alter gene expression by targeting mRNA. Here we aim to identify specific miRNAs carried by LN stromal cell (LNSC) EVs that alter local progression and distant metastatic spread in colorectal cancer.

Methods/Interventions: HK (a LNSC line) cells and HK-EVs, mesenteric LNSCs and LNSC-EVs, and 5 well studied colon cancer (CoCa) cell lines were analyzed for expression of 2822 known human miRNAs using Next Generation Sequencing (NGS). The miRNAs expressed in higher quantities in HK cells, LNSCs and their EVs than in CRC cell lines were selected and further analyzed using *in silico* prediction models (DIANA-miRPath v2.0). Ten miRNAs, with higher expression in EVs than CoCa cell lines and predicted to have roles in cancer specific Kyoto Encyclopedia of Genes and Genomes (KEGG) pathways, were selected for confirmation by qRT-PCR (Table 1). Briefly, custom plates were obtained with primers for these ten miRNAs and for miR-191-5p, a previously proven reference RNA. Then, using a commercially available kit cDNA was synthesized from CoCa cells, HK cells,

and HK EVs. miRNA expression was then confirmed by qRT-PCR (miRCURY LNA miRNA PCR System, Qiagen, Germantown, MD).

Results/Outcome(s): 493 miRNAs were found to be expressed higher in EVs from both HK cells and mesenteric LNSCs than in the CRC cell lines. *In silico* analysis revealed those miRNAs with roles in relevant KEGG pathways including “colorectal cancer” and “microRNAs in cancer.” The PCR threshold cycles (C_t s) of the miRNAs of interest were subtracted from the C_t of our reference miRNA. This confirmed our NGS findings of higher expression of our selected miRNAs in HK-EVs than in CoCa cell lines. (Table 1).

Conclusions/Discussion: We have previously found that LNSCs and their EVs assist in CRC tumor growth and spread. Here we identify miRNAs that may be introduced to colorectal tumors by EVs and are predicted to play roles in well studied cancer pathways. Using commercially available miRNA mimics and inhibitors we will next analyze the roles of these selected miRNAs *in vitro* and then *in vivo* using our patient-derived orthotopic mouse model.

PODIUM ABSTRACTS

CONSOLIDATION MFOLFOX6 CHEMOTHERAPY AFTER CHEMORADIOTHERAPY IMPROVES SURVIVAL IN PATIENTS WITH LOCALLY ADVANCED RECTAL CANCER.

S2

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Purpose/Background: The role of neoadjuvant chemotherapy in patients with locally advanced rectal cancer treated with preoperative chemoradiotherapy (CRT) is controversial. The Timing of Rectal Cancer Response to Chemoradiation trial showed that adding mFOLFOX6 after CRT and lengthening CRT-to-surgery interval are associated with an increase in the proportion of patients who achieved a pathological complete response (pCR)^[1]. Here we present the survival outcomes for patients treated in that trial.

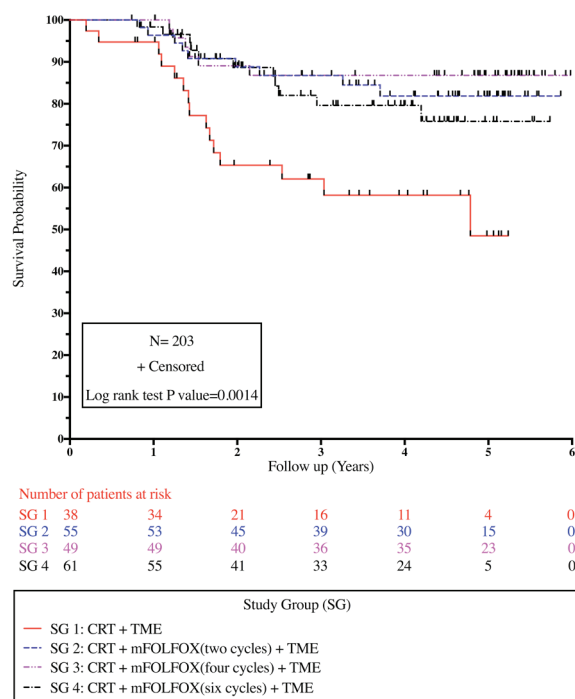
Methods/Interventions: This was a phase II, non-randomized multi-institutional trial for patients with Stage II and III rectal cancer treated with 5FU-based CRT, and 0, 2, 4, or 6 cycles of mFOLFOX6 after CRT (study groups 1-4, respectively), then surgery. All patients had total mesorectal excision (TME). Patients were recommended to receive adjuvant chemotherapy after TME to complete a maximum of 8 cycles of mFOLFOX6 total. The trial was powered to detect differences in pCR. The protocol was amended to include survival as secondary outcome after accrual had already started, and therefore some patients in the first study group (SG) were not consented for the survival analysis. Kaplan-Meier survival functions were computed and logrank test was used to compare the survival curves in a univariate analysis. Multivariate analysis was done using Cox regression model.

Results/Outcome(s): The survival analysis included 203 (out of 259) patients who were consented for the survival analysis and had a complete follow-up. Demographic, clinical, and pathological characteristics for patients in the survival analysis were similar to the entire group. Average follow-up was 4.4 years (0.74 to 5.98). Differences in disease-free survival (DFS) between the four SGs were statistically significant (Fig.1). We found no difference in overall survival (OS) between the four SGs. We found no difference in DFS or OS between patients with clinical stage II and III disease, but patients with a pCR (n=53) had an improved DFS (p value=0.0003) and OS (p value=0.01) compared to patients without a pCR. Study group and ypT classification were associated with DFS (p value=0.0014 and <0.0001, respectively) in the multivariate analysis.

Conclusions/Discussion: This study shows that adding mFOLFOX6 after CRT and before TME increases DFS in patient with locally advanced rectal cancer. This study also shows that a pCR to neoadjuvant therapy is associated

with improved survival. Therefore, consolidation chemotherapy after CRT and before surgery may have benefits beyond increasing the pCR rates. These results should be confirmed in a larger phase III trial. Ref. 1.Garcia-Aguilar, J., et al.,*Effect of adding mFOLFOX6 after neoadjuvant chemoradiation in locally advanced rectal cancer: a multi-centre, phase 2 trial.* Lancet Oncol, 2015. **16**(8):p.957-66.

Figure 1: Study Group-DFS with number of patients at risk.



ACCELERATED ENHANCED RECOVERY FOLLOWING MINIMALLY INVASIVE COLORECTAL CANCER SURGERY (RECOVERMI): RESULTS OF A PROSPECTIVE PHASE 2 RANDOMIZED CONTROLLED TRIAL.

S3

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Purpose/Background: The combination of minimally invasive surgery (MIS) and enhanced recovery protocols has resulted in significant improvement in post-operative recovery following colectomy. These benefits may be further enhanced using telemedicine technology. The purpose of this prospective randomized trial was to determine if the trimodality combination of MIS, Enhanced Surgical Recovery Program (ESRP), and telemedicine could accelerate post-colectomy recovery and shorten post-operative length of hospitalization by 50%.

Methods/Interventions: Following institutional review board approval and informed consent, patients scheduled to undergo MIS for colorectal cancer were randomly assigned to standard ESRP postoperative care or accelerated ESRP

with trimodality care (RecoverMI) at a tertiary cancer center. Patients undergoing open resection or requiring an ostomy were excluded. Patients in the RecoverMI arm were eligible for discharge on postoperative day (POD) 1 with or without definitive evidence of bowel function followed by a scheduled televideoconference on POD2 using an iPad (Cupertino, CA). The primary endpoint was 30-day hospital length of stay (LOS) defined as postoperative days plus readmission days. Secondary endpoints included patient reported outcomes (EQ-5D-5L, Brief Pain Inventory (BPI), and hospital anxiety and depression score surveys). Patient satisfaction with the perioperative care experience was also assessed. Statistical analysis was conducted using Fisher's exact test for patient characteristics and Wilcoxon rank sum test for the LOS and survey results.

Results/Outcome(s): Thirty patients were randomized following robotic (21) or laparoscopic (9) colectomy, including 14 patients in the RecoverMI arm. The median 30-day LOS was 28.3 hours (IQR 23.7, 43.6) in the RecoverMI arm and 51.5 hours (IQR 43.8, 67.0) in the standard of care arm ($p=0.04$). There were 4 patients in the RecoverMI arm that were readmitted ($n=2$) or seen in the emergency room after discharge ($n=2$) for issues unrelated to early discharge. There were no significant differences in EQ-5D-5L scores at baseline, discharge, clinic follow up or at POD30. The BPI scores revealed low pain scores for all patients regardless of treatment arm. Satisfaction was high in both treatment arms and nearly all patients in the study indicated that they would be likely/very likely to choose short stay recovery in the future (92.9% RecoverMI and 85.7% standard care).

Conclusions/Discussion: Among patients undergoing surgery for colorectal cancer, the trimodality combination of MIS, ESRP, and TeleRecovery can reduce 30-day hospital length of stay while preserving patient quality of life and satisfaction with perioperative care. The results of this prospective randomized controlled trial demonstrate the feasibility of short stay approaches with next day discharge after colectomy.

ADJUVANT CHEMOTHERAPY IMPROVES SURVIVAL FOLLOWING RESECTION OF LOCALLY ADVANCED RECTAL CANCER WITH PATHOLOGIC COMPLETE RESPONSE.

S4

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D. Nussbaum, E. Benrashid, T. Hyslop, J. Strickler,
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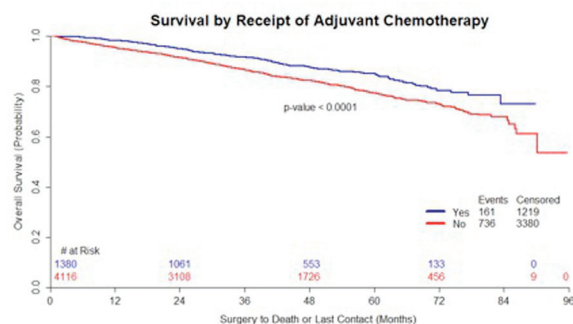
Purpose/Background: Controversy exists over the use adjuvant chemotherapy for locally advanced (stage II or III) rectal cancer (LARC) patients who demonstrate pathologic complete response (pCR) following neoadjuvant

chemoradiation despite the National Comprehensive Cancer Network (NCCN) guideline recommendation. We conducted a retrospective analysis of a large multi-center cohort to determine whether adjuvant chemotherapy imparts survival benefit among this population.

Methods/Interventions: The National Cancer Database (NCDB) was queried to identify LARC patients with pCR following neoadjuvant chemoradiation. The cohort was stratified by the receipt of adjuvant chemotherapy. Cox Proportional Hazards modeling was employed to estimate the effect of adjuvant chemotherapy on overall survival.

Results/Outcome(s): There were 24,418 patients identified in the NCDB with clinically staged II or III rectal cancer who received neoadjuvant chemoradiation. Of these, 5606 (23.0%) had pCR determined on surgical pathology. Among patients with pCR, 1401 (25%) received adjuvant chemotherapy and 4205 (75%) did not. Patients who received adjuvant chemotherapy were slightly younger, more likely to have private insurance, and more likely to have clinically staged III disease, but did not differ significantly in comparison to patients who did not receive adjuvant chemotherapy with respect to race, sex, facility type, Charlson comorbidity score, histologic tumor grade, procedure type, or hospital length of stay or rate of 30-day readmission following surgery. Survival was defined as time from surgery to death or censoring in the 98% of patients with surgery dates ($n=5496$). On adjusted analysis, receipt of adjuvant chemotherapy was associated with a lower risk of death at a given time compared to patients who did not receive adjuvant chemotherapy (HR 0.808; 95% CI 0.679-0.961; $P=0.016$).

Conclusions/Discussion: Despite poor adherence nationally to existing NCCN guidelines, the findings from this study suggest that adjuvant chemotherapy improves survival for LARC with pCR following neoadjuvant chemoradiation and should be recommended to these patients.



IMPACT OF TUMOUR DEPOSITS ON ONCOLOGIC OUTCOMES IN STAGE III COLON CANCER.

S5

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Purpose/Background: The prognosis of tumor deposits (TD) in stage III colon adenocarcinoma is poorly described. Furthermore, delivery of adjuvant systemic therapy for patients with N1c disease is unknown. The objective of this study is to determine the impact of TD on oncologic outcomes in patients with stage III colon cancer.

Methods/Interventions: The 2004-2014 National Cancer Database was queried for all patients undergoing colectomy with stage III colon adenocarcinoma on final pathology. Patients with other histology, lymph node (LN) harvest less than 12, 90-day mortality, and those undergoing proctectomy for rectal cancer were excluded. Patients were divided into three groups: LN+TD-, LN+TD+, and LN-TD+. The main outcome measure was 5-year overall survival (OS). Multilevel regression models were performed to determine the independent effect of TD on overall survival using institution as the higher order variable, as well as to identify predictors for the delivery of adjuvant systemic therapy.

Results/Outcome(s): A total of 88,607 patients underwent colectomy for stage III adenocarcinoma of the colon. Of these, 74,577 were included in the analysis with 55,800 LN+TD-, 13,740 LN+TD+, and 5,037 LN-TD+. Mean follow-up was 31.9 months (SD 16.5). The three groups were similar in regard to patient and facility characteristics, but patients with LN+TD+ had more advanced tumors (more pT4, N2, high grade, lymphovascular and perineural invasion, involved margins, and en-bloc resections of adjacent organs). Patients with LN-TD+ were less likely to receive adjuvant systemic therapy (52% vs. 74% for LN+TD- and 75% LN+TD+, $p < 0.001$) and also had a longer delay to initiation of adjuvant treatment (43% >8 weeks vs. 33% for LN+TD- and 33% for LN+TD+, $p < 0.001$). LN+TD+ had the lowest 5-year OS (46.0% vs. 63.4% LN+TD- vs. 61.9% LN-TD+, $p < 0.001$; **Figure**). On the multilevel multivariate survival analysis, patients with LN-TD+ had similar 5-year OS compared to the subset of patients in the LN+TD- with ≤ 3 positive LNs after adjusting for confounders (HR 0.93, 95% CI 0.87-1.01). Patients with LN+TD+ had worse prognosis regardless of number of involved LNs (≤ 3 +LNs: HR 1.39, 95%CI 1.30-1.48 and ≥ 4 +LNs: HR 1.30, 95%CI 1.23-1.37). Patients with LN-TD+ that did not receive adjuvant systemic therapy were more likely to be younger and have adverse tumor features than patients with LN+ disease that also did not receive adjuvant therapy. Multiple regression analysis also showed that LN-TD+ was independently associated with less delivery of adjuvant systemic therapy (OR 0.81, 95%CI 0.80-0.82).

Conclusions/Discussion: The prognosis of patients with N1c disease is similar to that of patients with nodal involvement without TD, yet these patients were less likely to receive adjuvant systemic therapy. Improvement in the delivery of appropriate care in these patients may increase survival and should be a target of future quality initiatives.

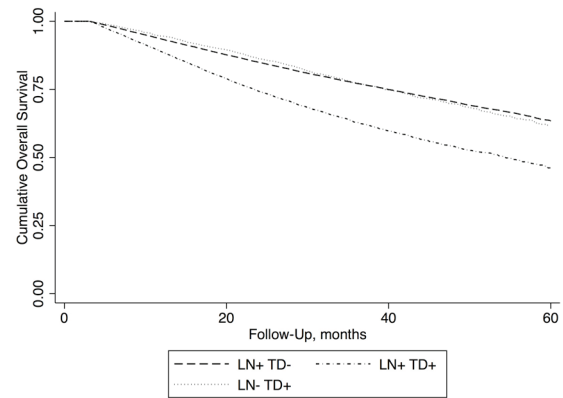


Figure – Kaplan-Meier graph comparing 5-year overall survival of the three study groups

CONDITIONAL PROBABILITY OF SURVIVAL AFTER NEOADJUVANT CHEMORADIATION AND PROCTECTOMY FOR RECTAL CANCER: WHAT MATTERS AND WHEN.

S6

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Purpose/Background: Disease-free survival (DFS) estimates are usually reported from the time of surgery, but as such do not account for the changing likelihood of survival based on time already elapsed. Thus, standard estimates offer limited future prognostic information for patients who have already survived “x” years after surgery. Conditional DFS (cDFS) is defined as the probability of remaining disease-free after reaching a specific time point without recurrence. Our aim was to evaluate rectal cancer cDFS for patients treated by proctectomy after neoadjuvant chemoradiation (nCRT).

Methods/Interventions: Demographics, tumor characteristics, and AJCC regression scores (0=complete response; 1=isolated tumor cells; 2=residual cancer outgrown by fibrosis; 3=extensive residual cancer) were assessed from rectal cancer patients treated by nCRT and curative intent surgery at a single institution. 3-year cDFS was estimated at “x” year after surgery based on the formula $cDFS_3 = DFS_{(x+3)} / DFS_{(x)}$. Survival analyses were performed using Cox proportional hazards models.

Results/Outcome(s): Five hundred forty-five patients were included (median age 57.5 years, 28.4% female). Median follow-up was 5.9 years. DFS at 1, 3, and 5 years was 89%, 71%, and 63%, respectively. Using cDFS estimates, the probability of remaining disease-free for an

additional 3 years, if the patient survived without disease at 1, 3, and 5 years, was 75%, 83%, and 82%, respectively. Tumor regression, pathologic stage, margin status, differentiation, and procedure (low anterior vs. abdominoperineal resection) were associated with DFS on multivariable analysis ($p < 0.05$). The relevance of these factors varied over time (Table). R1 resection was initially significant (cDFS₃, 44% vs. 73% for R0, $p < 0.001$), but for R1 patients who were disease-free at 5 years, cDFS₃ did not differ from R0 patients (86% vs. 83%, $p = 0.1$). Similarly, pathologic stage and differentiation had limited impact after 5 years. In contrast, tumor regression after nCRT had long-lasting impact on survival (at 5 years, cDFS₃, 91%, 85%, 76% and 71%, for scores 0, 1, 2, and 3 respectively, $p = 0.002$). Differences in actuarial DFS and calculated cDFS₃ were most pronounced in patients at higher risk for recurrence. For example, although the 8-year actuarial DFS for patients with Stage III disease was only 38%, the cDFS₃ at 5 years was 78% ($\Delta 40\%$), whereas for patients with Stage I disease, it was 72% and 84% respectively ($\Delta 12\%$).

Conclusions/Discussion: cDFS estimates for patients with rectal cancer improve over time, in particular among those with initially worse prognosis. For patients achieving 5-year DFS, the negative prognostic factors of R1 resection and stage III disease are less relevant. This prognostic information is useful to patients and providers, and could help guide counseling and surveillance.

SPIN IN TRANSANAL TOTAL MESORECTAL EXCISION ARTICLES (TATME): AN ASSESSMENT OF THE CURRENT LITERATURE.

S7

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Purpose/Background: Transanal Total Mesorectal Excision (TaTME) is a new surgical approach in treating rectal cancer. Most of the evidence of its efficacy and safety is based on case series and single institutional studies. “Spin” can be defined as “reporting strategies to highlight that the experimental treatment is beneficial” despite limitations in the study design. The objective of this study is to assess Spin within published studies assessing TaTME for the treatment of rectal cancer.

Methods/Interventions: Publications assessing TaTME in rectal cancer were identified by searching MEDLINE and EMBASE (2009 – 2017). We included case series, observational studies, randomized controlled trials and meta-analyses/systematic reviews. Study titles and abstracts were assessed for evidence of Spin. We assessed multiple domains of Spin, including how results were presented and discussed and whether author’s conclusions matched the methodology used. In addition, we assessed whether author’s recommended for the use of TaTME, recommended further studies or discussed the limitations of their study.

S6 Three-year Conditional Disease-free Survival Rates of Patients in Relationship to Clinicopathologic Features

Characteristic	Conditional 3-yr Disease-Free Survival, %				
	At Surgery	1 yr After Surgery	2 yr After Surgery	3 yr After Surgery	5 yr After Surgery
All patients	71.4	74.9	79.5	82.5	82.1
Pathological Stage					
I	92.0	91.5	91.8	91.0	83.9
II	75.0	75.2	75.0	76.0	79.4
III	56.3	62.9	72.3	76.6	78.3
Margin					
R0	73.4	76.3	80.9	83.2	82.5
R1	43.2	52.0	51.7	62.3	85.7
Differentiation					
Well/Moderate	72.0	75.6	81.3	83.3	78.5
Poor	52.0	55.6	60.6	71.2	85.0
Resection					
Low anterior	77.2	78.5	82.7	83.4	85.6
Abdominoperineal	61.6	68.0	71.5	80.0	72.8
Tumor regression score					
0	93.1	91.8	91.0	91.9	91.2
1	82.4	76.9	80.3	84.3	85.0
2	62.9	73.0	78.2	81.5	76.0
3	47.9	52.9	61.9	65.1	71.3

Results/Outcome(s): Of the 1202 studies identified through our search, 68 met the inclusion criteria. Most were published in 2015, 2016 and 2017 (n = 17, n = 27, n = 14 respectively). The majority of those included were case series (n = 45, 66%), followed by comparative studies (n = 13, 19%) and systematic reviews/meta-analyses (n = 10, 15%). The number of patients within the studies ranged from 3 – 794. Of the assessed studies, 51 (75%) had evidence of Spin within at least one domain. The most common type of Spin was claiming safety of TaTME without describing how this was defined or tested (n = 40, 59%). Other common Spin strategies included claiming superiority of TaTME without supporting results (n = 24, 35%) and reporting non-significance as equivalence (n = 10 of 22 studies with comparator groups, 46%). TaTME was recommended for use in 8 studies (12%). Thirty-nine (57%) studies recommended further research, while 14 (21%) acknowledged limitations in their study design or results. We did not find that year of publication (P = 0.92) or study design (P = 0.19) was associated with the presence of spin. We did find that more recent studies were more likely to recommend TaTME (P = 0.002). Acknowledging limitations and recommending further research was not associated with study type or year of publication.

Conclusions/Discussion: We have shown that spin is common within studies assessing TaTME for rectal cancer. Despite a lack of support from study results, authors concluded that TaTME was safe for use in rectal cancer in the majority of studies. Limitations of our study include the inherent subjective assessment of Spin. Readers of study abstracts describing new techniques need to be cautious of accepting authors conclusions, especially in case series and observational studies.

PROGRESSION TO ANAL CANCER IN HIGH-RESOLUTION ANOSCOPY CLINIC: A 7-YEAR INSTITUTIONAL EXPERIENCE.

S8

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Purpose/Background: High-resolution anoscopy (HRA) is increasingly utilized as a method of screening for anal cancer in high-risk patients. Here, we describe the progression of anal dysplasia to anal squamous cell cancer (ASCC) in patients screened at an academic institution’s HRA Clinic.

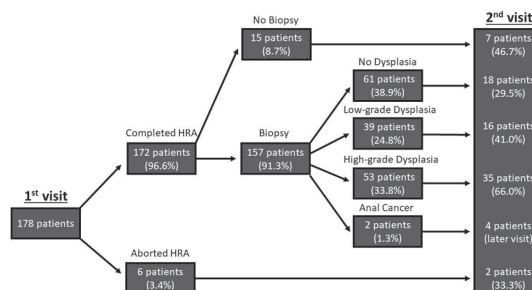
Methods/Interventions: This is a retrospective study of a prospectively maintained database of all patients who were referred to an HRA clinic at a single tertiary care center, from October 2010 to July 2017. Anal pap tests and HRA were performed concurrently by two surgeons.

All patients who were found to have anal intraepithelial neoplasia (AIN) II/III on HRA were scheduled for ablative therapy. Descriptive statistics were used to present patient demographics and comorbidities, HRA procedural characteristics, and HRA biopsy results.

Results/Outcome(s): A total of 178 patients presented for 320 HRA Clinic visits during the study period. The median age at initial presentation was 49 years (IQR: 39-54), and most patients were male (62.4%), black (44.9%), and HIV-positive (71.3%). A total of 567 biopsies were obtained (median [IQR] biopsies per visit: 2 [1-3]). During the initial visit, 172 patients (96.6%) successfully completed the HRA procedure, while six patients (3.4%) aborted the procedure. For patients who completed the procedure, anal biopsies were not obtained in 8.7% (n=15/172) of patients, while among those who underwent biopsy (n=157), no, low-grade, and high-grade dysplasia were found in 38.9%, 24.8%, and 33.8% of patients, respectively. Moreover, biopsies obtained during the patient’s initial HRA confirmed ASCC in 1.3% of patients (n=2/157, Figure 1). The median (IQR) time between the first and second HRA visit was 183 days (100-357). Among patients who underwent ablation for AIN II/III in the first visit, the risk of recurrence of biopsy-proven AIN II/III in the second visit was 48.6% (n=17/35). Furthermore, the risk of developing AIN II/III in subsequent visits among patients with no AIN and AIN I histology were 11.1% (n=2/18) and 18.8% (n=3/16), respectively. During subsequent visits for patients diagnosed with AIN II/III at the initial HRA visit, four patients (7.5%, n=4/53) developed ASCC. Two of these patients were non-compliant in undergoing ablative treatment AIN II/III and developed ASCC at 6 and 12 months following a diagnosis of AIN II/III by HRA. For those patients who were compliant with HRA, one developed superficially invasive squamous cell cancer and required local excision, while the other had very extensive AIN II/III throughout her rectum and underwent an abdominoperineal resection with pathology showing a moderately differentiated ASCC.

Conclusions/Discussion: High-grade AIN has high recurrence rate in our HRA clinic, despite ablation. HRA is a useful method in the diagnosis of early anal cancer. It remains to be determined whether HRA and ablation prevents the progression of anal dysplasia to anal cancer.

Figure 1. Outcomes of First High Resolution Anoscopy (HRA) Clinic Visit



BRIDGE TO LAPAROSCOPIC SURGERY STENT PLACEMENT VS EMERGENCY SURGERY FOR ACUTE MALIGNANT COLONIC OBSTRUCTION: A CASE-MATCHED RETROSPECTIVE STUDY.

S9

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Purpose/Background: Although self-expandable metal stents (SEMS) are widely used as a bridge to surgery in patients with malignant colorectal cancer obstruction, there are conflicting data about its effect on postoperative outcomes. Furthermore only few studies report the safety and feasibility of minimally invasive surgery (MIS) combined with SEMS placement. We aimed to determine surgical outcomes of SEMS as a bridge to surgery (BTS) and short-term outcomes of SEMS as bridge to surgery by minimally invasive colorectal surgery.

Methods/Interventions: Data from patients who were admitted with malignant obstructing colorectal cancer between January 2006 and December 2015 were retrospectively review. 82 patients underwent direct surgery and propensity score matching was used to match this group in a 1:1 ratio with 171 patients who underwent SEMS placement as a BTS. Surgical and oncologic outcomes of the groups were compared and on the subgroup analysis on a BTS group, short-term outcomes of conventional open surgery and MIS were compared.

Results/Outcome(s): SEMS insertion was technically successful in 93.9% of patients and clinically successful in 95.3% when used as a bridge to surgery. The successful primary anastomosis rate was higher in the SEMS group than in the direct surgery group (91.5% vs. 79.3%, $p = 0.027$), whereas stoma formation was less common (8.5% vs. 20.7%, $p = 0.045$). The length of hospital stay was shorter in the SEMS group (12.6 ± 5.8 vs 15.7 ± 9.6 days, $p = 0.011$). There were no significant differences in morbidity, mortality. There were no significant differences in terms of the long-term oncological outcome between two groups in the 5-year overall survival rate (65.5% versus 57.5%; $p = 0.105$) and the 5-year disease free survival rate (63.7% versus 60.1%; $p = 0.449$). Comparing conventional open surgery and MIS in BTS group, time to flatus (4.2 ± 1.7 days, 3.3 ± 1.1 days, $p < 0.001$) and time to resumed soft diet (6.1 ± 2.3 days, 4.8 ± 1.6 days, $p < 0.001$) were shorter in MIS group. Length of postoperative hospital stay for the MIS group were shorter (13.7 ± 6.0 days, 8.8 ± 3.9 days, $p < 0.001$) and the proportion of patients who received adjuvant chemotherapy more than 6 weeks after surgery differ between the groups (30.3 % open vs 13.3 % MIS, $p < 0.001$).

Conclusions/Discussion: Elective surgery after stent insertion was associated with a higher primary anastomosis rate and a lower stoma formation rate compared to emergency surgery but not with the long-term oncological

outcomes. Furthermore MIS combined with stent insertion in malignant colonic obstruction is safe and feasible.

MEDICAID EXPANSION AND COLORECTAL CANCER SCREENING.

S10

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Purpose/Background: Colorectal cancer (CRC) screening decreases incidence and improves survival. Minorities and low income patients have the lowest rates of CRC screening in the United States. The Affordable Care Act of 2010 sought to increase insurance coverage for low-income Americans by funding Medicaid expansion for those earning up to 138% of the federal poverty level (FPL) starting in 2014. Five states and the District of Columbia opted-in to expansion prior to 2014, 19 states in 2014, and 6 after 2014. Nineteen states opted-out of expansion. We evaluated if Medicaid expansion improved the CRC screening rate in minorities and low-income patients. We compared the effects of expansion between pre-2014 and 2014 to non-expansion states.

Methods/Interventions: We used the 2012, 2014, and 2016 Behavior Risk Factor Surveillance System, a nationally representative health-related telephone survey, to evaluate if respondents aged 50-64 had received recommended CRC screening. We compared responses from early expansion (EE), 2014 expansion (ME), and non-expansion (NE) states by using a Poisson regression of the relative percent change in screening.

Results/Outcome(s): NE state respondents represented approximately 20-million members of the population per survey year, whereas EE states and 2014 states represented 10- and 15-million per survey year. While screening increased significantly in all states, the most gains were seen in EE states (+7.6%, $p < 0.001$) compared to ME and NE states (ME: +3.7%, $p = 0.002$; NE: +3.2%, $p = 0.008$). Amongst respondents with income up to 138% FPL, the greatest increase seen in EE states (EE: +13.9%, $p = 0.016$; ME: +8.2%, $p = 0.009$; NE: +6.3%, $p = 0.039$). For Black respondents, there was an increase in screening although it was not significant (EE: +6.0%, $p = 0.645$; ME: +1.3%, $p = 0.784$; NE: +2.9%, $p = 0.426$). Hispanics made significant gains in EE states and more modest gains in NE and ME states (EE: +19.3%, $p = 0.038$; ME: +7.1%, $p = 0.246$; NE: +4.1%, $p = 0.639$). Amongst respondents who reported having one provider they considered their primary healthcare provider, there were significant increases across all states with the largest gain seen in EE states (EE: +6.9%, $p < 0.001$; ME: +2.9%, $p = 0.019$; NE: +3.5%, $p = 0.007$). Respondents who had no provider had a significant increase in screening in EE states (EE: +25.6%, $p = 0.018$; NE: +6.9%, $p = 0.343$; ME: +12.1%,

p=0.150). A significant increase was also seen in EE and ME respondents who reported difficulty obtaining medical care in the last year due to cost (EE: +21.2%, p=0.006; ME: +10.1%, p=0.034; NE: +4.8%, p=0.267).

Conclusions/Discussion: CRC screening has steadily increased with the greatest gains seen in EE states. Low-income respondents saw significant increases across the board. While screening for minorities increased, significant change was only seen in Hispanic patients in EE states. Notably EE respondents without a primary provider or who cited difficulty paying for care still saw significant increases in screening.

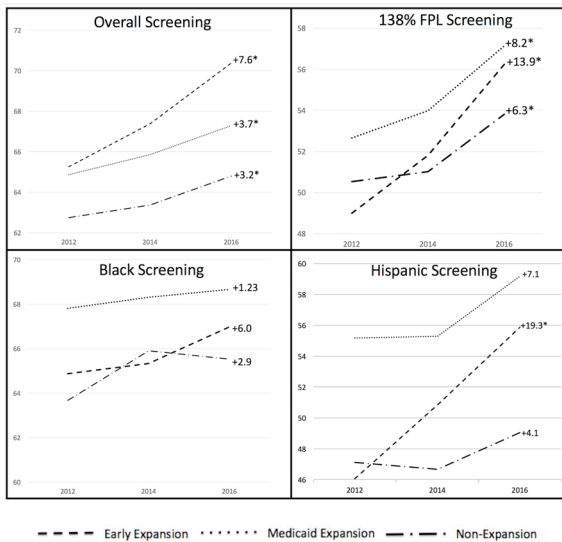


Figure 1: Changes in CRC screening in overall population, 138% FPL, Black, and Hispanic respondents. *p<0.05

Changes in colorectal cancer screening in overall population, up to 138% Federal Poverty Level (FPL), Black, and Hispanic respondents. *p<0.05

PROPOFOL ADMINISTRATION BY ANESTHESIOLOGIST VS. ENDOSCOPIST DURING COLONOSCOPY: DOES IT MAKE A DIFFERENCE?

S11

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Purpose/Background: Propofol anesthesia for endoscopic procedures has gained wide acceptance amongst physicians and patients. However much debate remains whether propofol can be safely administered by non-anesthesiologists. The purpose of this study was to compare the procedural outcome of patients undergoing colonoscopy with propofol anesthesia administered by an anesthesiologist vs. an endoscopist.

Methods/Interventions: A retrospective review was conducted of all consecutive patients who underwent colonoscopy at a private community based hospital between January 1, 2017 and September 30, 2017. In the initial part of the study, propofol was administered by an anesthesiologist until the endoscopists were trained to provide propofol anesthesia via targeted controlled infusion [TCI] by syringe pump. Intraprocedural data was collected in a prospective registry. Statistical analysis was performed using Chi Square and Student t-test.

Results/Outcome(s): 347 patients underwent colonoscopy with propofol anesthesia: Group 1 [n=84] by anesthesia and Group 2 [n=263] by endoscopist. Table 1 summarizes the findings of the study. Mean age was 44.9 and 46.9 years in Group 1 and 2, respectively (p=0.165). There was no difference in gender distribution. The mean procedural time was 21 minutes in both groups. The cecal intubation rate was similar in both groups [Group 1: 92.9% vs. Group 2: 94.3%, p=0.40]. Significant procedural related complications was no different in both groups with 1 patient in Group 2 sustaining endoscopic perforation during balloon dilation of an obstructing anastomotic stricture. Except for the patient with endoscopic perforation, no patient required advanced airway management in either group.

S11 Table 1 - Propofol administration by anesthesiologist [Group 1] vs. endoscopist [Group 2]

	Entire Cohort	Group 1	Group 2	P value
Gender [male/female]	218/129	54/30	165/98	0.45
Mean Age [years]	46.5	44.9	46.9	0.165
Biopsy/polypectomy	285 (82%)	71 (84.5%)	215 (81.75%)	0.34
Cecal intubation	326 (94%)	78 (92.9%)	248 (94.30%)	0.40
Mean procedural time [minutes]	21.1	21.1	21	0.93
Need for advanced airway	1 (0.29%)	0	1 (0.4%)	0.76
Complications	1 (0.29%)	0	1 (0.4%)	0.76

Conclusions/Discussion: Propofol can be safely administered by endoscopist using standardized TCI by syringe pump. Similar total procedural time and cecal intubation rate can be safely achieved.

WHO SHOULD GET POST-DISCHARGE THROMBOPROPHYLAXIS AFTER COLORECTAL SURGERY? CREATION OF A RISK ASSESSMENT CALCULATOR.

S12

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Purpose/Background: Colorectal surgery places patients at a high risk of venous thrombo-embolic (VTE) events. Previous studies have shown that one-third of these patients are diagnosed after discharge from the hospital. Some of the guidelines only recommend extended VTE prophylaxis for patients who underwent operations for colorectal cancer. We, however, lack a model to accurately predict the risk for post-discharge VTE across the spectrum of colorectal surgeries and assess the need for extended prophylaxis.

Methods/Interventions: The American College of Surgeons—National Surgical Quality Improvement Program (NSQIP) was used to identify 177,747 patients who underwent a colorectal resection between 2005 and 2012. Patients with bleeding disorders and who developed VTE before discharge were excluded. Univariate analyses using student's t test or Wilcoxon rank-sum test for continuous variables, and Pearson's chi-squared test or Fisher's exact test for categorical variables were used to assess potential risk factors for post-discharge VTE. Using

multivariate logistic regression with step-wise variable selection, a risk assessment model to predict the risk of post-discharge venous thromboembolism was created. This model was validated using the 2013 cohort from NSQIP (n=41,688). Sensitivity and specificity of various cut-points for calculated risks were analyzed with receiver-operating characteristics (ROC) analysis, and the best cutoff point was specified with Youden's J index (sensitivity + specificity -1).

Results/Outcome(s): The overall 30-day incidence of VTE was 2.3% (n=4150), of which 30% (n=1245) occurred after discharge. The final risk assessment model contained 15 variables. It includes BMI, smoking, laparoscopic surgery, disseminated cancer, chronic steroid use, ventilator dependency, pre-operative albumin, and PTT levels, emergency surgery, anesthesia time, the occurrence of post-op bleeding requiring transfusion, sepsis, and septic shock, return to OR and length of hospital stay (Table 1). The model demonstrated good calibration (Hosmer-Lemeshow Goodness-of-Fit test, P= 0.2) and discrimination (c-statistic=0.7). A cutoff of 0.006% probability in the model was associated with sensitivity of 69.3% and specificity of 57.4% with highest Youden's J index of 26.7.

Conclusions/Discussion: About one-third of VTE events occurred after discharge from hospital. The current model can be utilized to identify patients with high risk of developing post-discharge VTE for all colorectal surgeries irrespective of the diagnosis.

S12 Predictive factors of post-discharge VTE after Colorectal surgery based on Multivariate analysis

Variable	OR (95% CI)	p-Value
BMI	1.02 (1.01 - 1.04)	0.0011
Smoker	0.65 (0.47 - 0.90)	0.0139
Laparoscopic Surgery	0.71 (0.51 - 0.89)	0.018
Ventilator Dependent	0.25 (0.07 - 0.75)	0.0217
Disseminated Cancer	1.71 (1.19 - 2.32)	0.0042
Chronic Steroid Use	1.77 (1.2 - 2.27)	0.0007
Pre-operative albumin	0.66 (0.57 - 0.76)	<.0001
Pre-operative PTT	0.97 (0.95 - 0.99)	0.0131
Emergent Operation	1.33 (0.93 - 1.70)	0.0742
Anesthesia time	1.001 (1 - 1.002)	0.0259
Post-op bleeding requiring transfusion	0.68 (0.4 - 1.12)	0.1497
Post-op sepsis	0.42 (0.17 - 0.88)	0.0425
Post-op septic shock	0.08 (0.01 - 0.55)	0.0129
Post-op return to OR	3.09 (2.16 - 4.21)	<.0001
Days from operation to discharge	0.96 (0.94 - 0.98)	0.0004

THE EFFECT OF SURGICAL TRAINING AND OPERATIVE APPROACH ON OUTCOMES IN ACUTE DIVERTICULITIS - SHOULD GUIDELINES BE REVISED?

S13

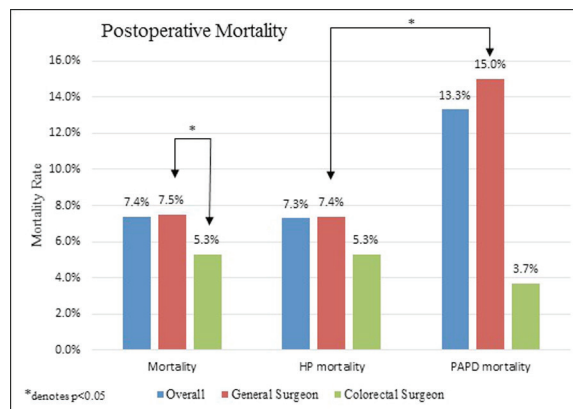
R. Goldstone, C. Cauley, Y. Altinel, D. Chang, H. Kunitake, R. Ricciardi, L. Bordeianou
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Purpose/Background: Guidelines from the American Society of Colon and Rectal Surgeons recommend partial colectomy and primary anastomosis with proximal diversion (PAPD) for hemodynamically stable patients with perforated diverticulitis. In this study, we evaluate and compare the affect of operative approach and surgeon training on outcomes following urgent or emergent colectomy for diverticulitis.

Methods/Interventions: We used ICD-9-CM diagnosis and procedure codes to identify all patients who underwent urgent/emergent colectomy for diverticulitis between 1/1/2000 through 12/31/2014 in the New York State Statewide Planning and Research Cooperative System database. We identified patients who underwent colectomy with end colostomy (Hartmann's procedure (HP)), or PAPD. Provider identification codes were used to identify board-certified colorectal surgeons (CRS). We developed multivariable regression models to determine the effect of operative approach (HP vs PAPD) on complications and mortality while adjusting for patient/hospital characteristics and CRS training.

Results/Outcome(s): 10,780 patients (mean age 63.5 ± 15.2 years) underwent urgent/emergent colectomy for diverticulitis: 10,600 (98.3%) received HP and 180 (1.7%) received PAPD. Only 6.0% of operations were performed by CRS. Utilization of PAPD was greater among CRS but remained low overall (4.2% vs. 1.5%; $p < 0.001$). There was an increase in PAPD over time (0.6% of all cases in 2000 to 2.5% in 2014, $p < 0.05$) which coincided with the increase in proportion of cases performed by CRS (2.4% in 2000 to 12.2% in 2014; $p < 0.05$). Postoperative in-hospital mortality was 1.8 times greater after PAPD than after HP (13.3% vs. 7.3% $p = 0.002$) and hospital stay was longer (22.3 ± 24.6 days vs 15.7 ± 13.9 days; $p < 0.001$). Mortality was 2-fold greater when a non-CRS performed PAPD vs HP (15% vs 7.4%, $p < 0.001$) yet there was no significant difference in mortality for PAPD vs HP when CRS performed colectomy (3.7% vs 5.3%; $p = 0.7$). On multivariable logistic regression (adjusting for age, sex, race, Charlson index, year, payer, hospital academic status, surgeon training) PAPD remained associated with increased postoperative mortality (OR=2.7 95%CI:1.7-4.4; $p < 0.001$), postoperative complications (OR=1.8 95%CI:1.3-2.5; $p < 0.001$), and reoperation (OR=3.4 95%CI:1.8-6.3; $p < 0.001$) whereas CRS was associated with significantly decreased mortality (OR=0.6 95%CI:0.4-0.9; $p < 0.02$).

Conclusions/Discussion: Despite the current recommendations for performance of PAPD for perforated diverticulitis based on randomized controlled trials by gastrointestinal surgeons at tertiary referral centers, PAPD in New York State was associated with increased postoperative complications and mortality when performed by non-CRS. Given that the majority of urgent/emergent colectomies for diverticulitis are performed by non-CRS, guidelines for operative management in perforated diverticulitis should be re-evaluated.



SHOULD THEY STAY OR SHOULD THEY GO? THE UTILITY OF C REACTIVE PROTEIN IN PREDICTING READMISSION AND ANASTOMOTIC LEAK AFTER COLORECTAL RESECTION.

S14

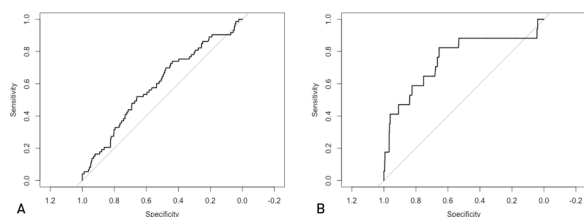
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Purpose/Background: Hospital readmission and anastomotic leak following colorectal resection have a negative impact on patients, surgeons, and the healthcare system. Novel assessments may allow identification of patients unlikely to suffer from these complications, and thus be more confidently discharged from the hospital. Our objective was to determine the predictive value of C reactive protein (CRP) for readmission and anastomotic leak within 30 days following colorectal resection.

Methods/Interventions: Data regarding consecutive patients undergoing elective colorectal resection with anastomosis without the presence of proximal intestinal stoma between 2013 and 2017 were retrieved from a prospectively compiled single institution database. Postoperative complications were coded prospectively by a third party reviewer outside of the department. The predictive value of CRP measured on postoperative day 3 for readmission or anastomotic leak within 30 days after colorectal resection was calculated.

Results/Outcome(s): Of the 752 patients examined, 73 (10%) were readmitted to hospital within 30 days of index operation and 17 (2%) suffered anastomotic leak. Mean CRP in patients who did not have an anastomotic leak nor were readmitted (127 +/- 77 mg/L) was lower compared to patients who were readmitted (157 +/- 96 mg/L, $p=0.002$), and also compared to patients who suffered anastomotic leak (228 +/- 123 mg/L, $p=0.0000002$). The area under the receiver operating characteristic curve for the diagnostic accuracy of CRP for readmission was 0.59, with a cut off value of 145 mg/L generating a 93% negative predictive value for 30 day readmission. Area under the curve for the diagnostic accuracy of CRP for anastomotic leak was 0.76, with a cut off value of 147 mg/L generating a 99% negative predictive value for anastomotic leak.

Conclusions/Discussion: Patients with a CRP below 145 mg/L on postoperative day 3 after colorectal resection have a low likelihood of readmission within 30 days, and a very low likelihood of anastomotic leak.



Diagnostic accuracy of CRP in predicting (A) readmission within 30 days and (B) anastomotic leak, displayed as receiver operating characteristic curve.

SESSILE SERRATED ADENOMAS/POLYPS: REFLECTIONS OF THE DEGREE OF DNA METHYLATION IN THE COLORECTAL MUCOSA.

S15

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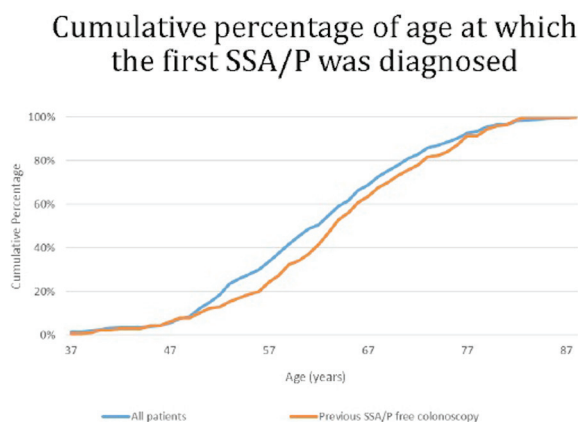
Purpose/Background: DNA methylation is a normal epigenetic mechanism for controlling the level of gene expression. In the colon and rectum, abnormally high levels of methylation can inappropriately abrogate gene expression and predispose to colorectal cancer. The premalignant lesion in this biochemical pathway is the sessile serrated adenoma/polyp (SSA/P). Normal levels of DNA methylation in the colonic epithelium increase with age and vary in their absolute level from one person to another. We hypothesized that the age at diagnosis of the first SSA/P reflects the age at which the level of DNA methylation in the colon reaches the threshold at which premalignant polyps form in clones of cells with an underlying BRAF/KRAS mutation. We expect to find a wide range of ages but a steadily increasing percentage of SSA/Ps diagnosed with each passing decade.

Methods/Interventions: A single endoscopist database listed all SSA/Ps removed during colonoscopy and identified histologically from 2010 to 2017. The colonoscopy history of the patients was extracted from medical records and the age at diagnosis of the first SSA/P was noted. This was the primary endpoint. Secondary endpoints included patient demographics, total number of SSA/P per patient, size and location of SSA/P, incidence of adenomas and colorectal cancer. Patients with a prior diagnosis of serrated polyposis were excluded. The single endoscopist nature of the study eliminates inter-endoscopist variation in the diagnosis of SSA/P and the time frame eliminates most of the subjectivity in the pathologic diagnosis. The credentials of the endoscopist include an adenoma detection rate of 32% and a SSA/P detection rate of 11% ($n=442$, 44% male, age 59.1yrs) in patients undergoing average risk screening.

Results/Outcome(s): There were 439 patients with 667 SSA/P. Their mean age at diagnosis was 68 +/- 11 years and 45% were men. 165 had had at least one SSA/P-free colonoscopy before the diagnosis of the first SSA/P. Figure 1 shows the cumulative incidence of the first occurrence of SSA/P by age for all patients and for those patients who had had a previously SSA/P-free colonoscopy. 31% of patients had multiple SSA/Ps, 24% synchronous, and 10% metachronous. The range of total cumulative SSA/Ps was from 1 to 7. 83% of SSA/P were right-sided. 48% of SSA/Ps were ≥ 1 cm diameter and 22% were ≥ 2 cm. 91% of those ≥ 2 cm diameter were right sided. The size of the first SSA/P was constant at all ages except patients >70 years old (<50 11.5mm, 50-60 12.0mm, 60-70 11.6mm, >70 15.1mm).

Conclusions/Discussion: These data confirm the hypothesis that SSA/P are age-related lesions likely reflecting an increasing level of hypermethylation in the right side of the colon.

Figure 1. Cumulative percentage of age at which the first SSA/P was diagnosed



EARLY RESULTS OF A PHASE I TRIAL USING AN ADIPOSE DERIVED MESENCHYMAL STEM CELLS COATED FISTULA PLUG FOR THE TREATMENT OF TRANSPHINCTERIC CRYPTOGLANDULAR FISTULAS.

S16

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Purpose/Background: High transsphincteric cryptoglandular fistulas are common and despite the evolution of sphincter-sparing procedures, no single approach has consistently been effective in curing these fistulas. Recently, we demonstrated preliminary evidence that the use of mesenchymal stem cells (MSCs) in combination with a dissolvable bio absorbable matrix was effective for the treatment of perianal fistulas in patients with Crohn's disease. Therefore, we tested this approach in patients with cryptoglandular fistulas.

Methods/Interventions: Following institutional review board approval, 15 patients have been enrolled in a phase I clinical trial to study safety of a MSC-coated fistula plug for the treatment of high transsphincteric cryptoglandular fistulas. Following enrollment, patients underwent exam under anesthesia with seton placement for control of perianal sepsis, and simultaneous abdominal wall adipose tissue biopsy for MSC harvest. In the lab, MSCs were expanded, and allowed to adhere to the fistula plug. Six weeks after seton placement, patients were taken back to the operating room for insertion of the MSC-coated fistula plug. Patients were followed serial perianal exams and magnetic resonance imaging (MRI) for evaluation of adverse events and fistula healing. Clinical healing was defined as complete (cessation of drainage with reepithelization of external opening), partial (decrease in drainage) or failed (no improvement or worsening of symptoms).

Results/Outcome(s): Twelve patients (7 female, average age 38.5 years) have had > than 6 months of follow-up and were used for analysis. The median disease duration at the time of study enrollment was 4.17 years (range, 1-13 years), and median number of surgical

procedures prior to plug placement was 5.67 (range, 1-20). Thirty day morbidity occurred in one patient who developed an abscess requiring surgical drainage. At 6 months, complete clinical healing occurred in 3 (25%) patients, partial healing in 6 (50%), and 3 were considered failures. Radiographic improvement was seen in 10 of 12 patients.

Conclusions/Discussion: Utilizing a MSC-coated fistula plug for the treatment of refractory transsphincteric cryptoglandular fistulas was safe and resulted in complete or partial healing in 75% of patients at 6 months.

HIGH RATE OF REOPERATION FOLLOWING COMBINED ABDOMINAL WALL RECONSTRUCTION AND HARTMANN'S REVERSAL SHOULD PROMPT EVALUATION OF A STAGED APPROACH.

S17

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Purpose/Background: Parastomal and ventral incisional hernias are common after Hartmann's procedure and add complexity to Hartmann's reversal. Colostomy reversal and abdominal wall reconstruction may be performed in a staged or concurrent fashion, though data are limited as to which strategy is optimal. We aimed to define the complication profile of concurrent abdominal wall reconstruction with Hartmann's reversal as compared to either procedure alone.

Methods/Interventions: All patients undergoing elective Hartmann's reversal (CPT: 44626), abdominal wall reconstruction with component separation (CPT 15734) or combined Hartmann's reversal with component separation were identified from the NSQIP PUF files from 2012-2015. Groups were compared with respect to demographics, comorbid conditions, procedural details and post-operative outcomes. Propensity score matched subgroup analysis was used to compare outcomes among similar patients undergoing Hartmann's reversal alone versus combined procedure.

S17

	All (N = 300)	Takedown Alone (N = 150)	Combined Procedure (N = 150)	p-value
Length of stay, days; Mean (SD)	8.6 (6.6)	7.4 (6.5)	9.7 (6.5)	<0.01
Non-home discharge; N (%)	22 (7)	6 (4)	16 (11)	0.03
Any wound complication; N (%)	53 (18)	24 (16)	29 (19)	0.55
Any complication; N (%)	94 (31)	33 (22)	61 (41)	<0.01
Reoperation; N (%)	18 (6)	4 (3)	14 (9)	0.03
Readmission; N (%)	36 (12)	14 (9)	22 (15)	0.21
Mortality; N (%)	7 (2)	3 (2)	4 (3)	1.00

Results/Outcome(s): We identified 13,204 patients with 8,444 (64%) receiving component separation alone, 4,585 (35%) Hartmann's reversal alone and 175 (1%) combined procedure. As compared to Hartmann's reversal, the combined group had fewer females (37% vs. 48%; $p<0.01$), more obese patients (40% vs. 30%; $p=0.01$), more patients with preoperative open wound (4% vs. 2%; $p=0.03$) and a higher proportion of patients with ASA class 3/4 (60% vs. 47%; $p<0.01$). The Hartmann's reversal and combined groups were similar in regard to other preoperative characteristics. Compared to component separation, biologic mesh was more commonly used in the combined group (13% vs. 4%; $p<0.01$). The combined group, as compared to Hartmann's reversal, showed a longer mean length of stay (9.5 vs. 6.6 days; $p<0.01$), increased overall complication rate (37% vs. 24%; $p<0.01$) and increased rate of reoperation (9% vs. 5%; $p=0.03$). Compared to Hartmann's reversal, combined procedure patients had similar rates of digestive system reoperation (4% vs. 3.2%; $p=0.52$) but increased skin and soft tissue reoperations (4% vs. 0.5%; $p=0.01$). The combined and the component separation alone groups did not differ with respect to reoperation rate (9% vs. 6%; $p=0.15$) or skin and soft tissue reoperation (2% vs. 3%; $p=0.82$) though the combined group did have increased digestive system reoperation (4% vs. 2%; $p=0.04$). Differences in postoperative outcomes between the Hartmann's reversal and combined procedure groups persisted on propensity matched analysis (Table 1).

Conclusions/Discussion: Hartmann's reversal is associated with a high rate of morbidity. In those requiring abdominal wall reconstruction, concurrent Hartmann's reversal is associated with increased morbidity including increased rate of reoperation, even when controlling for patient factors. Further study is needed to evaluate the role of a staged approach as compared to the combined approach.

THE EFFECT OF NONOPERATIVE MANAGEMENT OF CHRONIC ANAL FISSURE AND HEMORRHOID DISEASE ON BOWEL FUNCTION PATIENT-REPORTED OUTCOMES.

S18

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Purpose/Background: Common anorectal diseases are associated with significant patient complaints. Chronic anal fissure and hemorrhoid disease can be managed with both nonoperative and operative means. We sought to evaluate the effectiveness of dietary modification and medical therapy on bowel function patient-reported outcomes for these diseases.

Methods/Interventions: All patients evaluated for chronic anal fissure and hemorrhoid disease from May 2015 to May 2017 were eligible for analysis. Both disease processes were analyzed together and separately. Standardized dietary counseling including use of a fiber supplement was performed on all patients; those with fissures were also prescribed topical calcium channel blockers. The Colorectal Functional Outcome (COREFO) questionnaire was administered prospectively to patients during the initial visit and at the follow-up. The questionnaire assesses bowel function in five domains (incontinence, frequency, social impact, need for medication and stool related aspects) and total score; scores for each range from 0 (best function) to 100 (poorest function). We proposed a null hypothesis that there would be no improvement in bowel functional outcomes in domain or total scores. Demographic and questionnaire results were linked and analyzed. Paired t-test analysis was used to evaluate the score changes at the time of follow-up.

Results/Outcome(s): 64 patients were included in the study. 37 patients (58%) were treated for chronic anal fissure and 27 patients (42%) were treated for hemorrhoid disease. Mean age was 52 ± 15 years with a gender distribution of 25 men (39%) and 39 women (61%). The median number of days between visits was 49 days (IQR: 42 – 90 days). Table 1 shows patient reported functional outcomes scores. There was a significant improvement in three domain scores at follow-up: incontinence, stool-related aspects, and social impact; there were no differences

S18 Bowel Functional Outcome Scores

	Mean (SD) Score at Initial Visit	Mean (SD) Score at Follow Up	p
Frequency	9.5 (12.3)	8.8 (9.1)	NS
Incontinence	15.7 (14.5)	12.0 (12.1)	<0.05
Medication	31.2 (27.9)	33.1 (27.7)	NS
Social Impact	26.4 (20.6)	20.5 (20.9)	<0.05
Stool Related Aspects	56.4 (29.3)	39.5 (29.4)	<0.05
Total COREFO Score	25.2 (14.3)	20.3 (14.0)	<0.05

in the frequency and medication domains. Total COREFO score was significantly improved at follow-up for the group. When analyzed separately, chronic anal fissure had an improvement in the total score and the same domains as the main cohort whereas hemorrhoid disease had an improvement in the total score and the same domains except for social impact.

Conclusions/Discussion: Nonoperative management for chronic anal fissures and hemorrhoid disease significantly improves global bowel function as well as multiple functional domains. Dietary counseling and medical therapy should be the first line outpatient therapy for these diseases.

IS ENDOSCOPIC SUBMUCOSAL DISSECTION FOR RECTAL POLYPS AN ALTERNATIVE TO TRANS ANAL MINIMALLY INVASIVE SURGERY: A RETROSPECTIVE COMPARATIVE STUDY.

S19

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Purpose/Background: Trans Anal Minimally Invasive Surgery (TAMIS) is the preferred approach for large, mid and high rectal polyps not suitable for standard transanal excision. It has the advantage of en bloc resection of the lesion, allowing accurate assessment of margin and submucosal involvement. As opposed to endoscopic mucosal resection, which removes polyps piecemeal, endoscopic submucosal dissection (ESD) is a relatively new technique that enables en bloc resection similar to TAMIS. The aim of this study was to compare short and medium term outcomes of patients undergoing TAMIS and ESD for rectal polyps.

Methods/Interventions: This was a retrospective cohort study comparing all patients with rectal polyps undergoing TAMIS via submucosal dissection by colorectal surgeons at a single institution, and ESD by a single gastroenterologist over a 6- year period. Outcomes studied included en bloc resection rates, margin positivity, short term morbidity and local recurrence. Data was collected from a prospectively maintained database and electronic medical records. Statistical analysis was performed using SPSS software, and a p value of ≤ 0.05 was considered significant.

Results/Outcome(s): Fifty patients were included in the study, 19 underwent TAMIS and 31 ESD. Baseline demographics, including type of lesions, were similar in both groups. Duration of procedure was comparable in both groups (96 vs. 99 mins, $p=0.079$), although polyps removed by ESD were larger (51 mm vs. 73 mm, $p=0.014$). Short term complications including bleeding (5.3% vs. 6.5%) and perforation (1 in ESD and none in TAMIS) were similar in both groups ($p=0.543$). There

was no difference in en bloc resection (84.2% vs. 90%, $p=0.429$), but there was a non-significant higher margin positivity rates with TAMIS (31.6% vs 14.3%, $p=0.134$). Follow up was available for 17 ESD patients (55%) and 14 TAMIS patients (74%), with a mean follow up of 10 and 21 months respectively. There were no recurrences in the ESD group and 2 recurrences in the TAMIS group (14.2%) ($p=0.105$).

Conclusions/Discussion: ESD offers similar, if not improved, outcomes when compared to TAMIS for rectal polyps. If the required expertise is available, this is an appropriate alternative to TAMIS in a select group of patients. Larger studies with more complete follow-up are required to compare long-term outcomes between the procedures.

MULTIMODAL PAIN MANAGEMENT IN A COLON AND RECTAL SURGERY ENHANCED RECOVERY PATHWAY: A RANDOMIZED CLINICAL TRIAL COMPARING EPIDURAL ANALGESIA VERSUS LIPOSOMAL BUPIVACAINE TRANSVERSUS ABDOMINIS PLANE BLOCK.

S20

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Purpose/Background: Multimodal pain options are an integral part of Enhanced Recovery Pathways in colorectal surgery. Studies to date are conflicting with regard to which are the most effective pain management strategies. The purpose of this study was to compare epidural analgesia with liposomal bupivacaine transversus abdominis plane analgesia in an established Enhanced Recovery Pathway.

Methods/Interventions: This is an open-label non-inferiority randomized trial comparing epidural and TAP block analgesia in patients undergoing elective open and robotic colon and rectal surgery between 2016 and 2017. Primary outcomes were Numeric Pain Scale (NPS) and Overall Benefit of Analgesia Score (OBAS). Secondary outcomes were post-operative complications, length of stay, time to first flatus, time to first bowel movement, and narcotics dosage. A power analysis conducted prior to subject recruitment found the required sample size to be 176 to detect a medium effect size. The final sample size in this analysis was 167 (82 epidural, 85 TAP), which is sufficient to identify an effect size of $d = .44$ with power set at .80, alpha (two-tailed) = .05. Continuous outcomes with large positive skew (LOS, narcotics dosage) were log transformed. Pre-treatment comorbidities and demographics were confirmed to be similar between the two

randomized treatments using chi-square (categorical) and dependent samples t-tests (interval) variables. Outcomes were compared using the same statistical tests. P-values for secondary outcomes were adjusted to control the false discovery rate.

Results/Outcome(s): There were no significant differences in any patient characteristics between groups. There were no significant differences between groups with respect to mean NPS and OBAS scores. Time trend analysis revealed that TAP patients had higher NPS on the day of surgery but that the two groups were similar on the following postoperative days. There were no differences in post-operative complications, length of stay, time to first flatus, and time to first bowel movement. Narcotics dosages were significantly lower in the TAP group.

Conclusions/Discussion: This randomized controlled trial shows that transversus abdominis plane block with liposomal bupivacaine is as effective as epidural analgesia in a colon and rectal surgery multimodal Enhanced Recovery Pathway. Patient reported pain scores were comparable in both cohorts and there was a significant decrease in narcotic usage in the liposomal bupivacaine group. These data suggest that liposomal bupivacaine TAP blocks are a viable option for this patient population considering the more favorable risk profile.

Variable	Epidural	TAP	P Value
Complications	28 (35%)	26 (31.33%)	0.74
Readmission within 30 days of discharge	12 (46.15%)	10 (38.46%)	0.779
Reoperation within 30 days of discharge	2 (11.11%)	1 (5%)	0.595
Replace foley or straight cath	4 (20%)	8 (32%)	0.572
SSI	4 (21.05%)	6 (25%)	> 0.999
Type of SSI			0.333
Deep	1 (25%)	0 (0.00%)	
Organ Space	2 (50%)	2 (33.33%)	
Superficial	1 (25%)	4 (66.67%)	
Complication-Anastomotic Leak	4 (21.05%)	2 (9.09%)	0.39
UTI	0 (0.00%)	0 (0.00%)	NA
Sepsis	4 (21.05%)	1 (4.76%)	0.172
MI/Cardiac Arrest	0 (0.00%)	0 (0.00%)	NA
Pneumonia	1 (5.26%)	0 (0.00%)	0.475
Post-op Intubation	1 (5.56%)	1 (4.55%)	> 0.999
Acute Renal Insufficiency	6 (30%)	5 (22.73%)	0.854
DVT or PE	0 (0.00%)	0 (0.00%)	NA
Length of Stay (Log)	1.3 (0.7)	1.29 (0.57)	0.909
Time to First Flatus	34.22 (23.73)	38.92 (27.3)	0.249
Time to First Bowel Movement	34.64 (24.24)	40.45 (27.44)	0.179
Total Number of Complications	0.82 (1.32)	0.71 (1.14)	0.537
Total Narcotics (Log)	5.34 (0.74)	4.53 (1.17)	< 0.001
Narcotics Day 0 (Log)	4.47 (1.15)	3.93 (1.02)	0.002
Narcotics Day 1 (Log)	4.23 (1.34)	2.68 (2.35)	< 0.001
Narcotics Day 2 (Log)	1.77 (2.88)	1.24 (3.14)	0.272
Narcotics Day 3 (Log)	0.67 (3.42)	-0.3 (3.5)	0.143

Note. p-values adjusted to control the false discovery rate.

Secondary Outcomes

HIGH-RISK ELECTIVE ILEOCOLIC ANASTOMOSES FOR CROHN'S DISEASE: WHEN IS DIVERSION INDICATED?

S21

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Purpose/Background: Crohn's disease (CD) patients bring unique risk factors for anastomotic leak (AL) to the operating room table. We aimed to assess well-established clinical risk factors associated with AL, i.e. smoking status, chronic steroids, male gender and weight loss as predictors of AL. We hypothesized that diverting loop ileostomy (DLI) may be under-utilized in patients at high-risk for AL following ileocolic resection in CD.

Methods/Interventions: The National Surgical Quality Improvement Program (NSQIP) Colectomy module data from 2012–2016 was used to identify patients with a diagnosis of CD who underwent elective laparoscopic or open ileocolic anastomosis with or without DLI. The primary endpoint was a composite of any AL within 30 days of surgery. Univariate and forward stepwise multivariable logistic regression analysis was performed to identify independent risk factors.

Results/Outcome(s): Of 130,963 patients in the Colectomy Module, 4,420 had CD that underwent ileocolic resection. Of these, 4,084 (92.4%) were primary anastomosis (PA) only, while 336 (7.6%) had concomitant diverting loop ileostomy construction (PA-DLI). Overall, AL occurred in 180 (4.1%). ALs occurred in 172 (4.2%) of the PA only patients and 8 (2.4%) of the PA-DLI patients (p=0.11). On univariate analysis, rates of AL were higher in the PA only group for smokers 60 (6.3%) vs. 112 (3.6%), (p=0.0001), chronic steroids users 121 (4.9%) vs. 51 (3.2%), (p=0.006), male gender 95 (5.1%) vs. 77 (3.5%), (p=0.009) and patients with weight loss 22 (6.4%) vs. 150 (4.0%), (p=0.04), respectively. Patients with PA only who had 0, 1, 2, 3, or 4 risk factors had a 2.5%, 3.0%, 5.3%, 8.3%, 11.8% risk of AL (p<0.0001), respectively. On multivariate analysis, with diverting ileostomy as the primary predictor, all these factors (p<0.05, Table 1) were independent risk factors of AL (Odds Ratio for fecal diversion 0.48 (0.23 – 0.98), p=0.04). Of patients with ≥2 risk factors (i.e. leak rate ≥5.3%), only 188 (9.7%) received concomitant DLI (p<0.0001).

S21 Table 1: Results of Multivariate Logistic Regression for AL

Variable	Odds Ratio	95% Confidence Interval	P-value
Diverting ileostomy	0.48	0.23 – 0.98	0.04
Smoker	1.81	1.32 – 2.48	0.0002
Chronic Steroids	1.55	1.12 – 2.15	0.009
Male gender	1.45	1.07 – 1.96	0.02
Weight loss	1.63	1.05 – 2.53	0.03

Conclusions/Discussion: Based on our results, diverting loop ileostomy is under-utilized in CD patients at high-risk for AL after elective ileocolic resection. These patients should risk-stratified for AL and concomitant DLI considered when multiple risk factors are present.

ENDORECTAL ADVANCEMENT FLAPS FOR ANORECTAL FISTULAE IN CROHN'S DISEASE IN THE ERA OF IMMUNE THERAPY.

S22

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Purpose/Background: Anorectal fistulae resultant from Crohn's disease (CD) are a unique clinical challenge. Current treatments remain unsatisfactory due to recurrent fistulae and incomplete closure. Seton drainage is typically the initial treatment and select patients may undergo second stage repair utilizing several surgical procedures. The advent of immune therapy (IT) for CD has altered the way in which CD fistulae have responded to treatment. Some patients have complete resolution solely with IT, yet many still require surgical closure. We have employed ERAF as our second stage procedure for anorectal fistulae in CD patients and report our outcomes in 39 patients.

Methods/Interventions: The surgical database of 8 colorectal surgeons was queried for patients who underwent ERAF from 2007-2017 at The University of California in San Diego and Icahn School of Medicine at Mount Sinai. Charts were retrospectively analyzed for the presence of CD, use of IT, fistula characteristics, surgical treatment and outcomes. Significance was determined using the student's T-Test.

Results/Outcome(s): 557 ERAFs were performed over a 10-year period, 41 (7.4%) in 39 patients with perianal CD with an average follow up of 797 days. There were no significant differences in age, gender, presence of small bowel disease, fistulae characteristics, number of prior Seton or surgical procedures between patients who had recurrences and those that did not. There were significantly fewer recurrences in patients who had been diverted prior to surgery (p=0.003). See Table 1. 73.2% (n=30) of patients were on IT at an average of 380 days prior to surgery. 8% (n=11) of patients were taking zero agents, 43.9% (n=18) were on one agent and 29.3% (n=11) were on two agents. There were no differences in fistulae recurrence for patients taking one or two agents, however the duration of one agent therapy had significantly fewer recurrences (p=0.03). 17% (n=7) of patients used a combination of Infliximab +Thiopurines. None of these patients had recurrent fistulae (p=0.006). The overall recurrence rate after ERAF was 19.5% (n=8) with an average of 64.5 days until recurrence was diagnosed. Of the 8 patients who had a recurrence, 6 underwent a variety

of secondary techniques for fistula closure and 5 were successful. The salvage rate for recurrent fistulae was 63% (n=5). In combination with the patients who did not have a recurrence, the overall healing rate was 92.7%.

Conclusions/Discussion: To our knowledge, this is the largest series of CD patients undergoing ERAF for the treatment of anorectal fistula. This study helps point to several factors that may improve fistula closure for these patients. Diversion prior to surgery and patients who were on Infliximab + Thiopurine did not have a fistulae recurrence. Patients who were on IT longer prior to surgery were more likely to achieve successful closure. There is clearly a benefit to adding IT to ERAF when addressing Crohn's fistulae.

TABLE 1: Immune Therapy Use	All patients (n=41)	No Recurrence (n=33)	Recurrence (n=8)	p-value
Immune modulation	73.2% (n=30)	72.7% (n=24)	75% (n=6)	0.9
Avg Days	381	399.57	288.7	0.24
No agents	26.8% (n=11)	27.3% (n=9)	25% (n=2)	0.24
One agent	43.9% (n=18)	39.4% (n=13)	62.5% (n=5)	0.24
Avg Days	456.2	530.8	262.2	0.03
Two agents	29.3% (n=12)	33.3% (n=11)	12.5% (n=1)	0.19
Avg Days	244.3	256.5	110	n/a
Total One Agent (Biologics or Thiopurine)	43.9% (n=18)	39.4% (n=13)	62.5% (n=5)	0.24
Avg Days	456.2	530.8	262.2	0.03
All Biologics	31.7% (n=13)	27.3% (n=9)	50% (n=4)	0.29
Avg Days	436.4	550.3	267.8	0.07
Infliximab	4.9% (n=2)	0	25% (n=2)	n/a
Avg Days	143	0	143	n/a
Adalimumab	14.6% (n=6)	15.2% (n=5)	12.5% (n=1)	0.85
Avg Days	475.7	510.8	300	n/a
Certolizumab	7.3% (n=3)	6.1% (n=2)	12.5% (n=1)	0.63
Avg Days	587	638	485	n/a
Ustekinumab	0	0	0	n/a
Avg Days	0	0	0	n/a
Vedolizumab	4.8% (n=2)	6.1% (n=2)	0	0.63
Avg Days	561.5	561.5	0	n/a
All Thiopurines	12.2% (n=5)	12.1% (n=4)	12.5% (n=1)	0.98
Avg days	437.4	486.7	240	n/a
6-MP	7.3% (n=3)	6.1% (n=2)	12.5% (n=1)	0.63
Avg Days	342.3	393.5	240	n/a
Azathioprine	4.8% (n=2)	6.1% (n=2)	0	0.16
Avg Days	580	580	0	n/a
Total Two Agents (Biologics + Thiopurine)	29.3% (n=12)	33.3% (n=11)	12.5% (n=1)	0.19
Avg Days	244.3	256.5	110	n/a
Infliximab + Thiopurine	17.0% (n=7)	21.2% (n=7)	0	0.006
Avg Days	301.3	301.3	0	n/a
Adalimumab + Thiopurine	7.3% (n=3)	6.1% (n=2)	12.5% (n=1)	0.63
Avg Days	207.7	256.5	110	n/a
Certolizumab + Thiopurine	2.4% (n=1)	3.0% (n=1)	0	0.32
Avg Days	20	20	0	n/a
Ustekinumab + Thiopurine	4.9% (n=2)	6.1% (n=2)	0	0.16
Avg Days	100	100	0	n/a
6-MP + Biologic	19.5% (n=8)	21.2% (n=7)	12.5% (n=1)	0.55
Avg Days	332.5	364.3	110	n/a
Azathioprine + Biologic	7.3% (n=3)	9.1% (n=3)	0	0.08
Avg Days	89.7	89.7	0	n/a

Table 1: Immune Therapy Use

DURATION OF ULCERATIVE COLITIS DOES NOT IMPACT OUTCOMES OF RESTORATIVE PROCTOCOLECTOMY.

S23

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Purpose/Background: Ileal pouch anal anastomosis (IPAA) is a standard technique for restoration of gastrointestinal continuity following total proctocolectomy (TPC) for ulcerative colitis (UC). However, prolonged medical

treatment of UC, especially in setting of recurrent flares, may be associated with worse outcomes following surgery. We aimed to determine the impact of disease duration on perioperative morbidity, pouch longevity, function and quality of life (QoL) after IPAA.

Methods/Interventions: We queried a prospectively-maintained pouch database (1983 - 2016) to identify all patients undergoing IPAA with a confirmed pathologic diagnosis of UC. Duration of disease was defined as time interval between date of preoperative diagnosis and date of TPC. Patients who underwent IPAA for dysplasia, cancer,

Crohn's patients and indeterminate colitis were excluded. Patients were initially divided into groups based on disease duration: <10 years and > 10 years. An additional cohort was matched based on age \pm 5 years, gender, body mass index (BMI) \pm 5 kg/m², ASA scores, 2 vs. 3 staged IPAAs, biologics use, and omission of diverting loop ileostomy. Baseline demographics, perioperative morbidity, Kaplan Meier pouch survival at 10 years, functional (number of stools, seepage) and QoL outcomes were compared between groups.

S23 Demographics, intraoperative details, perioperative complications and quality of life after restorative proctocolectomy after ileal pouch anal anastomosis between the groups.

Parameter	Disease duration <10 years	Disease duration >10 years	P value
	n=1438 (58%)	n=1035 (42%)	
Age at surgery, years (mean/SD)	35.6 \pm 12.9	40 \pm 12.4	<0.001
Body mass index, kg/m ² (mean/SD)	25.5 \pm 4.9	25.8 \pm 4.7	0.08
Gender, male	808 (56.2)	589 (57)	0.72
ASA score	1078 (75)	698 (67)	<0.001
1-2	360 (25)	337 (27)	
3-4			
Biologics usage	618 (43)	279 (27)	<0.001
Steroids usage	474 (33)	662 (64)	<0.001
Procedure (2 staged IPAA/3 staged IPAA)	480 (33) / 958 (67)	776 (75) / 259 (25)	<0.001
Prior colectomy setting (elective / emergent)	662 (69) / 296 (31)	226 (87) / 33 (13)	<0.001
Pouch configuration	1366 (95)	890 (86)	<0.001
J - Pouch	72 (5)	145 (14)	
S - Pouch			
IPAA anastomotic technique			<0.001
Stapled	1337 (93)	921 (89)	
Handsewn	101 (7)	114 (11)	
Anastomotic separation	90 (6.3)	51 (5.0)	0.14
Pelvic sepsis	131 (9.1)	85 (8.2)	0.44
Anastomotic stricture	172 (12)	115 (15)	0.04
Fistula	96 (6.7)	889 (8.6)	0.08
Pouchitis	316 (22)	403 (39)	<0.001
Obstruction	294 (20.4)	217 (21)	0.89
Seepage protection (daytime)	245 (17.1)	172 (20)	0.20
Seepage protection (nighttime)	349 (24.3)	236 (27)	0.13
Number of stools (daytime) (mean/SD)	6.0 \pm 3.3	6.0 \pm 4.0	0.20
Number of stools (nighttime) (mean/SD)	2.4 \pm 1.7	2.3 \pm 2.0	0.20
Quality of Life (mean/SD)	0.7 \pm 0.1	0.7 \pm 0.2	0.84
Pouch failure at latest follow up	55 (3.8)	64 (6.2)	0.01
Kaplan Meier pouch survival, 5 years	96% (94.2% - 97%)	96.3% (95% - 97.4%)	0.53
Kaplan Meier pouch survival, 10 years	95% (93.2% - 96.2%)	95% (93.1% - 96.1%)	0.53
Wound undergo surgery again	1331 (92.6)	963 (93.1)	0.66
Would recommend surgery	1360 (94.6)	993 (96)	0.31
Length of follow up (median, IQR range)	5.3 (1.6 - 12.1)	9.1 (5.7 - 20.4)	<0.001

Data represented as n, percentage, unless otherwise specified. SD = standard deviation, IPAA = ileal pouch anal anastomosis, IQR = interquartile range.

Results/Outcome(s): From 2473 patients, 1438 (58%) patients had disease duration <10 years, 1035 (42%) patients had disease duration > 10 years. There were 742 patients (30%) with disease duration longer than 20 years. Patients with UC duration < 10 years were noted to be younger at time of IPAA ($p<0.001$) and had lower ASA scores ($p<0.001$). Patients with shorter disease duration had higher rates of biologic medication use ($p<0.001$) and lower rates of steroid use ($p<0.001$), as well as higher rates of urgent colectomies ($p<0.001$) and 3-staged IPAA's compared to patients with longer disease duration (**Table**). No difference was observed in rates of anastomotic separation ($p=0.14$), pelvic sepsis ($p=0.44$), small bowel obstructions ($p=0.89$) and fistulas ($p=0.08$). Patients with longer disease duration were noted to have higher rates of anastomotic strictures ($p=0.04$) and pouchitis ($p<0.001$). Kaplan Meier pouch survival was comparable between groups at 10 years postoperatively: 95% vs. 95%, $p=0.53$, as well as similar stool frequency, seepage and QoL parameters between the groups. Following case-matching ($n=176$ in each group), there were no differences in anastomotic separation (0.78), pelvic sepsis ($p=0.13$), fistulas ($p=0.40$), anastomotic strictures (0.26), pouchitis ($p=0.25$), small bowel obstructions ($p=0.21$), pouch retention rates ($p=0.68$), number of daily stools ($p=0.46$) and QoL ($p=0.31$) scores.

Conclusions/Discussion: Duration of UC does not impact rates of perioperative IPAA complications nor IPAA retention rates or QOL.

RISK FACTORS FOR INTRA-ABDOMINAL SEPSIS AFTER ILEOCOLIC RESECTION FOR CROHN'S DISEASE: AN ANALYSIS OF 621 CASES.

S24

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Purpose/Background: Up to 80% of patients with Crohn's disease (CD) will undergo an intestinal resection during their lifetime, and up to 50% will require repeat resections. Controversy remains regarding risk factors for postoperative intra-abdominal sepsis and the role repeat resection plays. Therefore, the aim of this study was to determine 1) risk factors for intra-abdominal sepsis following ileocolic resection and 2) the association of repeat resection with intra-abdominal sepsis.

Methods/Interventions: A retrospective chart review was conducted of all patients undergoing ileocolic resection with primary anastomosis for CD at a single institution between July 2007 and August 2017. Patients diverted at the time of ileocolic resection were excluded. For patients who underwent >1 ileocolic resection within

the study period, only the most recent ileocolic resection was included, but the number of life-time ileocolic resections was known. Intra-abdominal sepsis was defined as an intraperitoneal abscess or anastomotic leak and was graded using the Clavien-Dindo classification. Dual immunosuppression was defined as any combination of the following: corticosteroids or immunomodulatory agents (within 4 weeks of surgery) or biologic (within 12 weeks of surgery); triple immunosuppression was the use of all three. Univariate and multivariable analyses determined risk factors for intra-abdominal sepsis. Pearson's correlation assessed the relationship between number of prior resections and intra-abdominal sepsis.

Results/Outcome(s): 621 patients (55% female) with a median age of 37 years (range, 18-86) underwent ileocolic resection for CD; 391 were first-time resections. The overall rate of intra-abdominal sepsis was 8% ($N=50$; 14% grade 2, 40% grade 3a, 26% grade 3b, 20% grade 4). Diagnosis of intra-abdominal sepsis was made at a median of 9 days postoperatively (range 2-28), with 38% diagnosed during the index hospitalization. On univariate analysis, prior intestinal resection and pre-operative triple immunosuppression (versus none) were associated with intra-abdominal sepsis; these risk factors persisted on multivariable analysis (**Table**). Risk of intra-abdominal sepsis was 5%, 11%, and 22% for 0, 1, and 2 risk factors respectively ($p<0.01$ for 1 vs 0 risk factors, $p=0.01$ for 2 vs 0 risk factors). There was no correlation between number of prior ileocolic resections and the rate of intra-abdominal sepsis which was found to be 6%, 13%, and 10% for 0, 1, and 2+ prior resections respectively (Pearson's rho 0.08).

Conclusions/Discussion: Prior ileocolic resection and combination immunosuppression were associated with the development of intra-abdominal sepsis after ileocolic resection for CD. However, an increasing number of repeat resections did not correlate with a parallel rise in intra-abdominal sepsis. Surgeons should strongly consider the use of diversion in patients with more than one risk factor undergoing ileocolic resection.

Table. Univariate and Multivariable Analysis of Risk Factors for Intra-abdominal Sepsis after Ileocolic Resection

Variable	Univariate <i>p</i> -value	Multivariable Odds Ratio (95% confidence interval)	Multivariable <i>p</i> -value
Tobacco use	0.14	1.5 (0.8-2.9)	0.25
Pre-op medications (none as reference)	Overall: 0.15		
	Post-hoc tests:*		
Corticosteroids	0.27	1.8 (0.5-6.4)	0.37
Immunomodulators	0.72	1.2 (0.3-4.1)	0.81
Biologic	0.44	1.3 (0.5-3.4)	0.53
Dual immunosuppression	0.61	1.2 (0.5-3.1)	0.63
Triple immunosuppression	0.0099	3.5 (1.3-9.8)	0.02
Prior ileocolic resection	0.02	2.1 (1.2-3.8)	0.02
Age	0.30	-----	-----
Sex, female	0.44	-----	-----
Obesity (BMI ≥ 30)	0.33	-----	-----
Diabetes	0.63	-----	-----
Laparoscopic surgery	0.93	-----	-----
Intra-abdominal abscess	0.59	-----	-----

*Bonferroni corrected *p* value is 0.01; Limited univariate variables shown secondary to space constraints; variables with $p \leq 0.15$ were included in the multivariable model

THE IMPORTANCE OF EXTENDED VTE PROPHYLAXIS IN PATIENTS WITH IBD: NOMOGRAM-BASED ASSESSMENT FROM THE ACS-NSQIP COHORT.

S25

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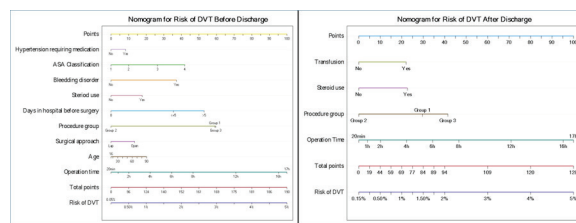
Purpose/Background: Identification of risk factors for postoperative venous thromboembolism (VTE) is an important step to reduce the morbidity after colorectal surgery. Patients with inflammatory bowel disease (IBD) have a significantly increased risk of VTE, and in contrast to cancer patients, there are no specific guidelines implemented for VTE prophylaxis. This study aimed to determine the risk factors for 30-day VTE after abdominal surgery for patients with IBD, identify potential indications for extended thromboprophylaxis, and develop a nomogram for prediction of VTE risk using a nationwide cohort.

Methods/Interventions: Data regarding patients with IBD who had elective abdominal surgery were retrieved from 2005-2015 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. Univariate analyses were conducted to determine predictor variables that were associated with VTE, and the presence of VTE before and after discharge. Variables were selected into each model using a backwards selection procedure with $\alpha=0.05$ stay criteria. Each removed variable was subsequently added to the model individually to see if it improved model fit based on reduction in Akaike information criteria. Optimal cutpoint for each model was determined using Youden's J-index. Validity of the nomograms was externally tested on the same patient group from the 2016 NSQIP database (N=4287).

Results/Outcome(s): A total of 24182 patients met inclusion criteria. Thirty-day total and post-discharge frequencies of VTE were 2.5% (N=614) and 1.0% (N=252), respectively. Univariate analysis was conducted with 37 NSQIP variables for the three study outcomes. Multivariate analysis showed patients with VTE before discharge were associated with older age, have higher rates of steroid use, underlying bleeding disorders, open surgery, ASA 3-4, hypertension, longer operative time and hospital stay prior to surgery. Patients with VTE after discharge had higher rates of postoperative transfusion, steroid use, pelvic and enterocutaneous fistula surgery, and longer operative time. A nomogram was created for each outcome, translating multivariate model parameter estimates into a visual scoring system where the estimated probability of VTE can be calculated (Figure). Final model had validity based on good fit under the H-L goodness of fit test ($p>0.05$) and discrimination based on the C-statistic ($C=0.740$) for VTE before discharge (Cutoff 1.3%). For VTE after discharge, the final model was shown to have good fit under the H-L goodness of fit test ($p>0.05$) and decent discrimination

based on the C-statistic ($C=0.636$), with an optimal cut off value of greater than or equal to 1%.

Conclusions/Discussion: Given the higher risk of VTE in patients with IBD after abdominal surgery, an accurate prediction of VTE before and after discharge using the proposed nomograms can facilitate decision-making for individualized extended thromboprophylaxis.



Nomogram for prediction of VTE before and after discharge for patients with IBD

REDUCING RACIAL DISPARITIES IN SURGERY FOR PATIENTS WITH INFLAMMATORY BOWEL DISEASE (IBD) USING ENHANCED RECOVERY AFTER SURGERY (ERAS).

S26

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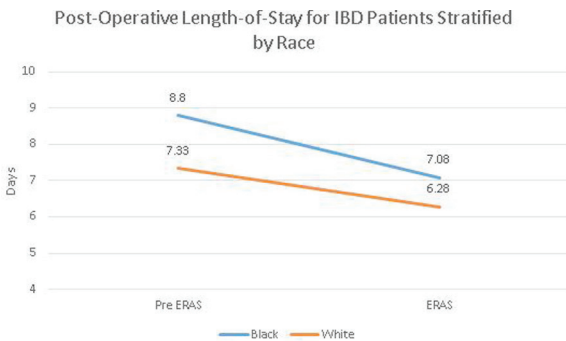
Purpose/Background: Racial disparities in surgery exist. ERAS has been shown to reduce racial disparities in post-operative length-of-stay (pLOS) for colorectal patients, but its effect in the IBD population is unclear. We hypothesized that ERAS would reduce disparities in surgical outcomes such as pLOS and post-operative complications (POCs) between black and white IBD patients undergoing colorectal surgery.

Methods/Interventions: Using a single-institution database we examined the surgical outcomes of black and white IBD patients undergoing abdominal surgery before ERAS (2006-2014) and after ERAS implementation (2015-2017). Patient and operative characteristics were included from the institutional American College of Surgeons National Surgical Quality Improvement Project (ACS-NSQIP) database. The primary outcome was pLOS. Secondary outcomes were ACS-NSQIP POCs including 30-day readmissions and infectious complications. Adjusted analyses were performed including secondary analyses stratifying patients by IBD type: Ulcerative Colitis (UC) and Crohn's Disease (CD).

Results/Outcome(s): Of 449 IBD patients (330 pre-ERAS and 119 ERAS), 17.3% were black. Overall, the adjusted mean pLOS was reduced from 7.6 days to 6.4 days with ERAS ($p<0.001$). For Pre-ERAS patients, racial disparities existed with black IBD patients stayed longer than white IBD patients (8.8 vs 7.3 days or +1.5d, $p<0.001$). With ERAS, racial disparities in pLOS were

reduced but still present between black and white IBD patients (7.1 vs 6.3d, + 0.8d, $p < 0.001$). ERAS reduced overall POC rates from 31.4% to 19.3% ($p = 0.01$) including postoperative sepsis rates from 9.7% to 1.7% ($p < 0.01$). For black IBD patients, ERAS reduced POC rates from 39.3% to 12.0% ($p = 0.01$). On secondary analysis, black patients with CD experienced the largest decrease in pLOS with ERAS compared to pre-ERAS (9.1 vs 4.3d, $p = 0.03$). Racial disparities in POCs existed for UC patients with Pre-ERAS black UC patients having higher overall POCs compared to Pre-ERAS white UC patients ($p = 0.01$). With ERAS, these racial disparities in POCs were eliminated.

Conclusions/Discussion: ERAS reduced racial disparities in pLOS between black and white IBD patients undergoing colorectal surgery, but did not eliminate it completely. ERAS reduced POCs for all patients with IBD and eliminated racial disparities in POCs for patients with UC. These data suggest that ERAS has major value in helping achieve more equitable outcomes in surgery, although more work remains.



THE IMPACT OF DISGUST ON PATIENT INTENT TO UNDERGO COLORECTAL SURGERY AND RECALL OF PERIOPERATIVE INSTRUCTIONS.

S27

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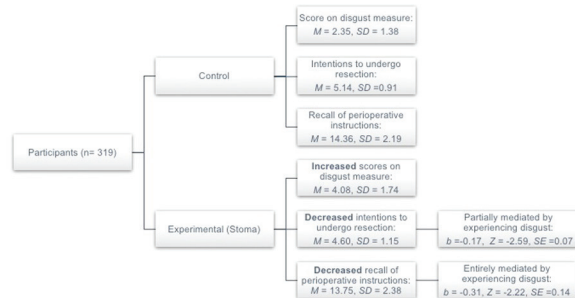
Purpose/Background: Complex information must be conveyed by surgeons to patients with colorectal cancer. Prognosis, operative plans, stoma formation, and perioperative instructions are discussed during a short visit. While it is known that receiving bad news impairs the ability to recall additional information from the same visit has been determined, no studies have assessed the role of specific emotional response of aversion or disgust on recall. The aim of this research is to determine the impact of disgust on intention to pursue a surgical resection, and ability to recall perioperative instructions.

Methods/Interventions: A scenario describing the management of colon cancer was administered to healthy participants via an online crowdsourcing mechanism.

Participants were randomly assigned to one of two conditions. The control group was provided with a scenario including the prognosis, operative plan, and perioperative instructions for removal of tumor with continent colonic reconstruction. In the experimental (stoma) group, additional information was provided for stoma formation including detailed descriptions and photos. Participants then rated their intention to undergo the recommended operation (6-point Likert scale: 'strongly disagree' - 'strongly agree'), and completed questions measuring recall of the diagnosis, prognosis, and perioperative instructions. Finally, participants completed a measure of their current disgust state.

Results/Outcome(s): Participants in the stoma group had lower intentions of undergoing surgery (Mean (M) = 4.60, Standard Deviation (SD) = 1.15) compared to the control group (M = 5.14, SD = 0.91, F-statistic (F) = 17.96, $p = 0.05$, partial $\eta^2 = 0.20$). Participants in the stoma group had worse recall of the perioperative care instructions (M = 13.75, SD = 2.38) compared to controls (M = 14.36, SD = 2.19, F = 5.00, $p = 0.03$, partial $\eta^2 = 0.02$). Participants in the stoma group scored higher on measures of disgust (M = 4.08, SD = 1.74) compared to the control group (M = 2.35, SD = 1.38, F = 79.84, $p = 0.00$, partial $\eta^2 = 0.20$). A mediation analysis was performed showing disgust partially mediates the effect of stoma information on surgery intentions ($b = -0.17$, Z = -2.59, SE = 0.07, $p = 0.01$, 95% Confidence Interval (CI) = -0.33, -0.04). Disgust fully mediates the relationship between stoma information and recall of perioperative instructions ($b = -0.31$, Z = -2.22, SE = 0.14, $p = 0.03$, 95% CI = -0.59, -0.07). (Figure 1).

Conclusions/Discussion: Intentions to undergo colorectal surgery and recall of perioperative instructions are diminished in patients who experience disgust when given stoma information. Surgeons must account for this effect in perioperative counseling so as to not interfere with intentions to undergo intervention and recall of perioperative instructions. Further studies are needed to understand how patients account for risk when experiencing disgust, and how to mitigate this response.



YOUNG SURGEON'S MOCK ORAL EXAMINATION: A REVIEW OF BENEFITS AND EARLY OUTCOMES.

S28

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Purpose/Background: To achieve certification by the American Board of Colon and Rectal Surgery (ABCRS), candidates must pass a certifying exam (CE) evaluating their problem-solving ability and knowledge of colorectal surgery. Studies in other fields have shown that mock oral examinations (MOE) can improve examinee confidence and preparedness when taking CEs. However, no published studies have evaluated the utility of a MOE in colorectal surgery. This study sought to determine if participation in a formal colorectal MOE would increase participants' confidence and improve pass rates for the CE.

Methods/Interventions: A MOE was designed and administered by the Young Surgeons' Committee (YSC) for the 2016 and 2017 ASCRS annual meetings. Board eligible colorectal fellows and recent colorectal surgery graduates (n=102) participated in three sessions simulating the ABCRS CE. Examinees were surveyed before and after the MOE to assess their preparedness, anticipated performance, and degree of confidence in passing the CE. Responses were rated on a 4-point Likert scale. Individual pre-post changes were assessed using the Stuart-Maxwell homogeneity test and McNemar's test statistics. Additionally, participants were given a follow-up survey post-MOE. For 2017 distinction in results was made between current colorectal fellows and graduates, and differences in distributions pre and post self-ratings was determined using a nonparametric repeated measures analysis. To obtain pass rates, a final survey was subsequently administered to participants who went on to take the ABCRS CE.

Results/Outcome(s): Statistically significant improvements were observed for most all pre-post survey items. Before the MOE, 47% believed they could pass the CE, whereas after the MOE 71% believed they could pass the CE (p= 0.001). When comparing fellows and recent graduates, current fellows had higher rates of confidence. On the follow up survey, 89% believed the MOE resulted in improved confidence in their ability to pass the exam. All participants found the MOE to be an efficient use of their time, 99% would recommend the MOE, 100% believed it should be offered annually at the scientific meeting, and 97% became aware of areas in which they need to improve. The MOE exceeded expectations in 57% of participants, and nearly half stated it was the major reason they attended the meeting. MOE participants had a 92% pass rate for the CE in 2017. The reported national pass rate in 2017 was 87% with an overall pass rate of 83% over the last 27 years.

Conclusions/Discussion: Participation in the MOE had multiple benefits: self-assessed competence improved in nearly all oral examination skills measured, and confidence to pass the CE increased. It has become a major draw for fellows and young faculty to attend the annual meeting, and pass rates of participants are higher than the national average.

FEMALE REPRESENTATION AND IMPLICIT GENDER BIAS AT THE 2017 TRIPARTITE ASCRS MEETING.

S29

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Purpose/Background: Women surgeons are underrepresented in academic surgery and are subject to implicit gender bias. In Colon and Rectal Surgery, there is an increasing proportion of women; in 2016, 42 of 99 candidates (42%) took the Boards, yet only 19% of ABCRS Diplomates were women. In the specific context of the 2017 ASCRS Tripartite Meeting in Seattle, WA, we quantified female representation and assessed for implicit gender bias in the formal program.

Methods/Interventions: Society and conference demographics were obtained with permission from the ASCRS. IRB approval was obtained. We used the online official program to quantify female representation in workshops, symposia, lectures, debates, and abstract sessions. We then attended live symposia and lectureships and tracked how female versus male speakers were introduced and addressed by moderators of both genders. Formal introduction was defined as inclusion of the speaker's professional title, e.g., "Doctor" or "Professor," and informal introduction was defined as use of first name +/- last name only, other denotation such as "she" or "he," or other colloquialisms. Statistical analysis was performed using Chi-Square Test.

Results/Outcome(s): Of the total 1,496 physician conference attendees who were ASCRS members, 443 (30%) were women. Overall, women represented 25% of moderators (28/110), and 26% of speakers (70/271). Of a total of 36 symposia, debates, and workshops, 19 were moderated or directed by men only (53%). Those with at least one female moderator or director (17/36; 47%) trended toward a higher overall percentage of female speakers within the session, compared to sessions without any female moderators or directors (28% vs. 19%, p=.14). Female speakers were evenly represented across topics, except for robotic surgery, where only 1 of 9 speakers was female (11%). A total of 87% of sessions were attended. Overall, female moderators were more likely than male moderators to use formal introductions (68.7% vs. 54.0%, p=.019). There was no difference when female moderators formally introduced female versus male speakers (73.9% vs. 66.7%, p=.524). By contrast, male moderators were

significantly more likely to formally introduce a male speaker than a female speaker (59.2% vs. 36.4%, p=.003).

Conclusions/Discussion: Women were well represented in the program, relative to current specialty demographics, with the exception of robotic surgery. Despite this, evidence of implicit gender bias exists, with male moderators significantly more likely to formally introduce male speakers compared to female speakers. By bringing these issues to the forefront, we hope to raise awareness and work actively to improve gender equity in our specialty, particularly as more women continue to enter the field.

USE OF ROBOTIC TECHNOLOGY: PRACTICE PATTERNS OF THE ASCRS YOUNG SURGEONS COMMITTEE.

S30

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Purpose/Background: Use of robotic-assisted colorectal surgery (RACRS) has been steadily increasing. Trainees may receive robotic training and participate in cases during residency and fellowship; however, the impact of this robotic training on clinical use after fellowship has not been evaluated. Pairing proven benefits of minimally invasive surgery with the controversy on comparative effectiveness and cost of RACRS, investigation into practice patterns with RACRS is warranted. Our goal was to examine the current practice patterns for RACRS in the young colorectal surgeon population.

Methods/Interventions: An online 25-question survey was developed to define young colorectal surgeons' experience, utilization, practice patterns, and perceived obstacles to RACRS in practice. The survey link was emailed to all ASCRS Young Surgeons Committee (YSC) members, with a one-month window for completion. YSC members were assumed representative of the young colorectal surgeon population. The main outcome measures were trends in training, utilization, opinions toward and impediments in RACRS, and minimally invasive surgery preferences.

Results/Outcome(s): 25/32 members completed the survey (78.3%). The group completed fellowship between 2010 and 2017, with the majority in practice 3-5 years (44%). Practice locations were distributed evenly across the US, with 1 international respondent. The *da Vinci* robotic course was completed by 56% during training (40% CRS residency, 16% general surgery (GS) residency) and 32% after training; 12% have still not been trained. Substantial robotic experience was limited during training- 84% performed <5 cases in GS residency, and 54% performed <5 cases in CRS residency. However, 92% are performing RACRS after training, with 68% performing >10 and 20% performing >40 RACRS annually (Figure). By indication, the robotic platform was highly

supported for rectal cancer (100%), rectal prolapse (83%), and diverticulitis (70%). By case, RACRS was preferred for rectopexy and proctectomy, while multiport laparoscopy was preferred for pouches, total, left/sigmoid, and right colectomy. Impediments to RACRS were identified, including difficulties scheduling cases (60%), no perceived clinical benefit over laparoscopy (36%), and personal experience/comfort (24%); 24% reported no impediments. 62% felt introducing new platforms would increase their RACRS utilization. Most members felt the robot had an evidence-based role as an effective minimally invasive platform (58%), while 38% felt further studies were needed to determine its role.

Conclusions/Discussion: The YSC actively uses robotics in clinical practice, and the platform is preferred in pelvic cases. The YSC encourages development of new platforms and evidence for RACRS. With impediments to RACRS identified, we can work as a committee to improve training and support of young surgeons to successfully overcome these barriers and potentially strengthen RACRS programs nationally.

Q13 Average # of Colorectal robotic cases per year after completing Colorectal Surgery fellowship

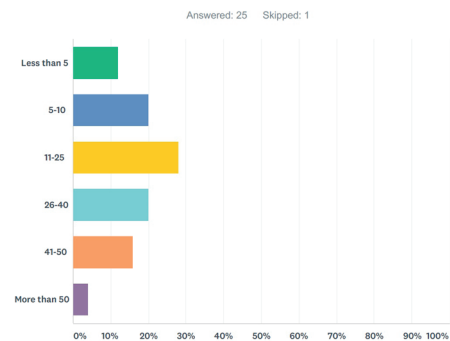


Figure 1- Average Case Volume After Fellowship. Study Submitted on Behalf of the ASCRS Young Surgeons Committee

ASSESSING THE VALUE OF ENDOSCOPY SIMULATOR TASKS DESIGNED TO PREPARE RESIDENTS FOR THE FUNDAMENTALS OF ENDOSCOPIC SURGERY EXAM.

S31

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Purpose/Background: The Fundamentals of Endoscopic Surgery (FES) exam is required for all general surgery residents and pass rates range from 60-83%. The exact FES modules are not available for practice prior to the exam, however there are similar commercially available modules. We sought to determine which modules are most valuable for resident training and preparation for FES by evaluating which correlated best with experience level.

Methods/Interventions: General surgery residents and faculty (colorectal surgeons and gastroenterologists) completed specific simulation modules (EndoBasket, EndoBubble, MucosalEval, and BasicNav) on the GI-Bronch Mentor. These modules are designed to test three of the seven deconstructed tasks needed to perform flexible GI endoscopy published by SAGES: scope navigation (all modules), mucosal evaluation (MucosalEval), and targeting (EndoBasket, EndoBubble). Participants were divided into: junior residents (JR) (have not completed an endoscopy rotation), senior residents (SR) (have completed an endoscopy rotation), and attendings (ATT). Each participant performed each task between one and five times, and a mean time was calculated for each individual. Mean performance on each task was compared between the three groups using a two-tailed student's t-test with significance set at $p=0.05$.

Results/Outcome(s): There were 36 participants: 22 JR, 11 SR, and 3 ATT. There were significant differences in average time to complete the EndoBasket module between JR and the other groups (JR 162 ± 64.6 sec, SR 116 ± 14.7 sec; ATT 70.9 ± 25.5 sec; JR vs SR $p=0.001$, SR vs ATT $p=0.08$, JR vs ATT $p=0.002$). Attendings completed the first EndoBubble task significantly faster than both JR and SR (JR 163 ± 87.4 sec, SR 125 ± 49.4 sec, ATT 63.2 ± 15.2 sec; JR vs ATT $p<0.0001$, SR vs ATT $p<0.01$). For the second EndoBubble task, there were significant differences in total time (JR 119 ± 20.6 sec, SR 100 ± 11.8 sec, ATT 87.7 ± 2.85 sec; $p<0.01$), number of balloons popped (JR 9.44 ± 3.84 , SR 15.6 ± 4.13 , ATT 28.8 ± 1.71 ; $p<0.001$), and number of wall hits (JR 1.59 ± 1.11 , SR 2.63 ± 1.67 , ATT 0.333 ± 0.333 ; $p<0.01$) between all groups. In the MucosalEval module, there were significant differences in total time (JR 469 ± 123 sec, SR 369 ± 63.4 sec, ATT 233 ± 70.4 sec; $p<0.01$) although percentage of suspicious lesions identified was similar between groups (all $>96\%$). There were no significant differences in performance on the BasicNav module between any group.

Conclusions/Discussion: Performance on modules involving mucosal evaluation, scope navigation, and targeting (MucosalEval, EndoBasket and EndoBubble) correlated well with experience level, providing benchmarks for each level to attain in preparation for the FES exam.

junior (within 5 years of appointment) and all investigators, respectively. We sought to study the scholarly output of awardees in terms of ASCRS meeting abstracts, peer-reviewed articles, securing additional research funding and career trajectory.

Methods/Interventions: We included CDA awardees from 2001 to 2017 and LPG awardees from 2017 to 2017. Variables collected included gender, institution at the time of award, amount awarded, total abstracts presented at ASCRS meetings from year of award to 2017 starting in 2007 (first or last presenter), total peer-reviewed publications available on PubMed (first or last author from year of award to November 2017). Yearly abstract and complication rate were calculated from totals by dividing by 2018 minus year of award. Additional variables included current rank, subsequent ASCRS and federal funding (NIH RePORTER).

Results/Outcome(s): We reviewed 27 LPG and 16 CDA completed award recipients (Table). In the CDA group the median (range) number of abstracts presented per year was 0.43 (0.00-2.73) and the median (range) number of publications per year was 1.33 (0.33-4.82). In the LPG group, the median (range) ASCRS abstracts presented per year was 0.4 (0.00-4.67) and the median (range) number of publications per year was 2.0 (0.00-10.00). In the CDA group 3 (19%) and LPG group 13 (50%) received follow up federal funding. Of note, in the LPG group 13 (44%) of the recipients were not colorectal surgeons (8 general surgeons/ surgical oncologists, 4 PhD, 1 gastroenterologist) but 8 (62%) of these recipients went on to receive federal funding. Of the 10 colorectal surgeons (CDA and LPG) who secured federal funding after RF funding, 3 had received 2 ASCRS awards in different years (either CDA + LPG or LPG + LPG).

Conclusions/Discussion: RF support has contributed to scholarly activity in the colorectal surgery by all measures and is an important component of ASCRS. The CDAs have assisted colorectal surgeons in developing their academic career while the LPGs have supported scholarly work by colorectal surgeons, surgical oncologists, gastroenterologists and researchers in our field. Both mechanisms

WHERE ARE THEY NOW? CAREER TRAJECTORIES AND PRODUCTIVITY OF ASCRS GRANT RECIPIENTS.

S32

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Purpose/Background: The American Society of Colon & Rectal Surgeons (ASCRS) awards Career Development Awards (CDA) and Limited Project Grants (LPG) to foster inquiry in the field of colon and rectal surgery in

S32 Grant Demographics

	CDA	LPG
# of awards executed	16	29
Gender (M/F)	10/6	20/9
Fellowship trained colorectal surgeons*	15/16	16/29
Current academic practice	14/16	29/29
Current leadership position	6/16	10/29
Unique institutions	15/16	16/29

*non colorectal surgeons = 8 surgeons; 4 PhD; 1 GI

were associated with similar scholarly activity and leadership roles but the LPG, alone, had a lower likelihood of leading to subsequent federal funding for colorectal surgeons.

WHAT DO YOUNG COLORECTAL SURGEONS VALUE FROM THEIR CRS RESIDENCY TRAINING?

S33

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Purpose/Background: The field of colon and rectal surgery (CRS) has seen rapid advances in recent years. This qualitative study sought to identify aspects of CRS residency curriculum that were most valued by recent graduates and what changes could be made to improve training.

Methods/Interventions: Semi-structured interviews were performed with board-certified colorectal surgeons 2-7 years removed from their CRS residency. Interview responses were qualitatively analyzed and converted to coded, categorizable data. Subjects were recruited via a snowball sampling method.

Results/Outcome(s): 20 board-certified colorectal surgeons currently employed in 13 states and one foreign country were interviewed. Surgeons ranged from 2-7 years in practice (mean 3.5 yrs) and represented 11 CRS residency programs. 50% were female. When queried on what aspects of their CRS residency made them successful, the group produced 74 comments including: volume of cases (65% of subjects), variety of cases (55%), development of technical skills (40%), management of specific disease processes (35%), faculty (30%), mentorship (30%), and practice management (15%). With regard to operative experience: surgeons cited pelvic surgery (40%) and MIS techniques (30%) as the exposures that helped them become successful. When queried about what elements they would like added to their training, 100% of subjects made 54 comments identifying: technical skills (pelvic surgery, robotics, and colonoscopy--60%), exposure to disease management (anorectal, pelvic floor, and IBD--50%), information about practice management (35%), and time for research (10%). When asked to identify aspects of their CRS residency training that could be eliminated, 65% responded "nothing." In regard to time spent in clinic, 45% of subjects expressed a desire to have spent more time in clinic. Of those subjects, 44% had no specific clinic requirement in their residency. Finally, regarding autonomy, 80% of surgeons were happy with the level of autonomy they experienced in CRS residency. 45% described themselves as happy while listing traditional descriptors of autonomous behavior, 35% described themselves as happy while

describing higher levels of supervision, while 20% wished for more autonomy.

Conclusions/Discussion: Although young colon and rectal surgeons appreciated many aspects of their training, they also expressed a strong desire to add elements to their CRS residency while declining to eliminate any part of the existing curriculum. Young surgeons valued time spent in the clinic during training, often more in retrospect. These findings suggest that programs should consider the incorporation of a structured clinic requirement to the residency curriculum. Finally, the traditional norms of autonomy were not as valued by young colorectal surgeons as one might expect for those nearing the completion of their training.

A STEADY TREND BUT A GENERAL RE-DISTRIBUTION OF ELECTIVE IPAA FOR UC.

S34

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Purpose/Background: The introduction of biologics in the management of ulcerative colitis has altered the natural history of the disease. This study aimed to determine the distribution of elective ileal pouch anal anastomosis (IPAA) across academic centers and to determine the rate of IPAA procedures over time among patients with ulcerative colitis.

Methods/Interventions: Elective IPAA from 2012 to 2015 were queried using the University HealthSystem Consortium (UHC) national database, which records all inpatient hospitalization data and procedures of 140 academic centers and their affiliates. All the academic centers had unique de-identified hospital codes in the UHC raw database. Descriptive statistical analysis was used to evaluate the two outcomes of interest: distribution of elective IPAA and rate of IPAA procedures over time.

Results/Outcome(s): Between 2012 to 2015, the average age of the study population of elective admissions with primary diagnosis of ulcerative colitis (N=7,382) was 41 years, more than half were men, 84% were white, and 73% had private insurance. One-third (N=2,469) underwent IPAA. These patients were of similar characteristics except a higher proportion had private insurance (80%). Rates of elective IPAA among total elective admissions were stable at 33-35% from 2012 to 2015. Of the 140 academic hospitals in UHC, 32 were colorectal fellowship training programs. There were 134 centers that performed IPAA, the 50th percentile performed 1.9 cases per year [IQR 0.8 – 4.5]. Nearly half (45%) of the cases were performed by only 9 high-volume academic centers (performing an average of 30 pouches/year). There were 125 centers that performed the remaining 55% of elective IPAA cases, and only 21 of those centers performed more than 5 elective IPAA cases per year. Overall, only a total

of 30 centers (out of 140 centers in the study) performed greater than 5 elective IPAA cases per year.

Conclusions/Discussion: Although the rate of elective IPAA surgery over time was stable, nearly half of IPAA cases were performed at 9 high-volume centers. The large concentration of cases at high-volume centers and the steady, non-increasing trend of case per year has potential implications for IPAA case requirements during colorectal fellowship training. Potential changes include decreasing the minimum pouch case requirements or allowances for fellows to travel to high-volume performing centers for pouch cases. Further work should be done to evaluate whether the clustering of IPAA cases at high-volume centers also has implications for potential differences in clinical outcomes.

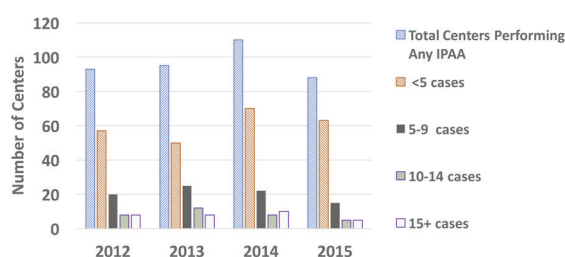


Figure 1. Distribution of IPAA Cases From 2012-2015

THE INFLUENCE OF COMPARABLE PROCEDURE VOLUMES ON PATIENT OUTCOMES AFTER LAPAROSCOPIC RECTAL SURGERY.

S35

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Purpose/Background: Laparoscopic rectal surgery is a technically challenging procedure with a potential advantage for high volume surgeons. However, average yearly volumes can be much lower for this procedure as compared to other, higher volume colorectal procedures. Therefore, the purpose of this paper is to determine the volume relationships of common colorectal procedures on laparoscopic rectal outcomes.

Methods/Interventions: This was a national retrospective cohort study of all colorectal surgeries with primary anastomoses between April 2008 and March 2015 across Canada (excluding Quebec). Patient characteristics, clinical comorbidities, patient procedures, and hospital discharge details relevant to summarizing an admission were collected from the Canadian Institute for Health Information (CIHI) Discharge Abstract Database (DAD). Volumes for common colorectal procedures were calculated for each individual surgeon and high volume status was established for each procedure as the upper quartile of procedure volumes. The primary outcome examined

included in hospital all-cause morbidity. Annual laparoscopic rectal volumes greater than 10 were considered high volume. Multilevel logistic regression analysis was used for the final model.

Results/Outcome(s): A total of 5,323 laparoscopic rectal cancer cases were identified within 180 hospitals and between 620 surgeons. Data analysis demonstrated an all-cause morbidity rate of 24.2% laparoscopic rectal cases. High volume laparoscopic rectal surgeons significantly reduced all-cause morbidity rates (OR 0.77, CI 0.61-0.96 $p=0.020$). High volume open rectal practitioners also significantly improved laparoscopic rectal outcomes (OR 0.76, CI 0.61-0.93 $p=0.009$). Laparoscopic and open colon cases volumes had no effect on laparoscopic rectal outcomes. Hospital volumes for colon and rectal cases also did not statistically affect outcomes.

Conclusions/Discussion: In summary, high volume surgeon status is an important predictor of all-cause morbidity after laparoscopic rectal surgery indicating that experience may be an important factor in this relatively complex procedure. In addition, open rectal cancer volumes also contribute to better laparoscopic rectal outcomes while colon surgery volume of any type, laparoscopic or open, did not impact laparoscopic rectal outcomes. This may indicate a potential dissimilarity in these cases and potentially less transferability of surgeon skills. It could also indicate the need for some level of rectal surgery specialization. This could have an important impact on surgical training and competency planning in the future.

EARLY URINARY CATHETER REMOVAL FOLLOWING PELVIC COLORECTAL SURGERY: A PROSPECTIVE, RANDOMIZED, NON-INFERIORITY TRIAL.

S36

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Purpose/Background: Optimal timing for urinary catheter removal after major pelvic colorectal surgery remains unknown. Due to the potential increased risk of acute urinary retention (AUR), the benefit of early catheter removal remains unclear. We performed a randomized, non-inferiority trial evaluating AUR with early vs. standard urinary catheter removal after pelvic colorectal surgery in the setting of an enhanced recovery protocol.

Methods/Interventions: Patients undergoing colorectal surgery below the peritoneal reflection for benign or malignant disease were randomized to catheter removal on postoperative day (POD) 1 (early) or on POD3 (standard). Patients in the early arm were also administered an alpha-antagonist (prazosin 1mg oral) 6 hours prior to catheter removal. Patients with a history of benign prostatic

hyperplasia, lower urinary tract surgery, epidural use or ureteral stent placement were excluded. The primary endpoint was incidence of AUR, defined as impaired voiding with post-void residual (PVR) >300 cc measured by ultrasound. A 15% noninferiority margin was chosen according to clinical relevance estimation. Secondary endpoints included postoperative length of stay (LOS) and incidence of symptomatic urinary tract infection (UTI). Continuous and categorical variables were compared with Student's t-test or Chi-square analysis, respectively. Standard error was calculated to define 95% confidence intervals (CI).

Results/Outcome(s): 142 patients were randomized to early (n=71) or standard (n=71) catheter removal. Mean age was 44.8±16.9 years and the study cohort included 54% males. The most common operations were ileal pouch-anal anastomosis (66%) and low anterior resection (18%). A diverting ileostomy (87%) and pelvic drains (87%) were used in a majority of patients without any inter-group differences. Mean intraoperative intravenous fluid volume, operative time, blood loss, narcotic use and VAS pain scores on POD1 were similar between patient groups. The overall rate of AUR was 9.2% (n=13), with no difference between early (n=6,8.5%) or standard (n=9,9.9%) catheter removal (RR 0.86; 95%CI 0.30 to 2.42). The risk difference was -1.4% (95% CI, -8.3 to 11.1), confirming non-inferiority. The rate of UTI was significantly higher in standard vs. early catheter removal (11.3% vs. 0%;p=0.01). LOS was significantly shorter after early compared with standard catheter removal (4.9 vs. 5.8 days;p=0.04). Prazosin was well tolerated; 6 (8.5%) patients experienced dizziness, and there were no serious cardiac events.

Conclusions/Discussion: Early urinary catheter removal on POD1, when combined with the addition of an oral alpha antagonist following pelvic colorectal surgery, is non-inferior to standard POD3 removal and carries a lower risk of UTI and shorter LOS. Early urinary catheter removal combined with oral alpha antagonist may be safely incorporated in enhanced recovery strategies following pelvic colorectal surgery.

DIFFERENT RISK FACTORS FOR IN-HOSPITAL AND POST-DISCHARGE VENOUS THROMBOEMBOLIC EVENTS AFTER COLORECTAL SURGERY.

S37

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Purpose/Background: Extended thromboprophylaxis after abdominal and pelvic cancer surgery to prevent venous thromboembolism (VTE) is recommended but adherence is poor. Identification of the patients at highest risk for post-discharge VTE may allow for selective

extended thromboprophylaxis. This strategy may be a more efficient use of resources, and may avoid potential adverse events and inconvenience to patients. Past studies have not differentiated between in-hospital and post-discharge VTE risk factors. We hypothesize that the risk factors for VTE are different for in-hospital and post-discharge occurrences.

Methods/Interventions: The American College of Surgeons National Surgical Quality Improvement Project (ACS-NSQIP) 2012 to 2016 database was queried for all patients undergoing colorectal resection. VTE was defined as a deep vein thrombosis (DVT) or pulmonary embolism (PE). Primary outcome was post-operative VTE occurrence within 30 days. Patients were divided into three groups: No VTE, VTE during hospital stay, and VTE post-discharge. A multinomial logistic regression was performed to identify in-hospital and post-discharge predictors of VTE, adjusting for potential confounders.

Results/Outcome(s): Out of 260,258 patients, 5,381 (2.1%) developed VTE, including 4010 patients with a DVT. A total of 3,442 (1.3%) occurred during the initial hospital stay (2597 DVT and 1088 PE) and 1,929 (0.8%) occurred post-discharge (1413 DVT and 742 PE). Mean time to DVT occurrence was 7.8 days (SD 8.2) after surgery for an in-hospital event and 14.5 days (SD 6.7) for a post-discharge event. For patients with PE, mean time to event was 6.7 days (SD 5.2) for an in-hospital event and 17.7 days (SD 6.6) for post-discharge PE. Postoperative mortality was higher in patients with a VTE than those without (8.0% vs. 2.9%, p<0.001). Risk factors for in-hospital and post-discharge VTE were different (Table 1), as patients with an in-hospital VTE were more likely to be older, male, have higher ASA, preoperative steroid use, poor functional status, bleeding disorder, or undergone an emergency operation or proctectomy. In the post-discharge setting, only age, higher ASA, steroid use, poor functional status, emergency operation, and postoperative complications remained significant. Patients with inflammatory bowel disease demonstrated higher risk of VTE than patients with malignancy for both in-patient and post-discharge occurrences.

Conclusions/Discussion: The incidence of VTE in patients undergoing colorectal resection is low, and only half of these occur post-discharge and therefore potentially avoidable with extended thromboprophylaxis. Patients at high-risk for post-discharge VTE have different characteristics than those who develop VTE in-hospital. Identifying this specific subset of patients at highest risk for post-discharge VTE may allow for the selective use of prolonged thromboprophylaxis.

Table 1. Results of the multinomial logistic regression analysis to identify independent risk factors associated with higher probability of VTE occurrence (further adjusted for smoking and other NSQIP-defined comorbidities).

	VTE in-hospital OR (95%CI)	VTE post-discharge OR (95%CI)
Age	1.01 (1.00-1.012)	1.01 (1.01-1.01)
BMI ≥35		1.20 (1.04-1.38)
Male gender	1.14 (1.07-1.23)	
ASA ≥3	1.92 (1.74-2.12)	1.13 (1.02-1.25)
Steroid use	1.43 (1.29-1.58)	1.34 (1.15-1.56)
Bleeding disorder	1.15 (1.02-1.28)	
Emergency operation	1.69 (1.55-1.86)	1.24 (1.08-1.43)
Poor functional status	1.32 (1.16-1.51)	2.23 (1.19-4.18)
Prolonged operative duration (>220 mins)	1.36 (1.25-1.48)	
Postoperative complications	4.28 (3.92-4.65)	12.42 (11.00-14.01)
Proctectomy	1.30 (1.18-1.44)	
Indication for surgery (vs. malignancy)		
IBD	1.56 (1.36-1.82)	1.23 (1.02-1.48)

Table 1. Results of the multinomial logistic regression analysis to identify independent risk factors associated with higher probability of VTE occurrence (further adjusted for smoking and other NSQIP-defined comorbidities).

USING TAMIS TO EXPAND SIZE AND CIRCUMFERENCE CRITERIA FOR RECTAL LESIONS.

S38

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Purpose/Background: National guidelines recommend that transanal resection of rectal neoplasms be limited to lesions < 3cm in size and < 30% circumference to preserve specimen quality. The influence of resection technique on specimen quality for larger lesions has not been assessed. Our aim was to evaluate outcomes of patients who underwent resection for large lesions >3cm and >30% circumference, and to compare specimen quality between transanal minimally invasive surgery (TAMIS) and traditional transanal excision (TAE).

Methods/Interventions: Patients who underwent full-thickness TAMIS or TAE resection for premalignant and malignant rectal lesions from 2010-17 at a single institution were included. Outcomes and specimen quality were analyzed for patients with large lesions (>3cm or >30% rectal circumference) compared to small lesions (<3cm and <30% circumference). Primary outcome was specimen quality, as defined by resection margin positivity and rate of fragmentation. Specimen quality for large vs small lesions was then compared by TAMIS vs TAE. Secondary outcomes were operative time, length of stay, and post-op complications including bleeding, post-operative urinary retention (POUR), fecal incontinence and readmission rate.

Results/Outcome(s): Of the 121 patients who underwent full thickness resection, the median age was 61yrs,

55% were male, 56% (n=68) underwent TAMIS and 44% (n=53) underwent TAE. When comparing large vs small lesions, there was no difference in age, gender, race, comorbidities, or type of lesion (pre-malignant vs malignant). The mean size and circumference of large vs small lesions was 3.0cm and 43% vs 1.5cm and 27%, respectively. Surgical specimens of large lesions were less likely to be fragmented (2% vs 15%; p=0.017) but more likely to have positive margins (15% vs 4%; p=0.055) compared to small lesions. Patients with large lesions were also more likely to have longer operative times (110min vs 60min; p<0.001), incontinence (8.5% vs 0%; p=0.025), and hospital readmission (13.6% vs 1.6%; p=0.015), but there was no difference in bleeding, POUR, or length of stay. When stratifying by surgical technique, however, there was no difference in specimen quality and complications between large and small lesions when resected by TAMIS. This finding did not hold true for TAE. When analyzing only large lesions, TAMIS specimens were less likely to have positive margins (9% vs 39%; p=0.019) compared to TAE, despite no difference in specimen fragmentation or complication rate between techniques.

Conclusions/Discussion: Resection of both large and small lesions by TAMIS technique yields similar specimen quality and complication rates. This improvement in outcomes with TAMIS over traditional TAE suggests this is a safe and oncologically sound modality for removing large lesions. Current national guidelines should be amended for resecting lesions that are >3cm or >30% circumference with a transanal approach.

THORACIC EPIDURAL ANALGESIA: DOES IT ENHANCE RECOVERY?

S39

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Purpose/Background: Thoracic epidural analgesia (TEA) has been shown to be an effective method of pain control. The utility of TEA as part of an enhanced recovery after surgery (ERAS) protocol is debatable. We investigated if the use of TEA in an ERAS protocol decreases hospital length of stay (LOS) or opioid consumption after elective colorectal resection.

Methods/Interventions: This is a retrospective review of all patients in the Section of Colon and Rectal Surgery at a tertiary care center between 2013-2017 undergoing elective transabdominal colon or rectal resection. We compared those who received TEA with bupivacaine and those who did not. Per institutional protocol, all patients were considered for TEA. In addition, standard ERAS protocol during this time period utilized a multimodal pain regimen including patient controlled analgesia (PCA) with intravenous opioids, and scheduled nonsteroidal

anti-inflammatory drugs (NSAIDs), acetaminophen, and gabapentin. Primary outcome was difference in LOS between those receiving TEA and those not; secondary outcome was oral morphine equivalents consumed during the first 48 hours.

Results/Outcome(s): There were 1006 patients (n=815 TEA, 191 no TEA) who underwent colorectal resection during the study period. Univariate analysis demonstrated no statistically significant difference in LOS between those who received TEA and those who did not (median 4 vs. 5 days, p=0.162), which was substantiated by multivariable linear regression. Multivariable linear regression identified these factors increasing LOS: presence of metastatic disease, preoperative dyspnea, and American Society of Anesthesiologists Classification score 3 or 4. Laparoscopic approach was associated with decreased LOS (see Table 1). Subgroup analysis showed the addition of TEA resulted in no statistically significant difference in LOS regardless of open (n=362, p=0.656) or laparoscopic (n=644, p=0.458) approach. Pharmacy data to calculate opioid consumption was available since 2015 (n=497 patients). Univariate analysis demonstrated no statistically significant difference in morphine equivalents consumed in the first 48 hours between patients who received TEA and those who did not (median 135 vs. 110 oral morphine equivalents, p=0.347), which was substantiated by multivariable linear regression. Subgroup analysis of open cases showed that the presence of TEA did not reduce the consumption of morphine equivalents in the first 48 hours (n=194, p=0.747). This also held true for laparoscopic cases (n=303, p=0.154).

Conclusions/Discussion: The use of TEA within an ERAS protocol was not found to be associated with a reduction in LOS or morphine equivalents consumed within the first 48 hours. We advocate for eliminating routine use of TEA within ERAS protocols.

Multivariable Linear Regression Model				
Variable	LOS Estimate	95% Lower	95% Upper	p-value
Epidural: Yes vs. No	-0.3	-0.9	0.4	0.404
Approach: Lap vs. Open	-2.2	-2.7	-1.6	<0.001
Age	0.0	0.0	0.0	0.892
BMI	0.0	-0.1	0.0	0.121
Diabetes: Yes vs. No	-0.5	-1.3	0.3	0.214
Smoker: Yes vs. No	0.3	-0.3	0.9	0.377
COPD: Yes vs. No	0.8	-0.9	2.5	0.343
Heart Failure: Yes vs. No	2.9	-0.1	5.8	0.056
Hypertension: Yes vs. No	-0.1	-0.7	0.5	0.844
Dialysis: Yes vs. No	0.3	-3.1	3.7	0.851
Ascites: Yes vs. No	0.6	-7.5	8.8	0.877
Metastases: Yes vs. No	0.9	0.1	1.7	0.021
Dyspnea: Yes vs. No	0.9	0.1	1.7	0.035
Functional Status: Partially Dependent vs. Independent	1.5	-1.5	4.5	0.324
Steroid: Yes vs. No	0.0	-0.8	0.7	0.892
ASA: 3or4 vs. 1or2	0.6	0.0	1.2	0.046

IS THE ROBOT WORTH IT? A POPULATION-BASED ANALYSIS OF 90-DAY COST & HOSPITAL UTILIZATION FOR ROBOTIC SURGERY IN COLON & RECTAL CANCER.

S40

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Purpose/Background: The role of robotic surgery in colon & rectal cancer remains controversial with most data arising from small, single-institution studies. Population-based studies are lacking in the United States. The aim of this population-based study was to compare 90-day cost and 90-day hospital days by surgical approach.

Methods/Interventions: The New York State Cancer Registry and Statewide Planning & Research Cooperative System were queried for elective stage I-III colorectal resection patients from 2008-2014. Patients were categorized as robotic, laparoscopic and open surgery on an intention-to-treat (ITT) and non-intention-to-treat (non-ITT) basis. Conversion rates were compared. Total costs for each patient were calculated by matching the federal diagnostic related grouper (DRG) to DRG-specific costs per the Centers for Medicare and Medicaid Services and summed for all admissions within 90-days starting with the surgery. Hospital days were calculated by summing the length-of-stay (LOS) of the index surgery plus the LOS of subsequent hospitalizations within 90-days. Propensity-adjusted regression models evaluated the association between approach and 90-day cost and hospital days.

Results/Outcome(s): 13,341 patients (colon cancer: 11,245; rectal cancer: 2,096) were identified. Patients who underwent robotic surgery were generally younger, and more likely to be of white race and have stage III cancer. Robotic surgery was more common among board certified colorectal surgeons (77% vs 23% general surgeon), and surgeons with <10 years in practice. Majority of robotic surgery occurred at academic hospitals. Conversion rates for colon robotic surgery was 3% and colon laparoscopic surgery was 13%, while for rectal robotic surgery the conversion rate was 6% and for rectal laparoscopic surgery 31%. In colon cancer, laparoscopic but not robotic was significantly associated with lower 90-day cost as compared to open (Table). In rectal cancer, both robotic and laparoscopic surgery were significantly associated with lower cost as compared to open; furthermore, when comparing robotic to laparoscopic, robotic surgery had significantly lower 90-day costs (10% less) in non-ITT analysis. Both colon and rectal robotic and laparoscopic surgery were associated with decreased hospital days as compared to open; no significant differences were found between robotic and laparoscopic in terms of hospital days.

Conclusions/Discussion: Both robotic and laparoscopic surgery had less cumulative hospital stay over the 90-day post-operative period versus open. Robotic surgery was associated with a significant 90-day cost benefit as compared to open, and even as compared to laparoscopic surgery. This may be driven by a 25% decreased in conversion rate to open among robotic rectal cancer cases versus laparoscopic. This cost advantage of robotic over laparoscopic was not observed for colectomy cases.

DOES THE EFFECT OF ENHANCED RECOVERY AFTER SURGERY ON POSTOPERATIVE LENGTH OF STAY FOR COLORECTAL PROCEDURES VARY BY SURGICAL INDICATIONS?

S41

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Purpose/Background: Enhanced Recovery After Surgery (ERAS) is associated with reduced postoperative length of stay (pLOS) in colorectal surgery, however, it is unclear whether reductions vary by the indication for surgery. In particular, patients with inflammatory bowel disease (IBD) have higher rates of postoperative complications, which may impact the efficacy of ERAS. We hypothesized that ERAS would be less effective for reducing pLOS in patients undergoing colorectal surgery for IBD compared to cancer or diverticular disease.

Methods/Interventions: We performed a retrospective cohort study of patients undergoing elective colorectal procedures for IBD, colorectal cancer, or diverticular disease at a single institution before and after the implementation of an ERAS pathway. Pre-ERAS patients were

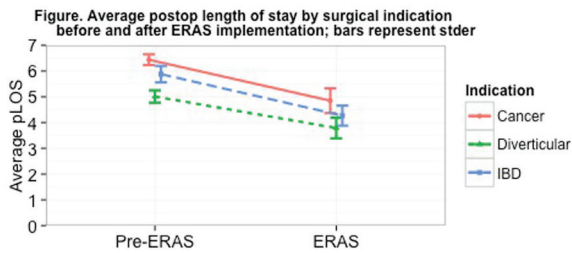
identified using the institutional National Surgical Quality Improvement Project database between years 2012-2014. ERAS patients included patients undergoing surgery with ERAS pathway between 2015 and 2017. The primary outcome was pLOS and the secondary outcome was the occurrence of any 30-day postoperative complication. Generalized linear models were used to test whether ERAS was associated with pLOS for each surgical indication adjusting for patient demographics and procedure type. An overall model of pLOS was created using all patients to test the interaction between ERAS and surgical indication.

Results/Outcome(s): Of 778 patients undergoing elective colorectal surgery, 510 were pre-ERAS and 268 ERAS. The indications were IBD (n=188, 24.2%), colorectal cancer (n=472, 60.7%), and diverticular disease (n=118, 15.2%). Prior to ERAS implementation, mean pLOS was longest in patients undergoing colorectal surgery for cancer (6.4 days) followed by IBD (5.9 days) and diverticular disease (5.0 days) (p <0.01). On adjusted analysis, ERAS was associated with a shorter pLOS for IBD (-1.7 days, 95%CI 0.6-2.8), cancer (-1.7 days, 95%CI 0.7-2.7), and diverticular disease (-1.8 days, 95%CI 0.9-2.8) (**Figure**). The reduction in pLOS did not significantly vary by surgical indication (p=0.88). Additionally, there were no significant differences in occurrence of postoperative complications before and after implementation of ERAS for each surgical indication (IBD: 30.5% vs 28.3%, p=0.74; cancer: 21.2% vs 22.8%, p=0.72; diverticular: 15.7% vs. 20.8%, p=0.48).

Conclusions/Discussion: ERAS is associated with reduced pLOS for colorectal patients across all three major surgical indications including IBD, cancer, and diverticular disease. These findings highlight the equitable benefits of ERAS principles for patients undergoing elective colorectal surgery and support its continued adoption in surgical care.

S40 Analysis of 90-Day Cost and 90-Day Hospital Days: Incidence Rate Ratios (95% Confidence Intervals)

	90-Day Cost		90-Day Hospital Days	
	ITT	Non-ITT	ITT	Non-ITT
		Colon Cancer Resections		
Open (n=3948)	Reference	Reference	Reference	Reference
Laparoscopic (n=6,846)	0.88 (0.77, 0.99)	0.86 (0.74, 0.97)	0.79 (0.71, 0.89)	0.78 (0.70, 0.89)
Robotic (n=451)	0.99 (0.86, 1.15)	0.96 (0.80, 1.15)	0.88 (0.80, 0.98)	0.90 (0.80, 1.01)
		Rectal Cancer Resections		
Open (1,240)	Reference	Reference	Reference	Reference
Laparoscopic (n=541)	0.92 (0.85, 0.99)	0.91 (0.85, 0.97)	0.86 (0.77, 0.97)	0.84 (0.71, 0.99)
Robotic (n=315)	0.88 (0.79, 0.97)	0.82 (0.74, 0.94)	0.80 (0.68, 0.93)	0.78 (0.67, 0.90)



RANDOMIZED CLINICAL TRIAL COMPARING LAPAROSCOPIC VS. ULTRASOUND-GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK IN MINIMALLY INVASIVE COLORECTAL SURGERY.

S42

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Purpose/Background: The transversus abdominis plane (TAP) block has emerged as an important tool in achieving multimodal analgesia after colorectal surgery. Although TAP blocks can be performed using laparoscopy (Lap-TAP) or ultrasound (US-TAP), the optimal approach is unclear given unstandardized techniques and conflicting results of uncontrolled studies. Herein, we report the first randomized trial comparing conventional Lap-TAP vs. US-TAP block in minimally invasive colorectal surgery (MICRS).

Methods/Interventions: A single-center, patient-blinded, 3-arm randomized (2:2:1) clinical trial was performed comparing Lap-TAP and US-TAP vs. No TAP in consecutive patients having MICRS between October 2015 and March 2017. The primary endpoint was morphine dose equivalents at 24 hours postoperatively. Secondary

endpoints included morphine dose at 48 hours, VAS pain scores, complications, and postoperative length of stay (LOS). Anesthesia and postoperative pain protocols were standardized. A non-inferiority margin of 10 mg morphine was chosen for comparison of Lap- and US-TAP blocks. The study was terminated after a planned interim analysis at 50% enrollment after meeting predefined study termination criteria (difference in morphine dose at 24 hours between Lap- and US-TAP groups at 0.05 significance level).

Results/Outcome(s): Of the 127 randomized patients, 20 patients were excluded for conversion to open surgery (n=16) or protocol violation (n=4). The remaining study cohort were randomized to Lap-TAP (n=41), US-TAP (n=45) or No TAP (n=21). Mean (SD) age for the study cohort was 50.4 (18) years and 50 (47%) patients were male. All groups were well matched in preoperative and surgical characteristics. Most patients had surgery for inflammatory bowel disease (52%) using multiport laparoscopy (52%) and there were no intergroup differences. The mean difference in 24-hour morphine dose between Lap-TAP and US-TAP was -16.2 mg (95% CI -28.2 to -4.3 mg) confirming non-inferiority of Lap-TAP to US-TAP. Lap-TAP was also superior to US-TAP and No TAP with respect to morphine dose at 24 and 48-hours (Table). There was a trend toward lower pain scores on arrival to PACU after Lap-TAP vs. US-TAP and No TAP but pain scores upon PACU discharge, at 24 and 48 hours remained similar. Mean (SD) LOS for Lap-TAP, US-TAP, and No TAP was 4.9 (2.9), 5.3 (3.3), and 5.1 (3.1) days, respectively; p=NS. Postoperative ileus and overall complications occurred in 30 (28%) and 40 (37%) patients without any between-group differences.

Conclusions/Discussion: In patients undergoing MICRS, Lap-TAP appears to provide superior analgesia and reduced narcotic utilization during the early postoperative

S42 24- and 48-hour Morphine Use

	Lap-TAP (n=41)	US-TAP (n=45)	No TAP (n=21)
24-hour morphine eq. (mg)	-----	-----	-----
Mean (SD)	22.8 (21.3) %	39 (35.5)	31.4 (19.2)
Median (IQR)	17.6 (6.6-33.9) &	34 (16.4-44.4)	31.6 (18.4-44.4)
48-hour morphine eq. (mg)	-----	-----	-----
Mean (SD)	42 (52.9)	67 (81.9)	63.6 (41.4)
Median (IQR)	26.8 (15.5-45.8) #	44 (27.6-70)	60.8 (34.8-78.8)
Pain score on arrival to PACU; mean (SD)	4.2 (3.6) \$	4.6 (3.3)	6.3 (2.8)
Pain score on discharge from PACU; mean (SD)	3.9 (2.7)	3.8 (2.5)	4.2 (2.8)
Pain score average during 1st 24 hr; mean (SD)	3.5 (1.5)	3.9 (1.5)	3.5 (1.2)
Pain score average during 2nd 24 hr; mean (SD)	3.6 (1.8)	3.9 (1.7)	4.3 (1.5)

Means compared using one-way ANOVA and medians compared using Kruskal-Wallis rank sums analysis for non-normally distributed data. %p=0.03, &p=0.01, #p=0.001, \$p=0.059; IRQ Interquartile range; SD standard deviation

period vs. US-TAP and no TAP. Differences in analgesia between Lap- and US-TAP may be attributed to varying technical details inherent to each procedure. Lap-TAP should be incorporated in standardized enhanced recovery pathways after MICRS.

KETOROLAC USE AND ANASTOMOTIC LEAK IN ELECTIVE COLORECTAL SURGERY: A DETAILED ANALYSIS.

S44

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Purpose/Background: Ketorolac is a nonsteroidal anti-inflammatory drug (NSAID) used for the short-term management of moderate to severe pain. Recent population level analyses have linked ketorolac use to anastomotic leak. However, the use of ketorolac is also associated with decreased use of opioids and faster time to bowel function. With a clear benefit of ketorolac use in the perioperative period, further investigation is needed to assess whether its use is associated with harm, specifically with anastomotic leak. We hypothesize that the use of ketorolac will not be associated with anastomotic leak in elective colorectal surgery.

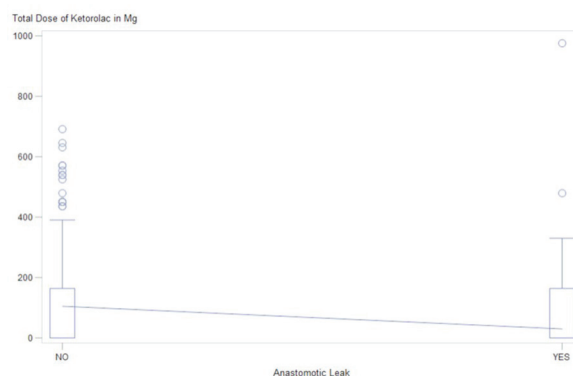
Methods/Interventions: Consecutive patients undergoing elective colorectal surgery with an anastomosis without diversion were identified from 2012-2016 from a prospectively maintained database. Total and median daily dose of ketorolac were calculated. Ketorolac exposure was defined as any administration of ketorolac during the peri-operative time period. Anastomotic leak was captured by the NSQIP targeted colectomy and proctectomy data set. Odds of anastomotic leak, acute kidney injury (AKI), reoperation, and readmission were adjusted for patient level factors (age, gender, comorbidity, ASA score), intra-operative factors (operative time and blood loss) and other NSAID exposure and then compared via a multivariable logistic regression. A secondary analysis of patients exposed to ketorolac used a multivariable regression to assess for a dose response association with anastomotic leak. An *a priori* power analysis concluded that a cohort of 852 was needed to have 80% power to detect a 4% difference at $p=0.05$.

Results/Outcome(s): 877 patients met inclusion criteria and formed the study cohort. 479 (54.6%) were female and the median age was 55. Overall, 566 (64.5%) were exposed to ketorolac. For those exposed, the median total dose was 165mg and the median daily dose was 41.2mg/day. Overall, 27 (3.1%) patients suffered an anastomotic leak. In an unadjusted analysis, there was no association between ketorolac exposure and anastomotic leak (K: 2.8% vs No K: 3.5%; $P=0.56$). This persisted in a multivariable model (OR 0.99; 95% CI 0.39-2.59; $P=0.98$). In addition, neither AKI (OR 2.47; 95% CI 0.44-13.77; $P=0.30$), return to the

operating room (OR 0.89; 95% CI 0.36-2.19; $P=0.80$), nor readmission (OR 1.10; 95% CI 0.65-1.85; $P=0.72$) were associated with ketorolac use. In a secondary analysis of patients receiving ketorolac, there was no association between total ketorolac dosing and anastomotic leak (OR 0.99; 95% CI 0.99-1.01; $P=0.15$) or mean daily dosing and anastomotic leak (OR 1.00; 95% CI 0.97-1.02; $P=0.85$).

Conclusions/Discussion: In this well powered and detailed analysis, ketorolac exposure was associated with neither anastomotic leak nor other important post-operative outcomes. Given the known benefits of ketorolac for peri-operative pain control, we advocate for its appropriate use in the post-operative period.

Box Plot for Anastomotic Leak by Total Dose of Ketorolac



Box Plot for Anastomotic Leak by Total Dose of Ketorolac

THE ROLE OF COLLAGENOLYTIC ENTEROCOCCUS FAECALIS ON COLORECTAL CANCER TUMOR FORMATION FOLLOWING SURGERY.

S45

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Purpose/Background: While local recurrence after colorectal cancer resection is often attributed to dormant cancer cells remaining outside the margins of resection (i.e. lymph nodes), there is a growing body of evidence demonstrating that cells within the primary tumor site drive the process of recurrence and metastasis. We tested the hypothesis that collagenase-producing *Enterococcus faecalis* strains, which have previously been shown to shift epithelial cells to express an aggressive epithelial mesenchymal-like phenotype via cleavage of MMP9, can influence local tumor formation in mice. The aim of this study was to determine if the typical perioperative exposure to an altered diet, antibiotics, and intraluminal shed cancer cells, allow for the colonization of *Enterococcus faecalis* on anastomotic tissues that can directly cause extramucosal tumor formation at the perianastomotic site.

Methods/Interventions: Mice were fed a high fat diet (PUFA) for 4 weeks to expose them to a Western diet typical of CRC patients. Prior to surgery, mice were given oral and IV antibiotics and then subjected to a segmental colorectal resection and anastomosis. 24 hours later, to expose anastomotic tissues to collagenolytic *E. faecalis*, 100 ul of live bacteria (OD600nm, total CFU=1x10⁵) was administered via enema. Finally, to expose colonized anastomotic tissues to shed colon cancer cells, CT26 cells (murine colon cancer cell line) were administered via enema 24 hours following bacterial exposure. Additional groups were studied controlling for *E. faecalis* exposure and diet. All mice were sacrificed on postoperative day 21 and tumor development assessed. Cecal, anastomotic, tumor tissue, and luminal stool were collected and evaluated for microbial composition (i.e culture and 16S rRNA) and function (i.e collagenase production, MMP9 cleavage).

Results/Outcome(s): When all four conditions were present (PUFA diet, antibiotics, anastomosis, and *E. faecalis*) 75% of mice developed extramucosal peri-anastomotic tumors compared to only 25% when no *E. faecalis* was administered. Mice fed a regular (chow) diet failed to produce tumors (Figure 1A,B). 16S rRNA analysis demonstrated a 5-fold increase in the relative abundance of Proteobacteria in the bacterial communities recovered from anastomotic tissues, compared to those recovered from the cecum or stool. Although the total concentration of bacteria or *E. faecalis* was not different between mice that developed tumors versus those that did not, the postoperative presence of the specific strains of collagenase producing, MMP9 cleaving *E. faecalis* was predictive of tumor formation in mice independent of initial exposure to those strains (Figure 1C).

Conclusions/Discussion: To our knowledge, these are the first data to suggest that a common yet specific bacterial phenotype present on anastomotic tissues may influence CRC tumor formation at the surgical site.

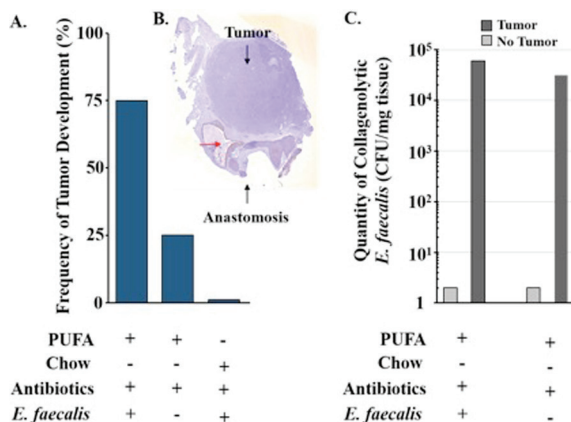


Figure 1: A) Frequency of tumor development between experimental groups. B) Representative histology of an extramucosal perianastomotic CRC tumor C) Quantity of collagenolytic *E. faecalis* as it relates to tumor formation

NOVEL ORGANOID MODELS TO INVESTIGATE THE ROLE OF IMMUNOTHERAPY FOR COLORECTAL PERITONEAL METASTASES.

S47

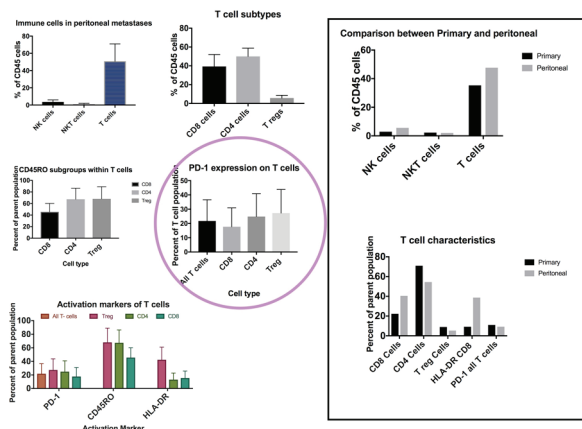
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Purpose/Background: Colorectal cancer is the third most common cancer in Australia, making it a major health burden. Up to 25% of patients have disease that spreads to the peritoneum, with an associated poor prognosis. Systemic chemotherapy has limited efficacy, offering modest improvement in survival. Aggressive surgery in the form of cytoreductive surgery and hyperthermic intraperitoneal chemotherapy is effective in very selected patients. However, the majority of patients are not suitable surgical candidates. The immune response and the immune landscape in peritoneal metastases has not been assessed previously. Immunotherapy, while effective in other cancers such as melanoma and renal cell carcinoma has an undefined role in peritoneal disease.

Methods/Interventions: Fresh tumour tissue from colorectal peritoneal metastases was used for flow cytometry analysis to evaluate immune cell infiltration. Tissue was further processed to develop robust organoid models. Simultaneous patient matched tumour infiltrative lymphocytes (TILs) were cultured from remaining fresh tissue and enriched with interleukin-2 (IL-2). Once organoids were robust and replenishable, they were co-cultured with various concentrations of matched patient TILs to assess the cytotoxic ability of the lymphocytes. Organoids were further co-cultured with TILs and an anti PD-1 antibody to assess if cytotoxic capacity improved in the presence of an anti PD-1 antibody.

Results/Outcome(s): Flow cytometry revealed a large CD45 population of mainly T cells. There was an even mix of CD4 and cytotoxic CD8 cells. However, there were unexpectedly high T-regulatory cells, comprising upto 15% of CD4 cells. PD-1 expression on T cells, whilst variable, was upto 75%, suggesting a possible role for anti PD-1 antibody therapy. Co-culture with organoids, TILs and PD-1 antibodies in a novel live cell scanning assay demonstrated organoid killing by TILs increased significantly with the addition of anti PD-1 antibody.

Conclusions/Discussion: This early pre-clinical data demonstrates a potential role for immunotherapy in the setting of peritoneal disease. These early results, whilst exciting, need to be expanded with a larger cohort, and validated in an in-vivo setting.



RECTAL CANCER ASSOCIATED FIBROBLASTS ACTIVATED BY RADIATION PROMOTE METASTASIS BY INDUCING EPITHELIAL MESENCHYMAL TRANSITION.

S48

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Purpose/Background: The standard of care for locally advanced rectal cancer includes neoadjuvant chemoradiotherapy (nCRT) followed by surgical resection. The addition of radiotherapy reduces the incidence of local recurrence, however, distant metastasis is still a significant cause of death. In addition, patients treated with nCRT have different patterns of recurrence compared to those who did not receive nCRT. Our group has shown that nCRT leads to an expansion of cancer associated fibroblasts (CAFs) in the tumor microenvironment, thus signifying their potential role in the response to treatment and tumor progression. We hypothesize that CAFs activated by radiation secrete factors that act on cancer cells and promote tumor progression and metastases.

Methods/Interventions: Primary CAFs were isolated and propagated from rectal cancer patients naïve to nCRT. Immunofluorescence confirmed the expression of CAF-specific markers. CAFs were treated with 10Gy of ionizing radiation and conditioned media (CM) was harvested and used in functional experiments. CAF effects on *in vitro* migration and invasion were evaluated by means of single cell migration assays and Matrigel coated TransWell assays. Expression of E-cadherin was evaluated after treatment of colorectal cancer cells with CM from radiated CAFs to assess for Epithelial-Mesenchymal Transition (EMT). For *in vivo* work, a novel orthotopic rectal cancer mouse model was used. Rectal cancer cells were co-injected with radiated and non-radiated CAFs in the distal rectum of NSG mice. Primary tumors and metastases were assessed using *in vivo* bioluminescence imaging and histologically confirmed.

Results/Outcome(s): Primary isolated rectal CAFs expressed the activated fibroblast markers vimentin and

alpha-SMA, and did not express the epithelial marker cytokeratin 19, confirming CAF lineage. Colorectal cancer epithelial cells treated with CM from radiated CAFs down-regulated the expression of E-cadherin, a fundamental event in EMT. Radiated CAFs also enhanced rectal cancer epithelial cell migration (187.7 ± 12.8 vs. 95.9 ± 6.7 μm ; $p < 0.001$) and invasion (44 ± 5.4 vs. 22.1 ± 3.8 cells/hpf; $p < 0.05$) when compared to non-radiated controls. *In vivo* imaging demonstrated 100% (15/15) local engraftment of orthotopically injected rectal cancer cells. Rectal cancer cells co-injected with radiated CAFs showed a higher frequency of metastases than non-radiated controls (60% vs. 20%). Primary tumors and metastases were histologically confirmed (Figure 1).

Conclusions/Discussion: Radiated CAFs present in the rectal cancer microenvironment secrete factors that induce EMT in rectal cancer epithelial cells resulting in increased invasion and metastases. Targeting the paracrine contribution of the tumor microenvironment is a potential strategy to decrease the development of metastatic disease in locally advanced rectal cancer.

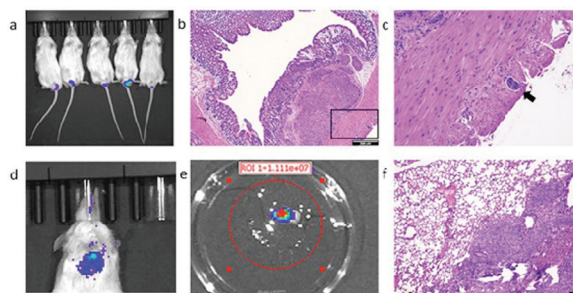


Figure 1: Orthotopic Co-Injection of Rectal Cancer Cells with Radiated CAFs. Rectal cancer cells injected orthotopically in NOD-SCID mice showed 100% local engraftment (a). On H&E poorly differentiated adenocarcinoma was seen in the rectal wall with an adjacent focus of lymphovascular invasion (arrow) (b, c). *In vivo* bioluminescence imaging (with pelvic exclusion) demonstrated the presence of lung metastases (d), which were confirmed *ex vivo* (e), and histologically (f).

THE RS7609897 ALLELE VARIANT OF THE COLLAGEN Q GENE (COLQ) IS INVOLVED IN THE PATHOPHYSIOLOGY OF DIVERTICULITIS.

S49

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Purpose/Background: Traditionally, the development of diverticulitis has been attributed to age and environmental factors such as diet, but there is increasing evidence that genetic factors play a large role. A recent genome wide association study from Iceland found an association between diverticulitis and the single nucleotide polymorphism (SNP) rs7609897, located in an intron of the collagen Q gene (COLQ). COLQ anchors acetylcholinesterase in the neuromuscular junction and has primarily

been studied in the somatic nervous system. Whether COLQ functions in the enteric nervous system is currently unknown. In the present study, we sought to confirm the association of this SNP in an independent cohort of patients with diverticulitis and to localize COLQ expression in sigmoid colon tissue sections.

Methods/Interventions: We investigated 349 patients with diverticulitis requiring surgery and 80 patients with asymptomatic diverticulosis treated at our tertiary care institution. Disease status was confirmed by surgical pathology and/or CT scan/colonoscopy. Controls were 503 individuals matched for race from the 1000 Genomes database. SNP rs7609897 was genotyped by Sanger sequencing and Taqman PCR was used to confirm equivocal findings. The association between rs7609897 and diverticulitis was statistically evaluated using an additive genetic model. Immunofluorescence staining for COLQ protein was performed on resected sigmoidal tissues of five diverticulitis patients and one colon cancer control. Of the five with diverticulitis, three were homozygous ancestral at rs7609897, one was heterozygous, and one was homozygous for the mutant allele. The control was homozygous for the mutant allele.

Results/Outcome(s): The minor allele frequency (MAF) of rs7609897 was 0.24 in the 503 control patients. Patients with diverticulosis had no significant difference in MAF at 0.23 (OR 0.92, $p = 0.70$) while patients with diverticulitis had a lower MAF at 0.17 (OR 0.65, $p = 0.0004$) (Table). COLQ localized within the ganglia of the myenteric plexus between the circular and longitudinal layers of the muscularis propria in sigmoid tissue and showed no qualitative difference between the different genotypes.

Conclusions/Discussion: This study confirms that the rs7609897 SNP has a protective association with diverticulitis, but not with diverticulosis, in a North American patient cohort. This is the first demonstration of COLQ expression in the ganglia of the myenteric plexus in sigmoid colon tissue. These findings implicate the enteric nervous system and by inference, gastrointestinal motility in the development of diverticular disease. How rs7609897 specifically influences COLQ function or expression and then participates in the pathophysiology of diverticulitis requires further study.

CHEMOKINE MRNA EXPRESSION IS PREDICTIVE OF METASTASIS IN COLON AND RECTAL CANCER.

S50

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Purpose/Background: Molecular characterization of colorectal cancer may help to identify patients at risk for late metastasis which could guide follow-up care. Chemokines such as IL-8 and chemokine receptors such as CXCR4 and CXCR7 promote both inflammation and metastasis. SDF-1 is a CXCR4 and 7 ligand with six different known isoforms. We evaluated the mRNA expression of six of these chemokines and chemokine receptors in colorectal specimens and examined their relationship to outcomes using clinical data.

Methods/Interventions: Using quantitative polymerase chain reaction, we measured mRNA expression of IL-8, CXCR4, CXCR7, and SDF1 isoforms α , β and γ in paired normal and tumor specimens from 74 unique patients undergoing resection at a single tertiary care center; Male=37, Female=37, Stage I=12, Stage II=23, Stage III=23, Stage IV=16. All specimens were obtained through an institutional biorepository. Deidentified clinical follow-up data was obtained to determine the development of local recurrence ($n=2$) or metastasis ($n=26$). Mean follow-up \pm SD was 41.27 months \pm 41.86 (range 0-167). Univariate and multivariate analysis was conducted to determine the relationship between the mRNA levels and metastasis.

Results/Outcome(s): Median expression of SDF1 α ($p<0.001$), SDF1 β ($p=0.007$), and CXCR4 ($p=0.0033$) was decreased two to five-fold in tumor specimens compared to the matched normal colon tissues. CXCR7 showed no difference in expression ($p=0.9093$), and IL8 expression was five-fold higher in tumors ($p=0.001$). Interestingly, despite lower mean expression in tumor specimens, tumors of patients who developed metastasis exhibited significantly higher SDF1 α expression (3.085 ± 0.5912 , $p<0.0001$) and CXCR4 levels (0.85 ± 0.166 , $p=0.0039$) when compared to those that did not (SDF1 α 0.365 ± 0.351 ; CXCR4 $.325\pm 0.0956$). In univariate analysis increased SDF1 α ($p=0.0024$) and CXCR4 ($p=0.0026$) levels were associated with metastasis. In multivariate analysis, SDF1 α ($p=0.04348$), CXCR4 ($p<0.001$), and IL8 ($p=0.02766$) were independent predictors of metastasis. Kaplan-Meier

S49 MAF of groups compared to control MAF of 0.24

Disease	n	MAF	OR (95% CI)	P-value vs. control
Control	503	0.24		
Diverticulosis	80	0.23	0.92 (0.062-1.38)	0.70
Diverticulitis	349	0.17	0.65 (0.5-0.83)	0.0004

plots showed that patients with high SDF1- α levels had a significantly higher risk for metastasis (logrank $p=0.0024$).

Conclusions/Discussion: Chemokines and chemokine receptors are differentially expressed between normal colorectal and tumor tissues. SDF1- α , CXCR4, and IL-8 levels are independent predictors of metastasis. Further investigations using cancer genome databases, combined biomarker mRNA expression, and immunohistochemistry is currently underway.

IN VIVO APPLICATION OF MULTI-FRACTION BRACHYTHERAPY COMBINED WITH CHEMOTHERAPY IN A MOUSE MODEL OF ANAL CANCER.

S51

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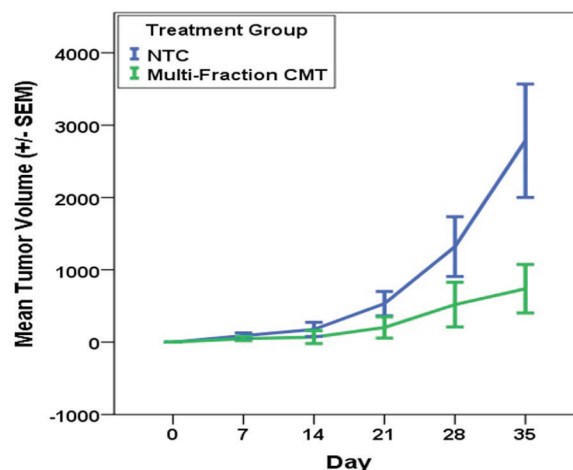
Purpose/Background: Despite the continued rise in the incidence and mortality of anal cancer, therapeutic options for anal cancer patients have remained unchanged. Failure of standard of care chemoradiotherapy, which occurs in 1/3 of patients, results in the need for surgical resection, which is associated with significant morbidity and mortality. Due to low patient accrual in clinical trials research into new therapies continues to be challenging, necessitating the development of preclinical models to research improved therapies. Such models would accurately recapitulate the current standard of care, and allow easy adaptation to investigate novel treatment modalities. Here we sought to interrogate the use of standard of care therapy, including fractionated brachytherapy, in our mouse model of HPV-associated anal cancer.

Methods/Interventions: Utilizing an established murine model of anal cancer, where mice overexpress the HPV oncoproteins, E6 and E7, via a *K14* epithelial promoter (*K14E6/E7*), we developed anal tumors via weekly carcinogen treatment (DMBA). *K14E6/E7* mice with established tumors were placed in one of two groups: 1) no treatment controls (NTC), or 2) Combined-Modality Therapy (CMT) where mitomycin C (MMC, 2mg/kg *i.p.*), 5-fluorouracil (5-FU, 25mg/kg *i.p.*) and targeted radiation (2 Gy for 5 days) were given. Mice were assessed daily for morbidity/mortality and tumors were measured every 7 days. Tumor volumes at days 28 and 35 were compared with independent sample t-tests. Tumor growth rates were analyzed, following volume transformation to account for logarithmic growth, using an independent samples t-test. Overall survival and time to a tumor volume of 1000mm³ were assessed using Kaplan-Meier statistics.

Results/Outcome(s): Tumor volume growth curves revealed logarithmic growth with significantly different mean volumes between the NTC and CMT groups at Day 28 and 35 post-treatment initiation (Figure 1; mean

volume \pm SEM; Day 28: 2601.1 \pm 650.4 vs 519.1 \pm 308.4, $p<0.01$; Day 35: 2784.3 \pm 783.6 vs 738.2.8 \pm 335.4, $p<0.05$). The NTC group had a significantly higher mean growth rate compared to the CMT group (mean growth rate \pm SEM; 0.049 \pm 0.006 vs 0.019 \pm 0.003; $p<0.0005$). Kaplan-Meier analysis calculated a median survival for the NTC group (median days \pm SEM; 28.0 \pm 1.6) that was, on average, 18 days less than the CMT group (46.0 \pm 6.1; $p<0.001$). Finally, the median time for each tumor to reach 1000mm³ in the NTC group (median days \pm SEM; 18.0 \pm 2.2) was, on average, 31 days less than the CMT group (49.0 \pm 11.7; $p<0.005$).

Conclusions/Discussion: Our results show a prolonged reduction of tumor growth kinetics in our *in vivo* model of HPV-associated anal cancer with standard of care chemoradiotherapy. This model will allow for examination of novel therapies in conjunction with CMT with the goals of increasing treatment efficacy, prolonging survival, and reducing or eliminating the toxicities associated with the current standard of care.



SULFONAMIDE-BASED DERIVATIVE (3D) INDUCES APOPTOSIS IN COLORECTAL CANCER BY INHIBITING JAK2-STAT3 PATHWAY.

S52

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Purpose/Background: Colorectal cancer is a major worldwide health problem owing to its high prevalence and mortality rate. Developments in screening, prevention, biomarker, personalized therapies and chemotherapy have improved detection and treatment. However, despite these advances many patients with advanced metastatic tumors will still succumb to the disease. New anti-cancer agents are needed for treating advanced stage colorectal cancer as most of the deaths occur due to cancer metastasis. A recently developed novel sulfonamide derivative, 4-((2-(4-(dimethylamino)phenyl)quinazolin-4-yl)amino)

benzenesulfonamide (3D) has shown potent antitumor effect; however the mechanism underlying the antitumor effect remains unknown.

Methods/Interventions: MTT assay was used for evaluating 3D-mediated inhibition in cell viability. Real-time cell proliferation was measured by xCelligence RTDP instrument. Western blotting was used to measure pro-apoptotic and anti-apoptotic proteins; and JAK2-STAT3 phosphorylation. Flow cytometry was used to measure ROS production, mitochondrial membrane potential and apoptosis.

Results/Outcome(s): Our study revealed that 3D treatment significantly reduced the viability of human colorectal cancer cells HT-29 and SW620. Furthermore, 3D treatment induced the generation of reactive oxygen species (ROS) in human colorectal cancer cells. Confirming our observation, N-acetylcysteine (NAC) significantly inhibited apoptosis. This is further evidenced by the induction of p53 and Bax, release of cytochrome c, activation of caspase-9, caspase-7 and caspase-3 and cleavage of PARP in 3D treated cells. This compound was found to have significant effect on the inhibition of anti-apoptotic proteins, Bcl2 and BclxL. The results further demonstrate that 3D inhibited JAK2-STAT3 pathway by decreasing the constitutive and IL-6-induced phosphorylation of STAT3. 3D further decreased STAT3 target genes like Cyclin D1 and Survivin. Furthermore, 3D was found to sensitize HT-29 cells to Doxorubicin treatment in combination studies.

Conclusions/Discussion: Collectively these findings indicate that 3D induces ROS-mediated apoptosis and inhibited JAK2-STAT3 signaling in colorectal cancer.

COL11A1 IS CO-EXPRESSED WITH EMT MARKERS AND OVER-EXPRESSED IN EARLY-ONSET COLON CANCER.

S53

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Purpose/Background: Although overall incidence of colon cancer (CC) has declined over the last three decades, the incidence has increased in patients younger than 50. The etiology of early-onset (EO) CC is not fully understood. Increased expression of Collagen, Type XI, Alpha-1 (COL11A1), normally expressed in cartilage, was shown to confer resistance to neoadjuvant therapy in breast cancer, poor survival in kidney cancer, and other adverse clinical outcomes. Resistance to neoadjuvant therapy has also been linked to epithelial-mesenchymal transition (EMT), a developmental process characterized by cell separation and invasion that is recapitulated in metastasis. The aim of this study was to elucidate gene expression patterns in EOCC, show its uniqueness compared to late-onset (LO) disease, and demonstrate correlation of EOCC gene expression and EMT genes.

Methods/Interventions: Tumors and matching noninvolved tissues from 6 EOCC patients (<50 years old) and 6 late-onset colon cancers (LOCC) patients (>65 years old) were obtained from pathology archives. Deparaffinized tissues were macrodissected from FFPE sections, RNA isolated, and used for expression profiling of 770 cancer-related genes. We compared expression patterns between COL11A1 and EMT markers for 329 CC patients from the TCGA COAD database using the UCSC Cancer Browser.

Results/Outcome(s): Among 770 genes assayed, 93 genes had changes in expression levels that were statistically significant between EOCC and matching noninvolved tissues and 118 genes had differences in expression levels between LOCC and matching noninvolved tissues. Comparative gene expression analysis between EOCC and LOCC normalized to their matching noninvolved tissues revealed changes in expression of 88 genes unique to EOCC using the cutoff criteria of expression levels difference >2 fold and P value <0.01. In this set, 28 were upregulated and 60 downregulated. COL11A1 was one gene uniquely overexpressed in EOCC. Analysis of data from the cBioPortal showed coexpression of COL11A1 with EMT markers SNAI1, SNAI2, ZEB1, ZEB2, TWIST1, POSTN, and MMP9.

Conclusions/Discussion: These results suggest that sporadic EOCC is characterized by distinct molecular events compared to LOCC. In addition, COL11A1 is overexpressed in EOCC, and associated with EMT markers and with poor overall survival. COL11A1 may potentially serve as a novel biomarker associated with EOCC as its protein can be easily detected using immunohistochemistry.

PARP-1 FRAGMENTS AND ACID CERAMIDASE (AC) EXPRESSION - A POTENTIAL MECHANISM OF RADIORESISTANCE IN COLORECTAL CANCER?

S54

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Purpose/Background: Chemoradiotherapy (CRT) is often employed to treat locally advanced rectal cancer with highly variable response, emphasizing the necessity for predictive response biomarkers. Our initial proteomic and immunohistochemical work demonstrated that acid ceramidase (AC) expression correlated with poorer CRT responses in rectal cancer. We described that higher AC expression correlates with radioresistance in colorectal cancer cells and improved radiosensitivity through siRNA inhibition of AC. The mechanisms behind AC expression, radioresistance and apoptosis remain unknown in colorectal cancer. AC is known to affect apoptosis and the enzyme poly (ADP-ribose) polymerase-1 (PARP-1) is a DNA repair enzyme that is also cleaved into specific

fragments during apoptosis. **Aims:** To elucidate a potential mechanism linking AC expression with radioresistance in colorectal cancer cells.

Methods/Interventions: Differential AC protein expression of four colorectal cell lines was confirmed by Western blotting. Radiosensitivity of these cell lines was examined using standard clonogenic assays by counting individual colony survival post-exposure to increasing doses of ionizing radiation. siRNA knockdown of AC was performed with further clonogenic assays to establish the impact of AC inhibition on radiosensitivity. HT29 and HCT cells were then treated with non-targeting control siRNA and AC siRNA, irradiated at increased doses of radiation then harvested at specific time points (2,6,24h). Western blotting was then performed to detect the presence of specific PARP-1 cleavage fragments in the different treatments as specific apoptotic markers.

Results/Outcome(s): Clonogenic assays confirmed that cell lines with greater cellular AC protein expression (LIM 1215/MDST8) demonstrated higher colony survival compared to those with lower AC expression (HT29/HCT 116) post irradiation. siRNA AC knockdown improved radiosensitivity by reducing colony formation efficiency (CFE) in three cell lines: HT29 (0.52 CFE control vs 0.13 CFE knockdown at 1Gy $p=0.00004$); HCT (0.24 CFE control vs 0.09 CFE knockdown at 1Gy $p=0.026$); LIM 1215 (0.88 CFE control vs 0.43 CFE knockdown at 0.25Gy $p=0.001$). Western blotting confirmed that HT29 and HCT cells treated with AC siRNA displayed significantly higher levels of the 24kD PARP-1 cleavage compared to control therefore indicating increased apoptosis.

Conclusions/Discussion: Higher AC expression correlates with radioresistance in multiple colorectal cell lines and we successfully improved radiosensitivity through biological (siRNA) inhibition of AC. Initial mechanistic work has confirmed that siRNA inhibition of AC causes increased apoptosis in HT29 and HCT cells following ionizing radiation, suggesting a role of AC expression and radioresistance through reduction in apoptosis. Further work is required which could potentially allow AC to serve as a predictive CRT response biomarker in rectal cancer patients.

LONG-TERM ONCOLOGIC OUTCOMES AFTER NEOADJUVANT CHEMORADIATION FOLLOWED BY INTERSPHINCTERIC RESECTION WITH COLOANAL ANASTOMOSIS FOR LOCALLY ADVANCED LOW RECTAL CANCER.

S55

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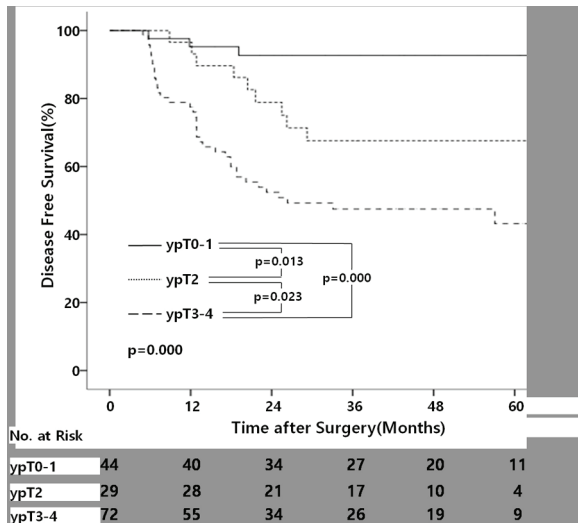
Purpose/Background: With the frequent use of neoadjuvant chemoradiotherapy(PCRT), the indication of intersphincteric dissection with coloanal anastomosis(ISR) has been expanded to locally advanced low rectal cancer

despite risk of inadequate resection margin. However, the oncologic safety of ISR in such advanced tumor has not been defined. The purpose of this study was to determine the oncologic outcomes and clinical factors affecting survival in patients who underwent PCRT following ISR for locally advanced rectal cancer located 3 cm below the anal verge.

Methods/Interventions: From January 2009 to September 2015, 147 patients with low rectal cancer undergoing ISR with coloanal anastomosis with PCRT were included. 3-year disease-free survival (DFS) and local recurrence (LR) rates were calculated using Kaplan-Meier methods. A logistic regression analysis was used analyzed the influence of tumor response and other prognostic factors on sphincter preservation.

Results/Outcome(s): After a median follow-up of 32 months (range 8 – 94 months), estimated overall 3-year DFS, and LR rates were 69.9% and 11.7%, respectively. Complete resection with negative histologic margins was achieved in 83% (n = 122). Pathologic T stage (yp T stage) and circumferential resection margins (CRM) status were important postsurgical predictors of outcomes. The 3-year DFS was 47.4% for patients with ypT3 compared with 82.0% for ypT0-2 patients ($P = .001$). The 3-year DFS for involved pCRM was 36.5% versus 69.7% ($P = .003$). Multivariate Cox regression analysis revealed that ypT stage, ypN stage and pathological CRM status were the independent factors affecting survival rates. Clinical T-stage and pathological distal margin status were not related to an increased risk of recurrence.

Conclusions/Discussion: After a median follow-up of 32 months (range 8 – 94 months), estimated overall 3-year DFS, and LR rates were 69.9% and 11.7%, respectively. Complete resection with negative histologic margins was achieved in 83% (n = 122). Pathologic T stage (yp T stage) and circumferential resection margins (CRM) status were important postsurgical predictors of outcomes. The 3-year DFS was 47.4% for patients with ypT3 compared with 82.0% for ypT0-2 patients ($P = .001$). The 3-year DFS for involved pCRM was 36.5% versus 69.7% ($P = .003$). Multivariate Cox regression analysis revealed that ypT stage, ypN stage and pathological CRM status were the independent factors affecting survival rates. Clinical T-stage and pathological distal margin status were not related to an increased risk of recurrence.



Disease-free survival by ypT state

ENDOSCOPIC BIOMARKERS AS PREDICTORS OF RESPONSE TO CHEMORADIATION IN RECTAL CANCER.

S56

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Purpose/Background: Rectal cancers have varied levels of response to preoperative chemoradiation therapy (CRT). The molecular changes associated with these responses are not yet known. The aim of this study is to compare the genetic variants detected in patients with rectal cancer who have no response (NR) or a complete response (CR) to CRT.

Methods/Interventions: Sixteen rectal cancer patients treated with neoadjuvant CRT followed by radical surgery were identified between June 2007 and March 2017. Patients who had no evidence of residual tumor on pathologic analysis were noted to have a CR and those who had greater than 50% of the original tumor volume remaining were labeled to have NR. Tumor DNA from each pre-treatment biopsy specimen was isolated from formalin-fixed paraffin-embedded tissue blocks, and libraries were prepared using a comprehensive cancer panel which focuses on 160 cancer-related genes. Libraries were sequenced and an alignment was done using a genomics analysis software with subsequent biological interpretation and variant analysis.

Results/Outcome(s): The two groups were compared to identify genetic variants relative to those patients who had a CR (n=8) and those who had NR (n=8). Variants were initially filtered to remove common variants and include only potentially deleterious variants. We identified genes that contained a variant in at least 2 of the NRs and did not exist in the CR group. Of these, APC and MET had variations found in 4 and 3 NRs, respectively. Of the

eleven genes, seven are involved in the regulation of the epithelial-mesenchymal transition (EMT) pathway, with 6 of the 8 NRs having a variant in at least 1 of these 7 genes.

Conclusions/Discussion: In comparing rectal cancer patients who were complete responders or non-responders to preoperative chemoradiation, we identified eleven genetic variations in the NR group that were not found in the CR group. Mutations unique to the NR group included variations to the APC and MET genes and in genes known to be involved in regulation of the EMT pathway. The APC and MET genes and the EMT pathway are commonly implicated in cancer development and progression. With continued investigation we hope to determine if these biomarkers are predictive of a poor response to CRT.

SIZE OF RECTAL NEUROENDOCRINE TUMORS PREDICTS METASTATIC POTENTIAL.

S57

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Purpose/Background: Rectal neuroendocrine tumors (rNET) are often found incidentally. Local excision has been advocated for lesions ≤ 2 cm; however, the evidence base for this approach is limited. Associations between tumor size, degree of differentiation and presence of distant metastatic disease were examined.

Methods/Interventions: Patients with rNET were identified in the National Cancer Data Base (2006-2015). Logistic regression was used to evaluate associations between tumor size, degree of differentiation and presence of metastatic disease. Cutpoint analysis was performed to identify an optimal size threshold predictive of metastatic disease.

Results/Outcome(s): Of 4977 patients included for analysis, 3941 (79.2%) had well-differentiated tumors, 548 (11.0%) had moderately-differentiated tumors, and 488 (9.8%) had poorly differentiated tumors. On logistic regression, increasing size and degree of differentiation were both independently associated with higher likelihood of metastatic disease. Evidence of effect modification was identified ($p < 0.001$); the association between tumor size and metastatic disease was strongest for well-differentiated tumors (OR 1.8, $p < 0.001$), followed by moderately-differentiated tumors (OR 1.34, $p < 0.001$) and poorly-differentiated tumors (OR 1.06, $p = 0.015$). For well-differentiated tumors the optimal cutpoint for the presence of metastatic disease was 1.15cm, which had good discriminative capacity (area under curve 0.88; 88% sensitive and 88% specific). With tumors below this cutpoint, patients had an extremely low risk of metastatic disease (10/3420, 0.3%). Tumors 1.15cm in diameter or greater were associated with a substantially increased incidence of metastatic disease (72/449, 13.8%). For moderately differentiated tumors, the optimal cutpoint

was also 1.15cm (area under curve 0.87, 100% sensitive, 74% specific).

Conclusions/Discussion: Tumor size and degree of differentiation are predictive of metastatic disease in rNET. Patients with tumors greater the 1 cm in diameter are at substantial risk of distant metastasis and should be staged and managed accordingly.

WHAT IS THE RISK OF ANAL CARCINOMA IN PATIENTS WITH ANAL INTRAEPITHELIAL NEOPLASIA?

S58

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Purpose/Background: The risk of anal squamous cell carcinoma (SCC) following prior diagnosis of anal intraepithelial neoplasia (AIN) is unclear. In this study, we estimate risk of anal SCC in patients with AIN, and identify predictors for malignant transformation

Methods/Interventions: We identified a cohort of patients with AIN from the Surveillance, Epidemiology, and End Results (SEER) registry (1973-2014). Next, we recorded patient demographics, tumor factors, treatment administered, and date of last follow-up. Then, we recorded prior and subsequent neoplasm development, noting the primary sites of these other malignancies. Last, we identified risk factors for anal SCC development after AIN diagnosis using logistic regression and Cox proportional hazard models.

Results/Outcome(s): A total of 2,129 patients with AIN were identified and followed over a median time of 4.3+/-3.3 years. More patients had a primary malignancy before their AIN diagnosis than afterwards (46.3% vs. 42.8%). Of the overall AIN cohort, 627 (29.5+/-2.0%) patients went on to develop an additional HPV-related neoplasm and 173 (8.1+/-1.1%) patients went on to develop anal SCC. Median time from AIN diagnosis to anal SCC diagnosis was 2.7+/-2.6 years. A total of 53 (30.8%) patients who developed anal SCC following AIN diagnosis were staged T2 or higher. For treatment of initial AIN, 602 patients (28.4%) underwent no procedure, 298 (14.0%) underwent ablative surgery, and 1,182 (55.7%) were treated with excisional procedures. On multivariable analysis, male gender (OR 2.1, C.I. 1.4-3.1; p<0.001) and divorced, separated, or widowed marital status (OR 0.5, C.I. 0.2-0.9; p=0.04) were significantly correlated with increased risk of anal SCC. Ablative therapies for initial AIN were associated with a marked reduction in risk of anal SCC, compared to no procedure (OR 0.3, C.I. 0.1-0.6; p=0.003). Additionally, patients treated with ablative procedures for AIN were diagnosed with anal SCC at a later time-point than patients who had no surgery (HR

0.3, C.I. 0.1-0.7; p=0.008) on adjusted Cox proportional hazard analysis.

Conclusions/Discussion: The incidence of anal SCC after AIN diagnosis is markedly higher than previously reported, as 8.1% of patients in our population-based cohort developed anal cancer. Nearly one third of anal SCCs were diagnosed at a stage of T2 or higher despite a prior diagnosis of AIN, suggesting that these lesions may require more vigilant surveillance. Ablative procedures were associated with significantly decreased risk of anal SCC, indicating the effectiveness of proper therapy. This study highlights the high rate of malignancy in patients with AIN and the need for effective therapies and surveillance

Table 1. Multivariable analysis of predictors of developing anal carcinoma in patients with previous AIN (n=2,123)

Variable	Odds Ratio	P-value	95% Confidence Interval	
Age at diagnosis of AIN				
<=40 years old	Reference			
41-50 years old	1.69	0.046	1.01	2.83
51-60 years old	1.11	0.720	0.64	1.92
>60 years old	1.22	0.505	0.68	2.19
Gender				
Female	Reference			
Male	2.08	<0.001	1.40	3.08
Race				
White	Reference			
Black	1.18	0.503	0.73	1.89
Other (Asian, American Indian)	1.39	0.469	0.57	3.36
Unknown	1.63	0.533	0.35	7.47
Marital status at diagnosis of AIN				
Single (never married)	Reference			
Married or unmarried/domestic partner	1.06	0.783	0.69	1.63
Divorced, separated, or widowed	0.49	0.041	0.24	0.97
Unknown	0.78	0.312	0.49	1.26
Region (based on US Census bureau designations)				
Northeast	Reference			
Midwest	1.17	0.713	0.50	2.74
South	0.99	0.965	0.51	1.90
West	0.79	0.411	0.44	1.40
Surgery type for AIN				
None	Reference			
Ablative surgery	0.27	0.003	0.11	0.64
Excisional surgery	1.75	0.005	1.19	2.58
Abdominoperineal resection	1.20	0.862	0.15	9.63
Unspecified surgery, or unknown	2.42	0.179	0.67	8.80

MINIMALLY INVASIVE SURGERY FOR RECTAL ADENOCARCINOMA HAS IMPROVED SURVIVAL VERSUS LAPAROTOMY, A NATIONAL CANCER DATABASE OBSERVATIONAL ANALYSIS.

S59

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Purpose/Background: The surgical approach to adenocarcinoma of the rectum remains a controversial topic. While current data focuses on the non-inferiority of minimally invasive surgery (MIS) for rectal cancer compared to laparotomy, conclusions are drawn from smaller sample sizes and may be underpowered. The purpose of this analysis was to utilize the National Cancer Database (NCDB) datasets to evaluate the survival benefit of a MIS approach to adenocarcinoma of the rectum.

Methods/Interventions: The National Cancer Database (NCDB) from 2010 to 2014 was reviewed for all cases of invasive adenocarcinoma of the rectum (SEER Histology Codes 8140) who underwent surgical resection for malignancy. Groups were separated based on laparotomy or a

MIS approach and stratified by NCDB Analytic Stage. Multivariate Cox regression analysis was used to evaluate for survival following diagnosis of adenocarcinoma of the rectum. Secondary outcomes of interest were circumferential, proximal and distal resection margins, nodal harvest and rate of intraoperative conversion from MIS to laparotomy.

Results/Outcome(s): The inclusion criteria identified 29828 cases of adenocarcinoma of the rectum managed surgically, 16937 by laparotomy, 12891 by MIS. The rate of MIS slowly increased over the period of study from 13.5% in 2010 to 27.25% in 2014. There was an equal distribution of stage at presentation between the laparotomy and MIS groups with the exception that the laparotomy group had more patients with stage IV disease (8.41% vs. 5.18%, $p < 0.001$). Patients in the laparotomy group were older (62.14 vs. 60.92, $p < 0.001$), had higher Charlson Deyo Score of 2 or greater (5.54% vs. 4.86%, $p = 0.002$) and had a higher rate of proctectomy (31.18% vs. 22.44%, $p < 0.001$) compared to the MIS group. After controlling for differences in the cohorts, survival following diagnosis and definitive surgical treatment for adenocarcinoma of the rectum is improved when a MIS approach was used (adjusted HR 0.825, CI 0.774 to 0.88, $p < 0.001$) (Figure 1). The protective effect of a MIS approach applied to stage I, II, III, and IV adenocarcinoma of the rectum. There was also a higher rate of negative proximal/distal and circumferential resection margins when surgery was performed MIS ($p < 0.001$). The intraoperative conversion rate from MIS to laparotomy was 13.9%.

Conclusions/Discussion: Minimally invasive resection for adenocarcinoma of the rectum shows an observed survival benefit compared to open surgery after adjusting for measured confounds. MIS should be considered for surgical disease.

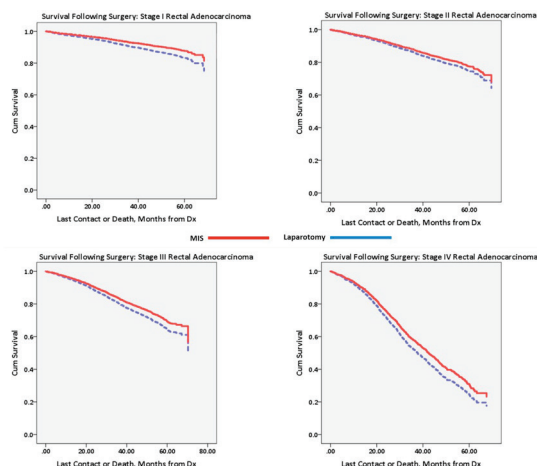


Figure 1: Cox regression analysis for adenocarcinoma of the rectum managed surgically based on NCDB Analytic Stage. After controlling for differences in each cohort, a MIS approach has a higher survival compared to laparotomy for all stages of disease.

DETECTION OF GERMLINE CANCER PREDISPOSITION VARIANTS AMONG ADVANCED COLORECTAL CANCER PATIENTS UNDERGOING TUMOR GENOMIC PROFILING FOR PRECISION MEDICINE.

S60

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Purpose/Background: Tumor genomic profiling is increasingly performed for precision medicine to aid the selection of systemic chemotherapy as well as targeted agents for advanced cancer patients. Among patients with advanced colorectal cancer (CRC) undergoing genomic profiling, we aimed to report the detection of germline variants that have clinically actionable implications due to inherited predisposition to cancer syndromes.

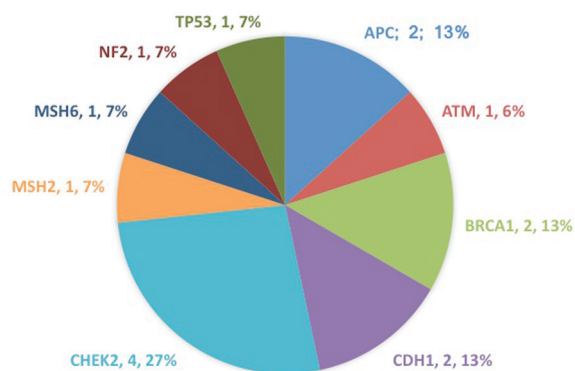
Methods/Interventions: Between 2012 and 2015, 1000 patients with advanced cancer underwent standardized somatic profiling using targeted exome sequencing of a pre-specified panel of 202 genes through an institutional protocol for precision medicine. The subgroup of 151 adult patients with metastatic, recurrent, or locally advanced CRC who underwent sequencing of both tumor and germline DNA formed our study cohort. After filtering, variants in 46 genes known to be associated with hereditary cancer predisposition were classified according to a defined in silico algorithm based on their predicted effects. Germline variants resulting in a nonsense (stop gain) mutation or a frameshift were considered pathogenic and thus clinically actionable. Clinical, demographic and family history data was collected on each patient and analyzed using descriptive statistics.

Results/Outcome(s): We observed 2002 germline variants in 151 patients. Fifteen (9.9%) had a germline variant in a cancer predisposition gene that is known or predicted to be pathogenic. Germline mutations were identified in 9 genes of high/moderate penetrance for cancer (APC [2 mutations; 13%], ATM [1; 6%], BRCA1 [2; 13%], CDH1 [2; 13%], CHEK2 [4; 27%], MSH2 [1; 7%], MSH6 [1; 7%], NF2 [1; 7%], and TP53 [1; 7%]) (Figure). Patients with a potential PGV were diagnosed at a younger age than those without (median age of 45 vs. 52, $p = 0.03$). Ten of the 15 patients (66%) met the Amsterdam II or Revised Bethesda Criteria; however, mutations from six patients (40%; in BRCA1, CDH1, CHEK2, NF2, TP53 genes) would not have been detected with traditional targeting germline sequencing for CRC predisposition based on clinical and pedigree data.

Conclusions/Discussion: In our series of unselected advanced CRC patients, 9.9% harbored a germline variant that is clinically actionable for cancer predisposition. As tumor genomic profiling panels are increasingly performed in clinical practice, the potential to detect previously unrecognized germline variants that confer cancer

predisposition must be recognized, followed by appropriate clinical genetics care.

Distribution of Pathogenic Germline Variants



A CHANGING SPECTRUM OF COLORECTAL CANCER BIOLOGY WITH AGE: IMPLICATIONS FOR THE YOUNG PATIENT.

S61

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Purpose/Background: Sporadic colorectal cancer (CRC) arises through either the adenoma-to-carcinoma sequence (chromosomal instability) or the serrated polyp (DNA hypermethylation/CIMP) pathway. The methylator pathway accounts for approximately 20% of CRC. In these cases, CIMP-associated silencing of key genes leads to cancer, with both sessile serrated polyps and adenomas as precursor lesions. CIMP cancers tend to be right sided and as DNA methylation in the right colon increases with age we expect an increasing predisposition to right sided cancer as age advances. We hypothesize that CRC in patients < age 50 have a different spectrum of biology to those in the > 50 age group, with less CIMP-high cancers. The goal of this study was to analyze the genetic differences in CRC from different age groups.

Methods/Interventions: The CIMP status, microsatellite instability (MSI), and the presence of *KRAS* and *BRAF* mutations in resected CRC from a genetically annotated tumor bank were reviewed. Tumor biology in patients <age 50 and > age 50 at diagnosis were compared. Tumor biology was also compared for age by decade: < 50, 51-60,

61-70, 71-80, >81. Hereditary syndrome cancers were excluded.

Results/Outcome(s): There were 497 cancers from 266 men and 231 women. 57 (11.5%) were in patients < 50. None (0/57) of these young cancers were hypermethylated, compared to 97/440 (22%) of the older cancers ($p < 0.001$). There was an increase in the proportion of CIMP-high cancers with each decade of age at diagnosis (see table). None of the cancers in patients <50 years were microsatellite unstable compared to 91/346 (23.6%) >50 years. No young cancer contained a *BRAF* mutation compared to 46/434 (10.6%) in older cancers ($p < 0.001$). *KRAS* mutations were less common in young cancers compared to older cancers, 13/57 (22.8%) vs. 126/410 (30.7%), $p < 0.01$. 11/57 (19.3%) of young cancers were proximal compared to 228/440 (51.8%), $p < 0.001$ of older cancers

Conclusions/Discussion: CRC in patients under 50 years did not arise from DNA promoter hypermethylation in this series. This explains the left predominant cancer distribution seen in the young and focuses efforts to understand and prevent cancer on causes of chromosomal instability.

ANORECTAL DYSFUNCTION AFTER TATME: MANOMETRIC AND ENDOANAL ULTRASOUND ANALYSIS.

S62

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Purpose/Background: Rectal resection has evolved from non-sphincter-saving operations to sphincter-saving operations in order to avoid a permanent stoma; and from open resection to laparoscopy and in the last years to transanal resection (TaTME). TaTME has demonstrated similar short and mid-term outcomes as open and laparoscopic surgery and specimen quality seems to be better than in laparoscopic surgery. One of the major impacts on quality of life of patients after rectal resection is due to symptoms of bowel dysfunction. Methods for Low Anterior Resection Syndrome (LARS) assessment varies from questions regarding particular symptoms, incontinence score systems, quality of life questionnaires and LARS score. Only few studies have assessed LARS

S61 Incidence of hypermethylation as per decades

Age	Hypermethylated	Normal Methylation	P Value
< 50	0 (0.0%)	57 (100%)	<0.0001
51-60	5 (4.9%)	98 (95.1%)	<0.0001
61-70	23 (18.0%)	105 (82.0%)	<0.0001
71-80	38 (28.1%)	97 (71.9%)	<0.0001
>81	31 (41.9%)	43 (58.1%)	0.16

using objective anorectal function measurements such as anorectal manometry and endoanal ultrasound. The aim of this study was to evaluate anorectal function after TaTME by means of standardized instruments – anorectal manometry and endoanal ultrasound.

Methods/Interventions: This prospective cohort study was conducted in Hospital Clinic of Barcelona between 2011 and 2017. Forty patients with rectal cancer underwent preoperative manometry and endoanal ultrasound as part as the preoperative evaluation. Postoperative follow-up was performed following National Guidelines, but adding a manometry and endoanal ultrasound between 1 and 2 years from index surgery or ileostomy reversal. Data was collected in a standardized database.

Results/Outcome(s): There was a decrease in all manometric data analysed except for maximum squeeze duration: resting pressure decreased from a mean of 62.4 mmHg to 30.9 mmHg; maximum squeeze pressure decreased from 209 mmHg to 140.3 mmHg; tenesmus threshold decreased from 74.9 mL to 47.8 mL. Endoanal ultrasound showed an increase in internal sphincter defects (27.5% anterior defect, 17.5% lateral defect, 7.5% posterior defect) and external sphincter defects (25% anterior defect). No differences in internal sphincter or external sphincter thickness were found.

Conclusions/Discussion: TaTME was associated with a decrease in all manometric parameters except maximum squeeze duration, and was associated with damage to the internal and external sphincters. Whether these alterations are clinically significant is still unknown and should be addressed in the near future.

USE OF NEOADJUVANT SHORT-COURSE RADIOTHERAPY FOR RECTAL ADENOCARCINOMA IN THE UNITED STATES: INSIGHTS INTO PATTERNS OF PRACTICE AND OUTCOMES.

S63

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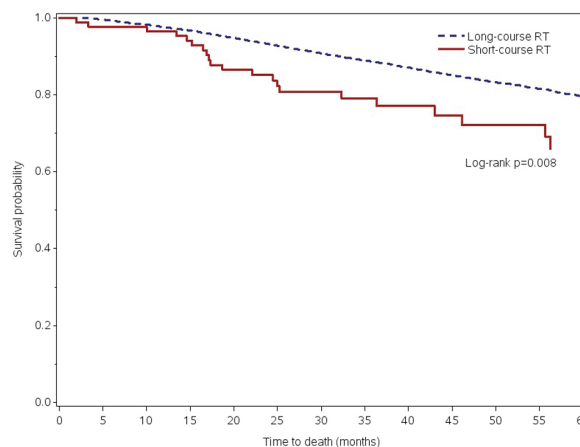
Purpose/Background: Published European data demonstrated the safety of short-course radiation (SC-RT) for locally advanced rectal adenocarcinoma, with potential advantages for compliance and lower costs. However, use of SC-RT remains controversial in the US, with a paucity of data. Our aims were to characterize patterns of use of SC-RT in the US and its short-term outcomes compared to long-course radiation (LC-RT).

Methods/Interventions: Patients with clinical stage II and III rectal adenocarcinoma who underwent neoadjuvant therapy followed by resection were included from the NCDB (2004-2015). SC-RT was defined as receipt of 25 Gy delivered in 5 fractions and LC-RT as 40.5-50.4 Gy

delivered in 28 fractions. Descriptive statistics and survival analysis were employed to compare groups.

Results/Outcome(s): A total of 28,968 patients were identified: 327 patients underwent SC-RT and 28,642 LC-RT. Use of SC-RT increased from 0.3% of all cases in 2004 to 2.3% in 2015. SC-RT vs LC-RT was more often used in the Midwest (41% vs. 30%) and less often in the South (22% vs. 29%), $p < 0.003$. The majority of SC-RT patients received treatment at academic centers (66%) compared with comprehensive community centers (27%) and community centers (3%), $p < 0.05$. Compared with LC-RT, SC-RT patients were older (69 vs. 60 yrs) and had more comorbidities (all $p < 0.05$), but more often had early stage (II) tumors (51% vs. 46%, $p = 0.08$). Patients with clinical stage T4 tumors were similar between SC-RT vs. LC-RT groups (7% vs. 7%). Rate of complete pathologic tumor response was significantly less with SC-RT (5% vs. 10%, $p < 0.0001$). Median time to surgery from completion of radiation was 2 weeks for SC-RT vs. 14 weeks for LC-RT ($p < 0.0001$). There were no differences in rates of sphincter preservation or completeness of surgical resection between groups. Pathologic stage was not different between groups; however, rate of lymph node harvest of ≥ 12 nodes was higher for SC-RT vs. LC-RT (75% vs. 50%, $p < 0.0001$). After matching, the two groups had similar hospital length of stay (SC-RT 6 vs LC-RT 6 days), readmission rates (5.5% vs. 5.4%), 90-day mortality (0.8 vs 0.6%), or margin positivity (5.5% vs. 4.3%). Overall survival for SC-RT vs. LC-RT was similar at 1 yr (97% vs 98%) but was compromised at 5 yrs (66% vs. 80%), $p = 0.008$ (Figure).

Conclusions/Discussion: Use of short-course radiotherapy for locally advanced rectal adenocarcinoma in the US is slowly increasing but remains significantly low. This may be related to skepticism about its oncologic effectiveness in the absence of data from the US. While surgical and short-term oncologic outcomes appear to be comparable to conventional LC-RT, this study argues for more evidence examining its impact on long-term survival.



COST-EFFECTIVENESS ANALYSIS OF TOTAL NEOADJUVANT THERAPY FOLLOWED BY RADICAL RESECTION VERSUS TRADITIONAL THERAPY FOR LOCALLY ADVANCED RECTAL CANCER.

S64

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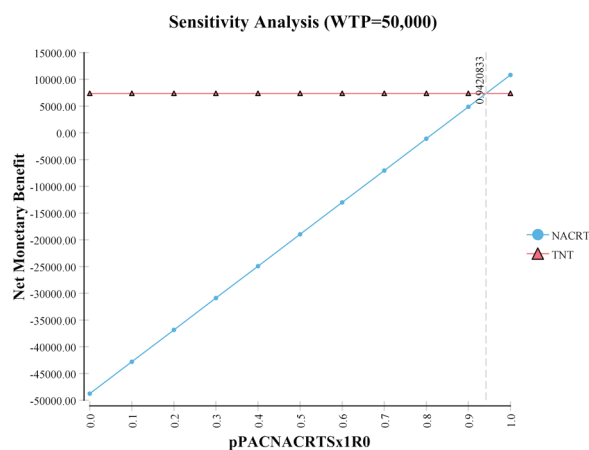
Purpose/Background: Total neoadjuvant chemoradiotherapy (TNT) is emerging as a treatment technique for locally advanced rectal cancer (LARC). The traditional route of neoadjuvant chemoradiation (NACRT) followed by radical surgery (RS) and adjuvant chemotherapy (AC) is complicated by the risk of patients not receiving recommended AC with associated decreased cancer survival. Institutional data and prior studies have shown that over one-third of LARC patients do not receive AC in a timely fashion with resulting decreased survival.

Methods/Interventions: Probabilities of completing NACRT/RS/AC within 12 weeks of surgery (62%) and completing TNT/RS (90%) and associated 5-year cancer specific survivals were derived from a prospective institutional rectal cancer database. A cost-effectiveness (CE) model was developed to compare the two treatment strategies based on estimated CMS costs and effectiveness in life-years (LY) over a 5-year period from treatment. Net-monetary-benefit (NMB) was determined based on effectiveness (LY), willingness to pay (WTP) threshold of 50,000 \$/QALY and CMS estimated costs of treatment. One-way sensitivity analysis was used to determine the CE threshold for the two strategies as a function of receiving AC after NACRT/RS versus completing TNT/RS. Probabilistic sensitivity analysis (PSA) using Monte Carlo simulation was used to account for second-order variability in the model and to determine strategy acceptability at the WTP threshold.

Results/Outcome(s): CE analysis and PSA both showed 5-year cost and effectiveness in LY for TNT/RS and NACRT/RS/AC of \$ 194,033 / 193,441 and 4.03 / 3.63 years, respectively. NMB for TNT/RS and NACRT/RS/AC were 7,359 / -11,829 \$/LY and CE of 48,173 / 53,257 \$/LY, respectively. Both strategies were undominated. However, 1-way CE sensitivity analysis with expected values showed that only at a 94% threshold of receiving AC would NACRT/RS/AC become the dominant strategy over a 90% rate of TNT/RS completion. (Graph) Acceptability at the WTP showed that TNT/RS would be the optimal strategy 100% of the time over NACRT/RS/AC.

Conclusions/Discussion: CE analysis shows that for LARC a strategy of TNT followed by RS may be more effective than NACRT/RS/AC based on improved cost per preserved life years (NMB). Sensitivity analysis shows that a decreased rate of AC after NACRT and RS plays a key role in decreasing the cost-effectiveness of NACRT/RS/AC. A 90% rate of successful TNT/RS would only

be dominated by completion of NACRT/RS/AC at 94%. This 94% AC goal is not currently being met locally and perhaps nationally. Studies should further evaluate this pattern and assess the benefits, alternative lengths and order of therapies and potential pitfalls of completing total chemotherapy and radiation therapy before radical surgery for LARC.



On the X-axis is the probability that the patient receives Adjuvant Chemotherapy after Neoadjuvant Chemoradiotherapy and Radical Surgery, on the Y-axis is the Net Monetary Benefit. The benefit of Neoadjuvant Chemoradiotherapy/Radical Surgery/Adjuvant Chemotherapy does not outweigh the benefit of Total Neoadjuvant Therapy/Radical Surgery until 94% of Neoadjuvant Chemoradiotherapy/Radical Surgery patients receive Adjuvant Chemotherapy.

LAPAROSCOPIC VENTRAL RECTOPEXY VERSUS STAPLED TRANS-ANAL RECTAL RESECTION (STARR) FOR TREATMENT OF OBSTRUCTED DEFECATION IN THE ELDERLY: LONG TERM RESULTS OF A PROSPECTIVE RANDOMIZED STUDY.

S65

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Purpose/Background: Purpose of the study was to compare long-term functional outcome, recurrence rate and quality of life between laparoscopic ventral rectopexy (LVR) and stapled transanal rectal resection (STARR) in the treatment of obstructed defecation due to structural abnormalities in elderly patients.

Methods/Interventions: Patients were included if they had obstructed defecation symptoms (OD) due to structural abnormalities (rectocele, rectal intussusception, and/or perineal descent) that failed to respond to conservative measures. Exclusion criteria included non-relaxing puborectalis, previous abdominal surgery, other anal pathology and pudendal neuropathy. Patients were randomly allocated to either LVR or STARR. Operative data, and postoperative complications were reported. Patients were assessed pre and postoperatively

by defecogram, dynamic pelvic MRI, modified obstructed defecation score (MODS), Wexner incontinence score (WIS), and Patient Assessment of Constipation-Quality of Life Questionnaire (PAC-QOL). The primary outcome measures were improvement of symptoms and recurrences. Follow up duration was at least 3 years.

Results/Outcome(s): Study included 112 patients (56 in each arm). Mean ages of patients in LVR and STARR were (73.4 vs. 75.7 years, $p=0.32$) respectively. ASA score II was reported in 32 patients (18 in LVR and 14 in STARR; $p=0.12$) while 3 patients in each group had ASA score III. Operative time was significantly longer in LVR than STARR (139 vs. 45 minutes; $p = 0.001$). Minor post-operative complications were seen in 6 (10.7%) patients of LVR and 5 (8.9%) cases of STARR group ($p = 0.69$). Mean Length of hospital stay was (3.7 days in LVR vs. 1 day in STARR; $P=0.01$). During follow-up, 3 patients had fecal urgency after STARR but No sexual dysfunction in either procedure. After 6 months, MODS improvement more than 50% were reported in 84 % vs. 80% in LVR and STARR respectively ($p = 0.21$). After mean follow up of 41 months (range 36- 48), recurrence of symptoms were reported in 4.3% in LVR vs.15.5% in STARR; ($p = 0.001$). Six month postoperatively, perineal descent improved >50% in defecogram in 79% after LVR versus no improvement after STARR. PAC-QOL significantly improved in both groups after 6 months, however, significant drop in the PAC-QOL after 36 months in STARR but not in LVR group. Short term and long term functional outcomes are listed in table 1

Conclusions/Discussion: In elderly patients even with comorbidities, both LVR and STARR are safe and can improve function of the anorectum in patients with OD due to structural abnormalities. LVR has better long term functional outcome, less complications and less recurrences compared with STARR. Perineal descent only improves after LVR. STARR showed not be the first choice in elderly patients with OD unless having medical contraindication to laparoscopic procedures.

ANATOMY IS NOT ALWAYS DESTINY: PATIENTS WITH SURGICALLY CORRECTABLE INTERNAL INTUSSUSCEPTION MUST BE EVALUATED FOR CO-EXISTING IRRITABLE BOWEL SYNDROME.

S66

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Purpose/Background: Although patients with surgically-correctable anorectal disease and those with irritable bowel syndrome (IBS) are thought by many clinicians to represent distinct patient populations, these conditions may coexist in patients seeking surgical consultation, and rates of co-existence and its impact on disease severity and quality of life are poorly understood. We aimed to evaluate the rates of pre-existing IBS in patients ultimately diagnosed as having internal intussusception on defecography to determine if the presence of IBS affected disease severity.

Methods/Interventions: This is a single institution prospective cohort study from January 2007 to June 2017. All patients with a referring diagnosis of either constipation or IBS at the time of their presentation to a pelvic floor center were evaluated. All patients underwent defecography to exclude anatomic etiologies. We compared patients referred for IBS to patients referred for constipation as their presenting symptoms. Varma Constipation Severity Index (CSI), Fecal Incontinence Severity Instrument (FISI) and Fecal Incontinence Quality of Life Scales (FIQOL) were compared. Patients were then subdivided into four groups based on the finding of intussusception on defecography (none, intra-anal, intra-rectal, external). Multivariable linear regression models of the impact of IBS and intussusception on CSI, FISI and FIQOL were performed.

Results/Outcome(s): Out of 721 patients evaluated, 443 (61.4%) patients were found to have intussusception:

S65 Long term functional outcome

	Preoperative	6 months postop- erative	36 months postop- erative	p value	
LVR					
	MODS	12.7 ± 4.4	3.3 ± 1.7	3.5 ± 1.9	0.001
	PAC-QOL	55.1 ± 13.2	22.1 ± 9.2	22.3 ± 10.1	0.001
	WIS	2.1 ± 0.9	1.7 ± 0.5	1.7 ± 0.5	0.32
STARR					
	MODS	11.5 ± 5.1	2.9 ± 2.1	5.3 ± 4.7	0.02
	PAC-QOL	52.2 ± 12.9	30.3 ± 6.7	40.5 ± 10.7	0.04
	WIS	2.8 ± 1.7	2.9 ± 2.1	2.7 ± 2.3	0.47

MODS= modified obstructed defecation score

PAC-QOL= patient assessment of constipation- quality of life score

WIS= Wexner incontinence score

179 (24.8%) intrarectal, 139 (19.3%) intra-anal and 125 (17.3%) external rectal prolapse. Rates of concomitant IBS diagnosis increased with rising grades of intussusception (none 14% vs. Intra-anal/external intussusception 25.2%, $p < 0.001$). Rise in co-existing IBS was associated with increased rates of reported abdominal pain and bloating (16.9% VS 26.6%, $P < 0.001$). Multivariable linear regression analysis of the impact of both the rising grades of intussusception as well as coexisting IBS showed that IBS was indeed associated with worsening of constipation severity (4.62(1.37,7.87) $p = 0.005$), QOL lifestyle (-0.29(-0.56, -0.02) $p = 0.035$), QOL depression (-0.27(-0.52,-0.02) $p = 0.033$) and QOL coping (-0.33(-0.6,-0.06) $p = 0.018$). Interestingly, IBS did not appear to alter fecal incontinence severity, which was only worsened by rising grades of intussusception (7.76 (2.64, 12.89) $p = .003$).

Conclusions/Discussion: It seems that IBS and FC due to rectal intussusception can coexist. In fact, patients who have both IBS and intussusception may have higher disease acuity and further worsening of their quality of life. We conclude that surgical candidates presenting for constipation should be screened and treated for IBS prior to considering any surgery for intussusception, especially when they do not have additional fecal incontinence at the time of their presentation.

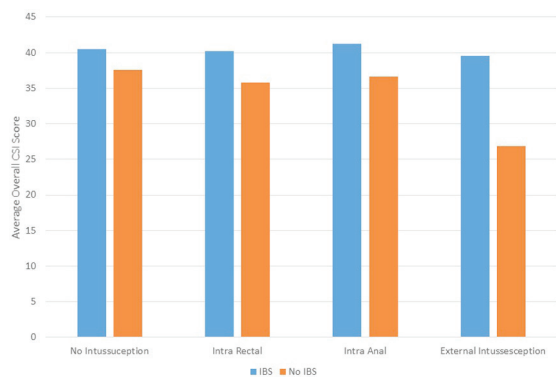


Figure1: Impact of IBS on CSI within Intussusception groups. Overall IBS was associated with a 4.62 point higher CSI score ($p = .005$)

USING SACRAL NERVE MODULATION TO IMPROVE CONTINENCE AND QUALITY OF LIFE IN PATIENTS SUFFERING LOW ANTERIOR RESECTION SYNDROME.

S67

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Purpose/Background: Patients who undergo sphincter preserving surgery for rectal malignancy will experience ongoing altered bowel function (low anterior resection syndrome) which has a negative impact on quality of life. Sacral nerve modulation, used most commonly in the treatment of faecal incontinence, has been shown to have potential early benefits when used in patients with altered

bowel habit post rectal resection for malignancy. The aim of this study is to confirm the long term improvement in faecal incontinence and quality of life in patients treated with sacral nerve modulation for low anterior resection syndrome.

Methods/Interventions: Patients who had undergone previous low or ultra low anterior resection for rectal adenocarcinoma and had ongoing symptoms of low anterior resection syndrome were considered for sacral nerve modulation. Eligible patients underwent sacral nerve modulation as a planned 2 stage procedure with initial 2week test stimulation using the Medtronic Interstim II system. Patients who had >50% improvement in faecal incontinence were offered permanent stimulation. Enrolled patients completed the Cleveland Clinic Faecal Incontinence score and a linear quality of life score before and after stimulation to assess improvement. Patients also underwent anal manometry and physiology studies prior to stimulation.

Results/Outcome(s): Twelve patients who had low anterior resection syndrome after previous ULAR for rectal cancer underwent permanent implantation of a sacral nerve stimulator. Primary tumour stage for patients ranged from T1N0M0 to T3N1M0. A range of anastomotic techniques had been used at initial operation with 42% undergoing side to end anastomosis, 25% having a j pouch, 25% an end to end coloanal anastomosis and 8% having a coloanal pull through. Mean follow up was 40 months (SEM 6.7 months) with no complications. Mean improvement in faecal incontinence was 87% (SEM 4.2%) whilst the mean improvement in patient QoL was 83.5% (SEM 4.3%). Patients who had previously been treated with biofeedback showed less improvement following SNS implantation with an average improvement in incontinence of 75% (SEM 13.7%) compared to 90% (SEM 7.6%) which was found in patients who had not had prior biofeedback treatment. The percentage improvement in patients with an internal anal sphincter defect was 72% (SEM 9%) compared to 88.6% (SEM 11.8%) seen in patients with an intact internal anal sphincter.

Conclusions/Discussion: Sacral nerve modulation is confirmed safe and highly effective in improving continence and quality of life in patients who suffer symptoms of low anterior resection syndrome, and should be considered in patients where conservative and non invasive management has not been successful. The results were at least sustainable at a mean follow-up of 40 months.

RECTAL PROLAPSE RECURRENCE FOLLOWING VENTRAL MESH RECTOPEXY CAN BE MINIMIZED IF ANTERIOR COMPARTMENT DEFECTS ARE THOROUGHLY EVALUATED AND TREATED.

S68

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O. Johansen, B. Tsai
Indianapolis, IN

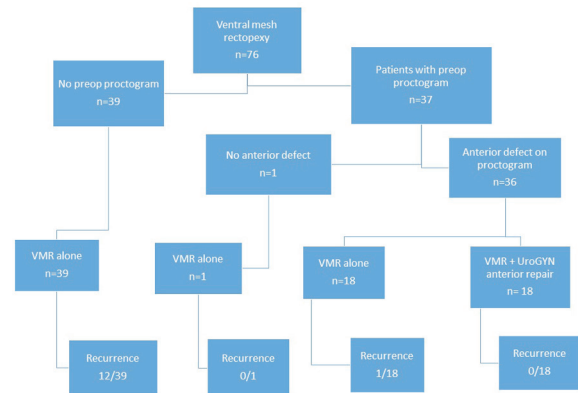
Purpose/Background: Ventral mesh rectopexy (VMR) is a widely utilized treatment for rectal prolapse in Europe, but its use in the United States is just gaining traction. Robotic-assisted VMR has been the preferred treatment for abdominal repair of rectal prolapse at our institution and we have expanded its use to include obstructed defecation in select patients. This patient population is at high risk for concomitant anterior compartment prolapse, yet the evaluation and treatment algorithm in regards to overall pelvic organ prolapse is highly variable. The purpose of this study was twofold: to evaluate recurrence rates with VMR, and to analyze the effect of concomitant anterior compartment defects on evaluation and treatment in this patient population.

Methods/Interventions: All patients that underwent VMR at our institution between July 2014 and June 2017 were identified and retrospective data collected. Primary outcome measure was recurrence of rectal prolapse or obstructed defecation. We then analyzed the association between anterior compartment evaluation with preoperative proctogram and subsequent treatment on overall recurrence. Data were analyzed with student's t-test or Fisher's exact test, $p < 0.05$ statistically significant.

Results/Outcome(s): Seventy-six patients underwent robotic-assisted VMR (3 converted to laparotomy) for full thickness rectal prolapse ($n=60$) or obstructed defecation ($n=16$). Mean patient age was 61.0 years (range 30-92) with 13 patients (17%) over 80 years. Mean hospital stay was 1.8 days (range 1-9) and three patients (4%) had complications. Over a follow-up time of 5.3 months (range 1-32) there were 13 overall recurrences (17%), all with recurrent rectal prolapse. Mean time to recurrence was 8.0 months (range 0-26). Thirty-seven patients had preoperative proctogram, of which 36 identified anterior compartment defects. Eighteen patients (23.7%) with concomitant anterior defects underwent urogynecology evaluation and combined repair with VMR; none of these patient had recurrence. Recurrence rate was significantly lower (2.7%) when preoperative proctogram was obtained ($p=0.0015$).

Conclusions/Discussion: Ventral mesh rectopexy is an effective treatment with short hospital stay and low morbidity, even in elderly patients. Recurrence rate was markedly decreased when preoperative proctogram was performed as many of these patients had concomitant anterior compartment defects requiring repair. However, not all patients with proctogram defects required urogynecologic repair which suggests that not all imaging defects

are clinically significant. We conclude that ventral mesh rectopexy is effective for rectal prolapse and select cases of obstructed defecation, but all patients should undergo thorough preoperative evaluation for concomitant anterior compartment defects.



HIGH DOSES OF BOTOX TO TREAT LEVATOR SPASM AND OBSTRUCTED DEFECATION: TO REPEAT OR NOT.

S69

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Purpose/Background: Injection of Botulinum A toxin (Botox®) into the levator ani muscle is a treatment modality that can be offered to patients with obstructed defecation syndrome (ODS) secondary to dyssnergic defecation and rectal pain associated with levator spasm. Paradoxical contraction of pelvic floor muscles and inability to relaxation the pelvic floor are among the most frequently reported pathophysiological mechanisms occurring in ODS and levator ani syndrome (LAS). Botox causes temporary chemodenervation of the injected muscles resulting in relaxation. Aim: Evaluate current clinical practice injecting Botox® for ODS and LAS at a single institution

Methods/Interventions: Patients treated by 2 surgeons between January 2011 and December 2016 were selected from an IRB approved database using CPT code 46505 for Botox injections then specifically selected through ICD-9 codes of 564.6 (LAS) and 564.02 (ODS). Electronic medical records were reviewed for these patients. Variables of interest are presented as means for continuous factors and frequencies for categorical factors

Results/Outcome(s): 51 patients (34 female) with a mean age of 48.8 years were evaluated. 26 (51%) presented with ODS and 25 (49%) with LAS. 35 patients underwent anorectal manometry. The abnormal findings were paradoxical contractions in 45.7% (16/35), balloon not expelled in 45.7% (16/35), abnormal volume studies in 31.4% (11/35) and high resting pressure in 14.3% (5/35). All paradoxical contraction reports matched the inability to expel the balloon. Additional studies included:

defecography (n=24), and colonic transit study (n=13). Defecography findings included rectocele 73.7% (14/19), difficulties or inability to initiate evacuation 15.8% (3/19), rectal intussusception 5.3% (1/19). Pelvic floor physical therapy was recommended for all patients either prior to or after Botox® injection. 23/51 patients underwent physical therapy, 14/26 (53.8%) patients with ODS received physical therapy prior to Botox®. A total of 101 procedures were performed in 51 patients. 29 patients had single and 22 multiple procedures (range 2 and 7). Botox 200 IU was the dose of choice in 67.7% procedures (67/101) and 100 IU in 23.2% for patients with lower sphincter tone or for patients with preoperative concerns about fecal urgency or leakage. Neither significant complications nor episode of long-term incontinence were reported. Perianal bruising, mild bleeding, mild anal pain, and increased spasm was anecdotal. Overall, 22/51 (43.1%) reported improvement. 12/26 (46.1%) ODS patients reported better evacuation while 10/25 (40%) LAS patients reported improvements. Patients having a single procedure reported improvement in 38% (11/29). Patients having multiple procedures reported improvement in 50% (11/22).

Conclusions/Discussion: High doses of Botox® injections into the levators can be safely given and improve ODS and levator spasm. Repeat injections in patients who have relief of symptoms may be necessary to sustain results

SACRAL NERVE STIMULATION FOR CONSTIPATION.

S70

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Purpose/Background: Constipation is a very common gastrointestinal disorder with significant impact on patients' quality of life. While many medical and operative treatment modalities are available, none has proven to be ideal for all patients. Sacral nerve stimulation (SNS) has been reported as a potential treatment for constipation

due to pelvic outlet dysfunction, but little follow-up data is available regarding its efficacy. The aim of this study was to evaluate outcomes of SNS for constipation.

Methods/Interventions: Retrospective chart review was performed for patients undergoing SNS for constipation at our institution from May 2015 to May 2017. All patients required abnormal baseline manometric data upon referral, a normal Sitz marker study, and symptoms > 1 year to qualify. Any patient who underwent sacral nerve stimulator placement for constipation, regardless of etiology, was included in our analysis. Patients without baseline data regarding frequency of bowel movements were excluded from analysis. Statistical analysis was performed using the R open statistical software package.

Results/Outcome(s): In total, 29 patients underwent sacral nerve stimulator placement for constipation during the study period and had sufficient baseline data regarding frequency of bowel movements to be included in our analysis. Females constituted 89.7% of the study patients. Median age was 45 (IQR: 38-70). The most common indication for placement was obstructive defecation/pelvic outlet pathology (62.1%), followed by idiopathic (13.8%), and mixed type (10.3%). Patients were followed for a median of 8 months (IQR: 3-12). Prior to stimulator placement, median number of bowel movements (BM) per week was 1.1 (IQR: 0-2). At initial post-operative assessment (prior to stage 2 procedure), median number of BM per week was 7 (IQR: 3-10, p<0.001). Prior to stage 2 procedure, 79.3% of patients reported subjective improvement in their symptoms. At last follow up, median BM per week was 4 (IQR: 2-7), representing a statistically significant increase over baseline (p<0.001). At last follow up, 63.6% of patients reported continued subjective improvement in their symptoms.

Conclusions/Discussion: Sacral nerve stimulation can provide short term improvement in symptoms of constipation. While there appears to be a trend toward decreasing effectiveness at longer periods of follow up, SNS is a feasible and promising treatment option that warrants further long term study.

S69 Botox to treat ODS and Levator Spasm

	Overall	Obstructive Defecation	
		Syndrome	Levator Spasm
Female n/%	34	18 (69.2)	16 (64)
Mean age (years/range)	48.8 (19-75)	46.9 (19-75)	50.7 (24-75)
Diagnostic testing			
Anal Manometry	35	22	13
Defecography	24	19	5
Colonic transit study	13	9	4
Botox 200UI	67	31	36
Botox 100UI	23	13	10
Multiple procedures	22	11	11
Improvement n/%	22 (43.1)	12 (61.1)	10 (40)

VAGINAL VALIUM FOR LEVATOR SPASM: AN ALTERNATIVE ROUTE OF TREATMENT.

S71

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Purpose/Background: Our colorectal surgeons have traditionally treated levator ani syndrome with a number of different modalities. One is diazepam. Concerns with possible dependence resulting from oral diazepam led us to consider alternative routes. We thought that local diazepam administration would provide greater pain relief and reduce dependency relative to oral administration. The aim of this study was to evaluate the efficacy of diazepam in relieving rectal pain associated with levator ani syndrome using a localized route (rectal and vaginal) versus an oral route.

Methods/Interventions: This retrospective study included 32 patients seen for levator ani syndrome at Swedish Colon and Rectal Clinic from July 1, 2012 to September 30, 2017, identified using ICD-9 and ICD-10 codes: Chronic rectal pain, levator ani syndrome, levator spasm, chronic idiopathic anal pain, proctalgia, proctalgia fugax, paroxysmal proctalgia, coccydynia, and obstructed defecation. Inclusion criteria: Women \geq 18 years of age with levator ani syndrome that was treated with diazepam only and with diazepam as an adjunct to physical therapy. Exclusion criteria: pelvic floor surgery with mesh placement; women who were pregnant or breastfeeding in the post-partum period up to 1 year. We compared the relative pain relief of oral, rectal and vaginal administration of diazepam seen and treated in our outpatient colorectal surgery clinic.

Results/Outcome(s): Subjective levator ani syndrome pain relief with the use of diazepam either orally, rectally, or vaginally. Subjective pain relief following diazepam administration was extracted from physicians' notes by a single extractor (C.L.) and coded either present (1) or absent (0). Chi square comparisons were calculated comparing vaginal, rectal and oral administration routes. All statistical analyses were done with IBM SPSS 19. Chi square comparison of our three treatment groups showed greatest pain relief from vaginal diazepam (91%), followed by rectal administration (67%), and the least from oral administration (42% - $P=0.046$).

Conclusions/Discussion: Our assignment to treatment was not randomized and the extraction of patient pain relief from physician notes is an indirect measure. Future studies will query the patients with a ten point VAS analog pain scale before and after treatments. Use of a VAS pain scale will increase objectivity, statistical power and enable us to examine changes in mean pain relief. Vaginal diazepam provided the greatest pain relief, followed by rectal administration. Both were better than oral administration.

We believe that the combination of greater pain relief and potentially less diazepam dependence make vaginal diazepam administration a promising treatment for this condition.

EFFICACY OF FOOT STOOL FOR THE PATIENT WITH OBSTRUCTED DEFECTION SYNDROME: A PROSPECTIVE STUDY.

S72

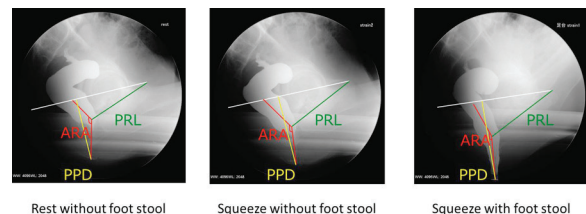
S. Takano
Kumamoto, Japan

Purpose/Background: We reported the structure with foot stool made higher rectal pressure but not wider anorectal angle (ARA) with the patients who complained evacuation difficulty. However, some patients with obstructed defecation showed wider ARA. This study aimed to assess the influence of foot stool on defecation in the patient with obstructed defecation syndrome (ODS).

Methods/Interventions: This is the prospective single group study. Patients who complain evacuation difficulty between July 2016 and May 2017 were enrolled in this study. First, cinedefecography was performed without foot stool; if the patient evacuated less than 50% of the paste, images were obtained with foot stool. Patients who were able to evacuate more than 50% of the paste were excluded from the study. ARA, *perineal plane distance* (PPD), and puborectalis length (PRL) were measured from the radiographs.

Results/Outcome(s): 21 patients evacuated less than 50% of the paste. 15 patients were male. Average age was 68.6 (range: 20-88) years. The difference of ARA, PPD and PRL between rest and squeeze were larger with foot stool than without foot stool (21.2 vs. 8.5°; $p < 0.01$), (17.6 vs. 10.1mm; $p < 0.02$), (22.7 vs. 12.4 mm; $p < 0.01$, respectively). The rate of evacuation with foot stool is significantly higher than without foot stool (51.7 vs. 3.7%, respectively; $p < 0.01$). Thirteen of 21 patients could evacuate more than 50% of the past with foot stool.

Conclusions/Discussion: The foot stool seems to be an efficient method for defecation with patients who cannot evacuate enough. This technique may be helpful when retraining patients with ODS.



Rest without foot stool

Squeeze without foot stool

Squeeze with foot stool

QUALITY OF LIFE COMPARISON OF TWO FECAL INCONTINENCE PHENOTYPES: ISOLATED FECAL INCONTINENCE VERSUS CONCURRENT FECAL INCONTINENCE WITH CONSTIPATION.

S73

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Purpose/Background: Many patients with fecal incontinence (FI) report co-existing constipation. The impact of this superimposed disease has not been well characterized. Furthermore, treatment recommendations for this FI subgroup have not been formulated. This study aims to 1) report the frequency of this phenotype of FI and 2) compare quality of life outcomes of FI patients with and without concurrent constipation.

Methods/Interventions: This is a single institution prospective cohort study from January 2007 to January 2017. 1399 patients with FI were identified. Of these, 946 (67.6%) completed the Fecal Incontinence Severity Index (FISI) survey. 656 (69.3%) had coexisting constipation measured by the Constipation Severity Instrument (CSI). The FISI, impact of FI on quality of life (FIQOL), rate of coexisting pathology (Pelvic Organ Prolapse Inventory (POPIQ-7) and Urinary Distress Inventory (UDI-6) surveys) were compared between FICA (constipation absent) and FICP (constipation present) groups. FIQOL scores were thematically categorized: lifestyle, coping, depression, and embarrassment. The impact CSI scores was evaluated using independent linear regression models for each FIQOL theme, adjusting for FISI score quartile, POPIQ 7, and UDI-6 scores. Manometry and defecography data was compared between FICP and FICA patients.

Results/Outcome(s): FICP patients (CSI score of 33.1 +/- 15.3) were more likely to report family history of

constipation (31.3% vs 9.3%, p=0.01) and less likely to report a history of pregnancy (89.2% vs 91.4%, p=0.001) or complicated delivery (9.1% vs 18.1%, p=0.005). FICP patients reported higher rates of pelvic pain (37.3% vs 14.9%, p<0.001), bladder pain (21.9% vs 11.5%, p<0.001), and abdominal pressure (57.0% vs 27.8%, p=0.001). In addition, FICP patients had higher rates of pelvic organ prolapse (POPIQ-7 18.4 vs 8.2, p<0.01) and urinary incontinence (UDI-6 30.2 vs 23.4, p=0.01). FICP patients also had different physiology and defecography results as well (Table). FICP patients had better FISI scores at presentation (21 vs 23.8, p <0.001) yet lower health satisfaction (28.9% vs 42.5, p<0.001). For each FISI quartile, FIQOL scores were worse as CSI increased: FIQOL-lifestyle (-0.013 (-0.018, -0.009) p<0.001); FIQOL-coping (-0.012 (-0.017, -0.007) p<0.001), FIQOL-depression (-0.022 (-0.027, -0.018) p<0.001), FIQOL-embarrassment (-0.007 (-0.012, -0.002) p=0.004). Coexisting pathology worsened FIQOL scores further.

Conclusions/Discussion: FICP patients represent a different disease phenotype from FICA patients with a different constellation of symptoms, medical and family histories, manometric and defecography findings, and worse overall QOL. In addition, they have higher rates of co-existing pelvic organ prolapse and urinary dysfunction. Treatment of FICP patients requires careful exclusion of prolapse pathology with coordinated treatment of co-existing disorders.

S73 Anorectal Physiology & Defecography Findings

	Number of FI Patients Who Underwent Testing, N (%)	FICP (Fecal Incontinence Patients with Constipation Present)	FICA (Fecal Incontinence Patients With Constipation Absent)	P value
Mean Resting Pressure	609 (64.4%)	56.8 ± 25.2	44.9 ± 20.4	<0.001
Maximum Resting Pressure	611 (64.6%)	78.8 ± 30.3	66.6 ± 26.2	<0.001
Maximum Squeeze Pressure	613 (64.8%)	138.1 ± 55.4	120.3 ± 51.1	<0.001
Inability to Expel Balloon	469 (49.6%)	117 (27.7%)	23 (11.4%)	<0.001
Paradoxical EMG	575 (60.7%)	147 (37.5%)	161 (28.0%)	<0.001
Intussuception/intra-rectal	140(14.8%)	26(40%)	8 (88.9%)	0.005
Intussuception/intra-anal		39 (60%)	1(11%)	0.005
Intussuception/rectocele		75 (61.5%)	8 (44.4%)	

LONG-TERM RESULTS OF PELVIPERINEAL REHABILITATION IN PATIENTS WITH FECAL INCONTINENCE.

S74

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Purpose/Background: Pelviperineal rehabilitation (PPR) plays an important role in the treatment of patients with fecal incontinence (FI) and is often indicated as first-line therapy. Its short-term effectiveness has been demonstrated in this group of patients, however, its long-term results are controversial. The objective of the study is to evaluate the long-term results in terms of severity and quality of life of patients treated by PPR at our Hospital and to identify factors associated with the response to treatment in our patients.

Methods/Interventions: Prospective cohort study. We identified patients with FI treated by PPR in our center between 2007 and 2014. Demographic data, past medical history and endoanal ultrasound results were recorded. The PPR consisted of 10 sessions of behavioral therapy, electrostimulation, and biofeedback. The severity of FI and the quality of life were measured using the Wexner score and the Fecal Incontinence Quality of Life Scale (FIQLS) respectively. Every patient completed these questionnaires before (T1) and immediately after treatment (T2). We conducted a survey via email, applying both scales after years of follow-up (T3). We excluded the patients with inability to answer the survey and those who had received another treatment at T3. Statistical analysis was performed with SPSS 22.0. Normality was confirmed by Shapiro-Wilk test, means compared by T-test and logistic regression analysis to evaluate risk factors. Statistical significance considered $p < 0.05$

Results/Outcome(s): Of 215 patients, 182 met criteria. 13 patients were excluded due to other treatments during follow up. Their characteristics didn't show any statistically significant difference compared to the group included. From 182 patients, a response was obtained in 96 (52.8%) patients at T3, who were included in the study. The age at T1 was 60.8 ± 13.1 years and 88.4% were women. The median of follow up was 4,5 (3-10) years. The Wexner score had a median of 16 (6-20) at T1 and 7 (0-18) at T2, $p=0,00$. The FIQLS improved significantly in its 4 dimensions when comparing T1 and T2, $p=0,00$. At T3, the Wexner score was higher than T2 with a median of 9 (0-19), $p=0,00$. The FIQLS at T3 was significantly lower than T2 in terms of depression, $p=0,01$ and style of life, $p=0,00$. In terms of conduct and shame, there was no statistical difference between T3 and T2. However, at T3, both scales had better means than T1, $p = 0.00$. There was no association between the follow-up time and the functional result at T3. At the logistic regression analysis, diabetes was a significant risk factor for a worse long-term functional result with OR 5,34 (CI 1,13-25,38).

Conclusions/Discussion: PPR is an effective treatment in patients with FI. Although their results deteriorate in the long term, the functional and quality of life results are significantly better than before treatment. DM2 is a significant risk factor for the long-term loss of effectiveness of PPR.

VIDEO ABSTRACTS

COMPLEX ROBOTIC PELVIC DISSECTION WITH EXCISION OF RETRORECTAL CYST.

WV1

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Boston, MA

Purpose/Background: Traditional excision of retrorectal masses have involved transabdominal or perineal approaches. The purpose of this video is to demonstrate robotic excision of such masses.

Methods/Interventions: The excision of the cyst involved initial dissection of the retrosigmoid junction in a medial-to-lateral direction, inferior to the superior hemorrhoidal artery. After entering the retrorectal space, dissection was continued inferiorly until the cyst was identified. Sharp dissection was performed circumferentially along the cyst capsule to release the cyst from the surrounding tissue.

Results/Outcome(s): This is a case of a 43 year old woman with an incidentally discovered retrorectal cyst during evaluation for uterine fibroids. MRI revealed a 4 x 4 x 6 cm cystic mass extending above and below S3. Patient underwent the operation as described and was discharged on postoperative day 1. Final pathology revealed a ganglioneuroma.

Conclusions/Discussion: Retrorectal cyst excision may be safely performed by robotic approach.

ROBOTIC EXTRALEVATOR EXCISION OF A RETRORECTAL GIANT AGGRESSIVE ANGIOMYXOMA.

WV2

B. Spindler, H. Saleem, S. Kelley
Rochester, MN

Purpose/Background: To demonstrate the surgical technique utilizing a completely abdominal extralevator approach to a complex retrorectal mass

Methods/Interventions: A 39-year-old Caucasian female presented with progressive pelvic discomfort and the sensation of left buttock fullness. Computed tomography revealed a retrorectal mass. High-resolution pelvic magnetic resonance imaging revealed an 8.7 x 3.5cm complex cystic lesion in the presacral space displacing the rectum and distal sigmoid colon. The mass was noted to be intimately associated with, though not invading, the lower rectum and anus on the left side with progression in-between the sphincter complex and levator ani and extension into the ischioanal space. A robotic extralevator excision of the retrorectal mass was performed with the Da Vinci® Xi robot system with a 5 port technique in synchronous position. Entry was obtained in the supraumbilical region utilizing a visible optical technique with a 8mm Airseal® (ConMed, Utica, NY, USA) trocar. Two 8mm robotic trocars (robot arms 1 and 2) were placed on the left side of the abdomen in a horizontal line with

the supraumbilical trocar, all a minimum of 8cm from each other. Another 8mm robotic trocar (robot arm 4) was placed on the right side of the abdomen 10cm from the supraumbilical trocar along an imaginary oblique line between the supraumbilical port and the anterior superior iliac spine. The Airseal® trocar was exchanged for a 8mm robotic trocar (robot arm 3), and then placed as an assistant port superiorly and in-between robot arms 3 and 4. The patient was placed in a trendelenburg position. The Da Vinci® Xi robotic system was positioned perpendicular to the patient's left side and docked to the trocars. A 30° down robotic trocar was placed in arm 3 and targeting to the pelvis was performed. The surgical assistant was located on the right side of the table. A Small Graptor™ (grasping retractor) was placed in arm 1, fenestrated bipolar in arm 2, and monopolar scissors in arm 4. The mass was mobilized circumferentially down to the levator muscles. Electrocautery was used to ligate the levator muscles (ileococcygeus and pubococcygeus) allowing entry into the ischioanal space. The mass was excised completely intact and removed through a 5cm Pfannenstiel incision approximately 2cm above the pubis.

Results/Outcome(s): Pathology revealed a 190 gram, 17.7 x 9.7 x 5.8 cm intact oval-shaped, tan-pink, and focally yellow, myxoid mass. Tumor cells were positive for desmin, CD34, HMGA2, and actin (focal), and negative for caldesmon, KIT, DOG1, S100, and type IV collagen. The tumor nuclei were positive for estrogen and progesterone receptors with 90% of the tumor cells showing moderate to strong staining for both receptors. Findings supported a histopathologic diagnosis of a giant aggressive angiomyxoma.

Conclusions/Discussion: The patient recovered without issue and was discharged the next day. Six months postoperatively she continues to do well with no evidence of local recurrence.

ROBOTIC ASSISTED APR WITH ROBOTIC HARVEST OF RECTUS ABDOMINIS MUSCULAR FLAP FOR VAGINAL RECONSTRUCTION.

WV3

G. Chedister, P. Maxwell, K. Delaney, V. George
Charleston, SC

Purpose/Background: Video presentation demonstrating robotic assisted APR and harvest of rectus abdominis muscular flap for vaginal reconstruction for patient with recurrent squamous cell carcinoma of the anus involving the posterior wall of the vagina. Procedure is presented as an alternative to a midline laparotomy incision for APR and muscular flap harvest.

Methods/Interventions: Video presentation highlighting robotic assisted surgical procedure for APR and rectus abdominis flap harvest for vaginal reconstruction after resection of posterior wall of the vagina.

Results/Outcome(s): Pt with minimally invasive robotic procedure for recurrent anal cancer involving the posterior wall of the vagina. Robotic assisted procedure was performed without standard midline laparotomy incision, which may help with faster wound healing, less narcotic usage, lower wound infection risk, and lower incidence of incisional hernias.

Conclusions/Discussion: Robotic assisted APR and rectus abdominis flap harvest is an alternative for procedure with midline laparotomy incision for APR with perineal reconstruction.

TRANSANAL POUCH REVISION.

WV4

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¹AUGUSTA, GA; ²Minnesota, MN

Purpose/Background: The patient is a 38 year old male who underwent total proctocolectomy and restorative ileal pouch anal anastomosis for ulcerative colitis. His post-operative course was complicated by stricture. Here we demonstrate excision of stricture and pouch advancement using a minimally invasive transanal technique.

Methods/Interventions: Using first a rigid rectoscope, then the gelpoint path access channel the strictured anastomosis is excised and the pouch is dissected up into the pelvis. After reaching the extent of dissection from below his previous lower midline incision was opened to complete the dissection. A minimal amount of adhesions remained. After complete mobilization and intraabdominal lysis of adhesions the pouch lay easily in the pelvis. A handsewn anastomosis was performed.

Results/Outcome(s): The patient recovered uneventfully from surgery was discharged to home shortly thereafter.

Conclusions/Discussion: The development of the transanal total mesorectal excision has pushed the boundaries of what can be accomplished using these techniques. A minimally invasive transanal technique is a novel approach to revision of an anastomosis complicated by stricture.

LAPAROSCOPIC SUTURE FIXATION FOR ILEAL J-POUCH VOLVULUS.

WV5

M. Ferrara, H. Vargas
 New Orleans, LA

Purpose/Background: Pouch volvulus is a rare complication in patients who undergo ileal pouch-anal anastomosis, with few reported cases in the literature. The purpose of this video is to detail a case typical of how patients with this complication can present. The workup and treatment of this condition is also discussed. We present a minimally invasive way to treat this condition

that salvaged the patient's pouch and restored normal function.

Methods/Interventions: Medical records were reviewed, including video documentation of the patient's surgery and endoscopy. These were used to formulate a case presentation elucidating the diagnosis and treatment of this patient's pouch volvulus.

Results/Outcome(s): Our patient underwent laparoscopic reduction of her volvulus and internal hernia with subsequent bilateral suture pexy of her pouch. She was discharged after 3 days and has had no recurrence of her volvulus in the 4 months since surgery. Pouchoscopy was performed approximately 3 months post-operatively and showed normal configuration of her pouch.

Conclusions/Discussion: Pouch volvulus is a rare but potentially severe complication for patients undergoing IPAA. Without proper identification and diagnosis, this can lead to pouch necrosis, pelvic sepsis, and permanent ostomy. Some interest has developed in prophylactic pouch fixation at the time of creation. Described methods of treatment include suture fixation, mesh fixation, pouch revision, or pouch removal. Minimally invasive techniques are feasible in the treatment of pouch volvulus as long as there is no compromise of the pouch itself.

TRANSANAL MINIMALLY INVASIVE SURGERY FOR RECTAL STRICTURE.

WV6

G. Chedister, P. Maxwell, V. George
 Charleston, SC

Purpose/Background: Video demonstrating TAMIS resection of idiopathic benign rectal stricture on a 73 year old male. Purpose of the video is to highlight a possible surgical alternative for patients with benign rectal strictures who are not candidates for dilation and do not want coloanal pull nor low anterior resection for treatment of stricture. The video demonstrates TAMIS investigation of stricture, dissection of then stricture, and reapproximation of proximal and distal rectum, relieving patient of completely obstructive short segment rectal stricture. Pt was subsequently able to have diverting colostomy reversed and return of physiologic bowel function.

Methods/Interventions: Video depicts and describes Transanal Minimally Invasive Surgery (TAMIS) for resection of benign short segment rectal stricture. Procedure is highlighted as a possible alternative for multiple dilations and more invasive pull through and LAR procedures.

Results/Outcome(s): TAMIS resection of rectal stricture was done on outpatient basis with pt discharging on the day of surgery. Following the procedure, a flexible sigmoidoscopy was done demonstrating intact mid rectal anastomosis and the patient's diverting loop colostomy was taken down.

Conclusions/Discussion: Video presents a possible, less invasive, surgical technique for short segment rectal strictures. TAMIS allows for outpatient resection of rectal stricture with good outcome and reversal of diverting colostomy and return to physiologic bowel function.

REDO REPAIR OF A RECURRENT RECTOVAGINAL FISTULA WITH RECTAL ADVANCEMENT FLAP: THREE LAYER CLOSURE.

WV7

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¹Park Ridge, IL; ²Chicago, IL

Purpose/Background: Rectovaginal fistulas are most commonly caused by obstetric trauma. Conservative therapy often fails as does simple surgical closure of the communicating defect. This videos provides demonstrates the redo repair of a recurrent rectovaginal fistula with a rectal advancement flap and three-layer closure.

Methods/Interventions: We present a 36-year-old female who developed a rectovaginal fistula after an obstetric injury. She had previously undergone a rectal advancement flap, however this failed and a 1.5cm defect between the rectal and vaginal walls remained. We describe our technique of redoing the rectovaginal fistula repair utilizing a three-layer closure: primary closure of the vaginal wall, interposition of the ruptured tendinous remnant of the perineal body, and a rectal advancement flap. The patient underwent a concomitant laparoscopic diverting ileostomy.

Results/Outcome(s): At 6-month follow-up, the patient recovered well, and there has been no recurrence of the rectovaginal fistula.

Conclusions/Discussion: A three layer closure of a rectovaginal fistula with primary closure of the vaginal wall, interposition of a tendinous remnant of the perineal body, and a rectal advancement flap provides an effective option for repairing recurrent rectovaginal fistula.

COMPARISON OF BURSA OMENTALIS APPROACH VERSUS MEDIAL-TO-LATER APPROACH LAPAROSCOPIC RADICAL LEFT HEMICOLECTOMY.

WV8

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 Guangzhou, China

Purpose/Background: Laparoscopic splenic flexure mobilization was technically difficult for left colon cancer. This study was aimed to compare the safety and feasibility of laparoscopic radical left hemicolectomy using a bursa omentalis approach (BOA) versus medial-to-lateral approach (MtLA).

Methods/Interventions: BOA was entering the bursa omentalis prior to separating left Toldt's fascia. We retrospectively analyzed data of 32 cases undergoing laparoscopic radical left hemicolectomy using BOA, matching with using MtLA from January 2013 and October 2016. The matching factors consisted of gender, age, ASA score, BMI, and TNM stage. Data of intraoperative and postoperative characteristics were reviewed. Splenic flexure mobilization time was defined as laparoscopic operation time minus left Toldt's fascia separating time.

Results/Outcome(s): There was no significant difference in average time of ambulation, time to first flatus, hospital stay between two groups. The operative time was also similar between two groups (134.2±27.6 min vs 139.4±23.5 min. $P = 0.42$), but there are significantly shorter splenic flexure mobilization time in BOA group (25.9±12.3 min vs 35.5±22.5 min. $P = 0.03$). No entry to posterior pancreatic space was recorded in BOA group and 9.4% (3/32) were wrongly entering to posterior pancreatic space when separating left Toldt's fascia in MtLA group. However, there was no significant difference in intra- or postoperative complication between groups.

Conclusions/Discussion: Our initial results suggest BOA for laparoscopic radical left hemicolectomy may be safe and feasible approach especially for unexperienced surgeons. The main advantages of present approach contain easy to identify pancreas and avoiding wrongly entering posterior pancreatic space when expanding the left Toldt's fascia.

E-POSTER ABSTRACTS

PROPENSITY MATCHED COMPARISON OF ROBOTIC VS. LAPAROSCOPIC-ASSISTED ELECTIVE SIGMOID RESECTION FOR DIVERTICULAR DISEASE.

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Purpose/Background: As the availability and use of robotic surgery increases, retrospective data suggest that outcomes may be comparable to laparoscopic surgery but at an increased cost. Sigmoid resection for diverticulitis is the most common application of robotic surgery among colorectal surgeons, and there is limited data specifically comparing outcomes of robotic and laparoscopic surgery for sigmoid resection for diverticular disease. Our aim was to compare outcomes and cost with a matched cohort of laparoscopic patients.

Methods/Interventions: We identified all elective cases of laparoscopic and robot-assisted surgery for diverticulitis among a practice of 7 different colorectal surgeons. We performed propensity matching based on surgical indications (recurrent disease, ongoing symptoms, or presence of fistula), stoma creation, and body mass index. All cases collected were after an enhanced recovery after surgery program was implemented. Chi-square analysis was used to compare categorical variables while continuous variables were tested using Wilcoxon Rank Sum Test.

Results/Outcome(s): From 2011-2016, 69 robotic cases were propensity matched from a cohort of 207 laparoscopic cases to create a 1:1 case ratio. There were no statistical differences between demographics or operative indications (Table 1). There were no differences between blood loss (100 vs.100, $p=0.98$), conversion to open (2 vs. 0, $p=0.50$), time to bowel movement (1 vs. 2, days $p=0.091$), 72-hour narcotic use (110.8 vs. 97.4, $p=0.70$), or length of stay (3.5 vs. 3.6 days, $p=0.64$). Although the robotic group had a lower mean pain score on postoperative day 0 (4.6 vs 6.1, $p=0.0020$), scores were similar on day 1

and day 2 (4.3 vs 4.1, $p=0.10$ and 3.8 vs 3.3, $p=0.90$). Operative time was longer in the robotic group (4.0 vs. 2.1 hours, $p<0.00010$). Supply costs (\$2,835.20 vs. \$2,196.30, $p<0.00010$) and total hospital costs were higher in the robotic group (\$41,159.10 vs. \$25,761.00, $p<0.00010$).

Conclusions/Discussion: In a carefully matched cohort of elective resections for diverticulitis, we demonstrated that although pain scores were lower initially, there were no overall clinically relevant postoperative differences between the two surgical approaches. Although the increased costs with robotic surgery has not slowed its uptake, further analysis will be required to better define its optimal role in colon and rectal surgery.

P1

TECHNICAL CONSIDERATIONS FOR SURGICAL RESECTION OF DUMBBELL SHAPED PELVIC LIPOMAS.

P2

P. Davis, E. Dozois, S. Kelley, P. Rose
Rochester, MN

Purpose/Background: Lipomas that traverse pelvic foramina or other anatomical canals can form a dumbbell shape configuration, making them challenging to remove surgically. Understanding the complex anatomy of the pelvis is essential for surgical planning and complete and safe resection. Given these complexities, a multi-disciplinary team of surgical specialists is often required. This study reports our experience with surgical resection of dumbbell-shaped lipomatous tumors, with a focus on anatomical and technical considerations.

Methods/Interventions: All patients who underwent operation for dumbbell-shaped lipomatous pelvic tumors between 2001 and 2017 were reviewed. Demographics, anatomical configuration of tumors, and technical aspects of surgical resection were reviewed.

Results/Outcome(s): Fourteen patients, 10 female, with median age of 55 years, underwent resection of a

P1 Table 1. Demographic Data and Operative Indications

Variable	Robotic (n=69)	Laparoscopic (n=69)	p-Value
Age	57.9 ± 12.6	57.0 ± 12.3	0.65
Gender (Male)	25 (36.2)	28 (40.6)	0.60
ASA	2 [1]	2 [1]	0.78
BMI	29 [8]	29 [8]	0.86
Stoma Creation (Ileo)	2 (2.9)	2 (2.9)	>0.99
Indication			0.27
Recurrent disease	45 (65.2)	42 (60.9)	
Ongoing symptoms	10 (14.5)	17 (24.6)	
Fistula	14 (20.3)	10 (14.5)	

ASA: American Society of Anesthesiologists physical status classification system

BMI: Body mass index

Ileo: Ileostomy

benign pelvic lipoma traversing either the sciatic (n=9) or obturator (n=2) foramen, or the femoral canal (n=3). All but one operation was performed by 2 or more surgical specialists. A two-incision approach was necessary in 10 of 14 patients to achieve complete tumor resection. When a single incision was used, 3 were anterior midline laparotomies, and one was from a posterior-only gluteal approach. In patients who required a two-incision approach, we employed a posterior transgluteal incision for tumors involving the sciatic foramen (n=5) or an anterior thigh incision for those traversing the obturator foramen (n=2) or femoral canal (n=3). Tumors were removed intact in thirteen, while one had a piecemeal resection. Patients with tumors traversing the femoral canal required mesh to close the femoral canal defect. Median blood loss was 250 ml (range, 100 – 2050). No intraoperative injuries occurred to viscera or major neurovascular structures. Complete tumor resection was achieved in all patients.

Conclusions/Discussion: Benign lipomatous dumbbell shaped pelvic tumors may traverse the sciatic and obturator foramina, or femoral canal. With careful preoperative planning and an expert surgical team, a safe and complete resection can be achieved.

IT'S TIME TO RETIRE GOODSALL'S RULE: THE MIDLINE RULE IS A MORE ACCURATE PREDICTOR OF THE TRUE AND NATURAL COURSE OF ANAL FISTULAS.

P3

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Purpose/Background: On May 6, 1887 at a meeting of the West London Medico-Chirurgical Society, David Henry Goodsall first publicly described an association between the external sinus opening of an anal fistula to the location of its primary (internal) opening: posterior external fistulas had a midline origin and anterior fistulas took a straight path to its internal origin- eponymously known as Goodsall's Rule. The dominance of the midline as the primary (internal) origin of ALL anal fistulas,

reported by many authors over the past century, challenges the predictive accuracy of Goodsall's Rule.

Methods/Interventions: A review of the medical literature evaluating the accuracy of Goodsall's Rule in predicting the course of anal fistulas, including recent studies of the positive predictive value (ppv) published between 1992 and 2003 from Europe (Belgium), Australia and the USA.

Results/Outcome(s): Men are the dominant sex when it comes to anal fistulas, especially posterior-based fistulas, with women having greater representation in anterior-based anal fistulas. Published reports, beginning in the 1920s, document the importance of the midline as the primary (internal) origin of anal fistula tracts with up to 95% accuracy (see Table). Recent studies reveal Goodsall's Rule to be inaccurate when applied to anal fistulas with an off-midline anterior external sinus opening: the midline was still the dominant primary (internal) origin of these anterior anal fistulas, with curved tracts to the midline anterior (as in anterior horseshoe abscess/fistulas) versus the presumptive straight course predicted by Goodsall's Rule. Several recent studies reveal an increase in the ppv of the location of the primary (internal) origin of an anal fistula using a Midline Rule versus Goodsall's Rule. The Midline Rule more accurately predicted the natural course of anal fistulas, confirmed by an increased ppv in these recent studies (1992-2003).

Conclusions/Discussion: Goodsall's Rule falls short in predicting the natural course of anal fistulas, especially fistulas with an anterior external sinus opening. Given the propensity of women to have anterior-based anal fistulas and the increased risk of fecal incontinence related to surgical intervention in this location, dependence on Goodsall's Rule to guide the surgeon may have "disastrous consequences" relative to maintenance of fecal continence. Granted there are exceptions to any rule, however, the preponderance of evidence published over the last century favors a Midline Rule as a more accurate predictor of the true and natural course of anal fistulas, regardless of the location of the external sinus opening.

P3 Literature Review- Location of the Primary (Internal) Opening

Author(s)	Country	Year	Number of patients	Midline (Total)	Midline Posterior	Midline Anterior
Gant	USA	1923			95%	
Minor	USA	1929			80%	
Rankin, Bargaen & Buie	USA	1932	1000	70%	50%	20%
Buie	USA	1960	600	87%	56%	31%
Parks	UK	1961	30	73%		
Lockhart-Mummery & Todd	UK	1977		80%		
Vasilevsky & Gordon	Canada	1984	160	59%	44%	15%
Cirocco & Reilly	USA	1992	216	81%	51%	30%

ACUTELY PERFORATED DIVERTICULITIS - WHAT IS THE IDEAL MANAGEMENT? A PROPENSITY MATCHED ANALYSIS OF NSQIP DATABASE.

P4

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Purpose/Background: The ideal treatment of acutely perforated diverticulitis remains a controversial topic. Traditionally, patients underwent Hartmann's procedure (HP), but randomized studies suggest primary anastomosis with proximal diversion (PAPD) is superior. However, controversy exists regarding the safety of PAPD vs. HP in the setting of dirty or infected cases, with some studies suggesting an increased mortality in patients treated with PAPD. Stoma reversal has been shown to occur more frequently after diverting loop ileostomy compared to end colostomy, with less overall morbidity for diverting loop ileostomy reversal. We hypothesized that PAPD, compared with HP, is safe in dirty or infected cases.

Methods/Interventions: National Surgical Quality Improvement Program Colectomy Module from 2012-2016 was queried to identify patients undergoing emergent colectomy for the diagnosis of acute or chronic diverticulitis (n=5071) with perforation with a wound class of IV recorded (n=4205). Power analysis was undertaken which showed a sample of 1760 patients should achieve 90% power. Demographic characteristics, intraoperative data, and postoperative outcomes were reviewed. PAPD and HP patients were compared using propensity scoring with a 1:3 ratio of based on 21 demographic and preoperative variables. The primary outcome was anastomotic leak, with secondary outcomes of 30 day mortality, overall complication rate, and post-operative length of stay (LOS). These outcomes were evaluated by conditional logistic regression and linear mixed modelling as appropriate.

Results/Outcome(s): A total of 560 PAPD patients were matched to 1680 HP patients. Matching achieved adequate coariate balance with almost all covariates in good (<10%) range except for preoperative serum albumin which has absolute standardized difference in the adequate (10-20%) range. On propensity matched analysis, anastomotic leak rate was not significantly different between PAPD and HP patients (OR 1.2 [0.66 - 2.3], p-value 0.52), nor were the rates of mortality, reoperation, readmission, or other complications (Table 1). Overall surgical site infection rate was the same between groups (OR 0.94 [0.68, 1.3], p-value 0.69). Patients in PAPD group spent on average one day fewer in the hospital (-0.92 days [-1.8, -0.05], p-value: 0.04). Subgroup analysis of only acute diverticular disease showed the same findings of no significant difference in all outcomes measures except LOS which was shorter in PAPD patients (-1.4 days, p=0.003).

Conclusions/Discussion: For patients with dirty or infected perforated diverticulitis, PAPD appears to be

safe, with a similar rate of perioperative complications, a shorter LOS, and no change in 30 day mortality or anastomotic leak rates. On the basis of these findings, PAPD is the preferred treatment of perforated acute or chronic diverticular disease.

	Univariate Analysis			Propensity Matched	
	HP	PAPD	p-value	Odds Ratio (95% CI)	p-value
Septic complications					
Anastomotic leak	2.1%	2.6%	0.45	1.20 (0.66, 2.3)	0.52
Organ Space SSI	11.4%	10.9%	0.76	0.93 (0.68, 1.3)	0.63
Wound Disruption	3.3%	3.9%	0.48	1.20 (0.68, 2.1)	0.56
Post-op Sepsis	19.9%	19.4%	0.80	0.95 (0.75, 1.2)	0.68
Other complications					
Prolonged Ileus	33.8%	33.4%	0.80	0.98 (0.79, 1.2)	0.81
Readmission	9.5%	10.2%	0.58	1.04 (0.76, 1.4)	0.80
Reoperation	8.5%	7.6%	0.42	0.80 (0.56, 1.2)	0.24

OPERATIVE RATES IN ACUTE DIVERTICULITIS WITH CONCURRENT SMALL BOWEL OBSTRUCTION.

P5

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Purpose/Background: The prevalence of diverticulosis has been steadily increasing over the past century. Approximately 20% of patients with diverticulosis will develop diverticulitis and while a vast majority can be managed non-operatively, it carries the potential for severe complications. One complication is concurrent small bowel obstruction (SBO) in the setting of large bowel diverticulitis (LBD). While this has not been well published, Bodon in 1958, described a case series of LBD with SBO. Almost all of these patients had progression of disease with a high rate of surgical intervention. Today, these patients are typically treated in a similar fashion to patients without SBO. Earlier identification of patients likely to fail nonoperative management could decrease length of stay (LOS), cost, and possibly allow more favorable operative interventions. The purpose of this study is to assess how patients with diagnoses of concurrent LBD and SBO are managed and assess the need for operative intervention.

Methods/Interventions: Retrospective review at a large community hospital of all patients greater than 18 years of age who presented with a diagnosis of acute LBD, excluding only patients with incomplete documentation. A 5:1 match was performed for 34 patients with LBD and SBO with 170 control patients with LBD only. Regression analysis was performed, adjusting for Hinchey classification and other comorbidities, to assess for the primary outcome of need for surgical intervention. Secondary outcomes include length of stay, ostomy, surgical site infection, and mortality.

Results/Outcome(s): Patients with concurrent SBO were more likely to require surgical intervention (OR 4.2; 1.5-11.6; p=0.006). When surgical intervention was required, patients who had LBD with SBO were more likely to undergo an open rather than laparoscopic

procedure ($p < 0.001$) and more likely to receive an ostomy (OR 6.3; 1.6-25.0; $p = 0.008$). The LOS was longer for LBD with SBO (difference in mean LOS 3.2 days; 1.1-5.2; $p = 0.003$). If surgery was required the respective median time to operation was 14.5 hours for patients with SBO vs. 39 hours for those without. Both groups had a median postoperative LOS of six days. There was no difference in surgical site infection or mortality between the groups.

Conclusions/Discussion: Diverticulitis is a common cause for hospital admission accounting for approximately 300,000 hospitalizations per year in the United States. Typically, nonoperative management is attempted for patients who do not require urgent intervention. Patients with concurrent LBD and SBO are more likely to fail nonoperative intervention. Given their high rate of failure of nonoperative management and higher rate of open surgery and ostomy formation, earlier surgical intervention for this group of patients may improve outcomes and decrease hospital LOS.

CASE SERIES OF SINGLE SURGEON EXPERIENCE WITH ROBOTIC-ASSISTED SURGERY FOR COMPLICATED AND NON-COMPLICATED DIVERTICULITIS.

P6

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Purpose/Background: Laparoscopic colectomy has become the preferred approach for surgical management of non-complicated diverticulitis (ND), with lower complication rates, shorter hospital length of stay (LOS)

and decreased narcotic use compared with open surgery. Complicated diverticulitis (CD), characterized by abscess, fistula or stricture, is often more difficult to manage with laparoscopic approach, with reports of higher conversion rates, prolonged operative time (OT), longer LOS, and higher complication rates. The robotic platform may offer advantages over laparoscopy when operating for CD. Our aim was to present outcomes of consecutive patients who underwent robotic-assisted surgery for ND and CD.

Methods/Interventions: From January 2014 to June 2017, 68 patients underwent elective robotic-assisted surgery for diverticular disease by a board-certified colorectal surgeon (SAR). Preoperative, intraoperative and postoperative variables were recorded prospectively in a database and analyzed with retrospective review.

Results/Outcome(s): For all patients, of whom 28 (41.2%) were men, mean age was 60.5 ± 11.5 (range 38-90) years and mean body mass index (BMI) was 28.7 ± 4.9 (range 20-48) kg/m^2 . Patients had a mean of 3.2 ± 2.4 (range 0-11) significant comorbidities and 40 (59.7%) patients had undergone prior abdominal surgery. Indications for surgery were recurrent diverticulitis in 32 (47.1%), abscess in 20 (29.4%), fistula in 11 (16.2%), and stricture in 5 (7.4%) patients. For all patients, average OT was 184.4 ± 38.7 (range 104-302) minutes, average estimated blood loss (EBL) was 114.9 ± 187.0 (0-1200) mL, and average LOS was 4.2 ± 2.4 (range 2.5-14) days. Comparison of robotic-assisted surgery for CD and ND revealed significant differences in OT (195.6 ± 38.4 vs 171.8 ± 35.6 min, $p = 0.01$), conversion rates (22.2% vs 3.1%, $p = 0.03$) need for ostomy (33.3% vs 9.4%, $p = 0.04$) and placement of a pelvic drain (28.6% vs 3.2%, $p = 0.02$). There were trends for higher complication rates (38.9%

P5 Multivariate Analysis of Outcomes

		LBD [n (%)]	LBD + SBO [n (%)]	OR (95% CI)	P Value
		n= 170	n = 34		
Surgical Intervention		36 (21.2)	18 (52.9)	4.2 (1.5 - 11.6)	0.006*
Type of Procedure	Lap	9 (5.3)	1 (2.9)	1.1 (0.1 - 10.1)	0.954
	Open	27 (15.9)	17 (50.00)	6.2 (2.6 - 14.7)	<0.0001*
Ostomy		21 (12.4)	14 (41.2)	6.3 (1.6 - 25.0)	0.008*
Postoperative Infection		10 (5.9)	3 (8.8)		0.536†
Mortality		4 (2.4)	1 (2.9)		0.999

LBD = Large bowel diverticulitis; SBO = Small bowel obstruction

Too few occurrences to calculate odds ratios for mortality or postoperative infection

* $p < 0.05$

† Derived from unadjusted analysis

vs 15.6%, $p=0.06$) and longer LOS (4.49 vs 3.83 days, $p=0.05$). No significant differences were noted in EBL, return of bowel function (ROBF), readmission rate, or narcotic use. Only four patients, all in the CD group, had intraoperative ureteral stents placed and there were no ureteral injuries.

Conclusions/Discussion: In this report, limited by modest sample size and a single surgeon experience, patients with CD required longer OT, and more often required conversion, an ostomy and a pelvic drain. In the CD group, trends were seen for higher incidence of complications and longer LOS. Robotic-assisted surgery is safe and feasible for both ND and CD. The robotic platform may enable more surgeons to operate safely without the assistance of prophylactic ureteral stents during surgery for complicated diverticulitis.

Results of robotic-assisted surgery for complicated and non-complicated diverticulitis			
	Non-complicated diverticulitis (n=32)	Complicated diverticulitis (n=36)	p-value
Patient Breakdown			
Age - mean (range)	59 (42-77)	62 (38-90)	0.314
Gender - M/F (%)	12/20 (37.5/62.5)	16/20 (44.4/55.6)	0.738
BMI - mean (range)	28.8 (20-48)	28.7 (22-38)	0.876
Number of comorbidities - mean (range)	2.9 (0-11)	3.4 (0-7)	0.330
Patients with prior abdominal surgery (%)	18 (56.3)	22 (61.1)	0.997
Indications (%)			
Recurrent disease	32 (100)	0 (0)	< 0.01
Abscess	0 (0)	20 (55.6)	
Fistula	0 (0)	11 (30.6)	
Stricture	0 (0)	5 (13.9)	
Surgery Breakdown (%)			
LAR*	29 (90.6)	24 (66.7)	0.045
LAR with DLI*	3 (9.4)	9 (25.0)	
Hartmann's procedure	0 (0)	3 (8.3)	
Results			
OR time in minutes - mean (range)	171.8 (104-258)	195.6 (120-302)	0.011
Conversions to open (%)	1 (3.1)	8 (22.2)	0.030
Ostomies (%)	3 (9.4)	12 (33.3)	0.037
Ureteral catheters utilized (%)	0 (0)	4 (11.1)	0.116
Drain placed (%)	1 (3.1)	10 (27.8)	0.015
Complications (%)	5 (15.6)	14 (38.9)	0.062
EBL in mL - mean (range)	82.9 (0-400)	142.5 (0-1200)	0.621
ROBF day (range)	2.5 (1-7)	2.8 (1-12)	0.248
LOS in days - mean (range)	3.83 (2.5-13)	4.49 (2.5-14)	0.052
MSO4 equivalent dose POD# 1-4 - mean (range)*	87.7 (0-562)	85.3 (8-532)	0.458
Readmit 60 days - mean (%)	1 (3.1)	4 (11.1)	0.427
Mortality (%)	0 (0)	0 (0)	-

* LAR = low anterior resection; LAR w DLI = low anterior resection with diverting loop ileostomy; POD = post-operative day

SELF-FIXATING MESH IN PARASTOMAL HERNIA REPAIR: A NEW APPROACH TO AN OLD PROBLEM.

P7

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Purpose/Background: Parastomal hernias are a relatively common complication of intestinal stomas. There are various approaches for repair, including primary repair and mesh repair, using both biologic and synthetic materials. The safety of synthetic mesh use in parastomal hernia repair has been established, but the majority of the studies describe their experience with polytetrafluoroethylene

(PTFE) and polypropylene (PP) implants. No study to date has evaluated the use of self-fixating polyester mesh in this patient population. We reviewed our experience with self-fixating polyester mesh in parastomal hernia repair.

Methods/Interventions: From April 2012 through April 2017, 29 patients underwent a parastomal hernia repair using self-fixating polyester mesh at the University of North Carolina Hospitals. A retrospective review of the medical records was performed searching for all patients who were repaired using the same technique: the fascia was first repaired primarily, a piece of self-fixating mesh was placed on top of the fascia, the stoma was pulled through a cruciate incision in the mesh allowing for the flaps of the mesh to abut the bowel wall circumferentially. Patient demographics, presence of specific comorbidities and perioperative complications, including recurrence, were extracted from the medical record. Patient characteristics were described using univariate analyses. Potential risk factors for any complication were assessed using Fisher's exact and Student's t tests, where appropriate. A p-value <0.05 was considered significant.

Results/Outcome(s): There were 8 colostomies, 16 ileostomies and 5 urostomies. The cohort was 41% male and the average BMI was 33. Thirty one percent of patients had diabetes mellitus, 10% had COPD, 17% used tobacco products and 38% of patients had at least one previous parastomal hernia repair (14% had more than 2). Most of the patients in the study had stomas for inflammatory bowel disease (55%), cancer (28%) and diverticulitis (7%). Post-operative complications included obstruction (21%), parastomal abscess (17%) and recurrence of parastomal hernia (34%). No patients developed mesh erosion or required removal of the mesh. There were no statistically significant correlations between any complications and a particular comorbidity, such as obesity, smoking, or diabetes mellitus. Median follow up time was 2.8 months.

Conclusions/Discussion: The repair of parastomal hernias with self-fixating polyester mesh did not result in any instances of mesh erosion or need for mesh removal, despite direct contact between the mesh and the bowel wall. It appears that the use of this mesh is safe for parastomal repair, even in patients with inflammatory bowel disease. Due to the short follow-up time and small sample size, however, we were not able to draw more definitive conclusions about the efficacy and long term complication rate of this technique.

PROPHYLACTIC MESH USE IN END COLOSTOMIES TO PREVENT PARASTOMAL HERNIA: A STUDY OF THE CURRENT PRACTICE PATTERNS AND ATTITUDES OF NORTH AMERICAN COLORECTAL SURGEONS.

P8

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Purpose/Background: Prophylactic mesh insertion during end colostomy creation has been shown to reduce the rate of parastomal hernia in many studies and recent meta-analyses; however, this evidence has not been widely applied to clinical practice. This study aimed to identify the current rate of prophylactic mesh use among American and Canadian colorectal surgeons, as well as the barriers that limit surgeons' adoption of prophylactic mesh.

Methods/Interventions: A cross-sectional survey was administered to a random sample of North American colorectal surgeons between May and July 2017. The survey consisted of questions on current practices and attitudes with respect to the use of prophylactic mesh,

including Likert scale questions assessing 20 potential barriers to its use.

Results/Outcome(s): Forty-eight of 93 invited Canadian surgeons (52%) and 253 of 1521 (17%) invited American surgeons responded. Of all 301 respondents, 11% currently use mesh, 11% have used mesh in the past, 59% are considering use, and 19% are not considering the practice. Only 2% of Canadian surgeons currently use prophylactic mesh in comparison to 13% of American surgeons. Among those currently using mesh 41% are using it only in select patients, 68% are using a sublay technique, and 57% are using biological mesh. There is broad agreement among colorectal surgeons that parastomal hernias have a negative impact on patients' quality of life (85%); however, there is disagreement between those using mesh and those who do not on the efficacy of mesh to reduce parastomal hernia formation (100% vs 53%) and the quality of evidence supporting the practice (69% vs 43%). Surgeons who have stopped using mesh cite insufficient benefit from the use of mesh (38%) and lack of available resource, ex. appropriate mesh (22%). Concern regarding the risk of complications was the most commonly cited reason among

P7 Comorbidity/demographics and likelihood of developing any complication

	Complication (15 total, 52%)	No Complication (14 total, 48%)	p-value
Age, in years, mean (SD)	54 (16.4)	55 (15.0)	0.80
Male, n (%)	6 (40)	6 (43)	0.99
BMI, mean (SD)	34 (8.0)	33 (5.4)	0.69
Comorbidities, n (%)	-	-	-
Diabetes mellitus	4 (27)	5 (36)	0.70
COPD	3 (20)	0 (0)	0.22
Hypertension	6 (40)	5 (36)	0.99
History of DVT/PE	1 (7)	2 (14)	0.60
Smoking status, n (%)	-	-	-
Current smoker	3 (20)	2 (14)	0.99
Former smoker	6 (40)	4 (29)	0.70
Never	6 (40)	8 (57)	0.47
Steroid, n (%)	2 (13)	2 (14)	0.99
Previous repair, n (%)	5 (33)	6 (43)	0.71
Indication for stoma, n (%)	-	-	-
Cancer	3 (20)	5 (36)	0.43
Inflammatory bowel disease	9 (60)	7 (50)	0.72
Other	2 (13)	1 (7)	0.99
Indication for repair, n (%)	-	-	-
Pain	13 (87)	8 (57)	0.11
Other	2 (13)	6 (43)	-
Stoma type, n (%)	-	-	-
Colostomy	3 (20)	5 (36)	0.43
Ileostomy	10 (67)	6 (43)	0.27
Urostomy	2 (13)	3 (21)	0.65
Drain placed, n (%)	6 (40)	10 (71)	0.14

surgeons who have not used mesh for not adopting the practice (47%), followed by the associated cost (22%).

Conclusions/Discussion: Despite current evidence, prophylactic mesh placement remains relatively uncommon. Most surgeons use biologic mesh despite the larger proportion of data supporting synthetic mesh, thus increasing costs. Most surgeon are not convinced of the safety of mesh despite the current evidence and this remains a major barrier to the adoption of the practice.

CHRONIC HIDDRENITIS SUPPURATIVAE, HURLEY STAGE III: A CASE STUDY.

p9

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Purpose/Background: Hidradenitis suppurativa (HS) is a chronic condition involving the sweat glands of different intertriginous parts of the body. This disease has been shown to be caused by infundibular hyperkeratosis, hyperplasia of the follicular epithelium and perifolliculitis of a folliculopilosebaceous unit. Among parts affected with HS, the axillary area is the most common site involved in both men and women. On the other hand, perineal and gluteal HS is relatively less common, but if seen, presents more in males than females. In the Philippines, HS is encountered commonly in women, and presents in the axillary area. We aim to report a rare case of a gluteal and perianal HS (Hurley Stage III) managed with wide excision and secondary intention healing.

Methods/Interventions: We present a case of a 50 year old male with a two year history of painful induration at the right gluteal area. He was initially managed as a case of perianal abscess, and prescribed several antibiotics but with no resolution of symptoms. In fact, during the interim, the patient's condition worsened and spread to affect almost the entire left and right buttocks. On physical examination, the patient presented with multiple, round erythematous indurations on both gluteal regions draining purulent discharge. Digital rectal examination revealed a tight sphincteric tone, with no palpable internal indurations, or masses. An endoanal ultrasound was requested for the patient, which revealed radial fistulous tracts on both gluteal areas. No fistula were noted. The planned procedure for the patient was wide excision of bilateral gluteal and perianal lesions. Intraoperatively, the lesions were noted to have multiple openings and fistulous tracts up to the dermal layer only. No intersphincteric or extrasphincteric fistulous tracts were noted. Wound care was done every 6 hours using Chlorhexidine wash for the duration of the admission. Patient's wound was allowed to heal by secondary intention, and he was discharged on the 6th hospital day.

Results/Outcome(s): The wound bed showed improving granulation and proper wound healing on

weekly follow-up. The wound bed was photographed weekly (for total of 8 weeks) for documentation. There was no note of any recurrence of the perianal discharge noted post-operatively. Patient was able to resume activities of daily living by the 1st week, and resumed work by the 2nd week post operatively.

Conclusions/Discussion: Attempts at removing all tissue affected by HS through wide surgical excision are the mainstay intervention for achieving complete cure, particularly in the most cases of the disease. Our experience with wide excision of disease and healing by secondary intent demonstrated clinically satisfactory functional and excellent aesthetic results. This healing modality requires strict adherence to the wound healing protocol, which is often tolerated only by patients who have endured symptoms of severe HS for an extended length of time.

HIDRADENOMA PAPILLIFERUM OF THE ANUS: A REPORT OF TWO CASES.

P10

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Purpose/Background: Hidradenoma papilliferum (HP), also known as papillary hidradenoma, is a rare, benign, cystic tumor that originates from the apocrine gland or anogenital mammary gland. It occurs almost exclusively in middle-aged women. It presents as a solitary, circumscribed nodule approximately 1 cm in diameter and may resemble a hemorrhoid. The lesion is usually asymptomatic, but may be revealed by itching, pain, bleeding or discharge, especially if it ulcerates. Here we describe the two cases of HP occurring on the anus.

Methods/Interventions: Case 1. A 39-year-old female presented in our clinic with anal pain and anal protrusion during defecation. Her past medical history and family history were unremarkable. On physical examination, an about 1 cm sized, well-circumscribed, umbilicated, reddish nodule with prolapsed hemorrhoids was seen on the anus (Figure 1A). Anoscopy showed multiple internal hemorrhoids. Endoanal ultrasound showed normal finding with no evidence of abscess or fistula. The patient underwent hemorrhoidectomy and excisional biopsy of anal mass under caudal block. Case 2. A 35-year-old female visited our clinic with a history of anal bleeding and mass. On physical examination, an about 0.8 cm sized, round, well-marginated, ulcerated, red nodule with touch bleeding was seen on the anus (Figure 1B). Anoscopy showed nonspecific finding except internal hemorrhoids. Endoanal ultrasound showed normal finding with no evidence of abscess or fistula. Under caudal block, she underwent hemorrhoidectomy and excisional biopsy of the lesion.

Results/Outcome(s): Histopathological examination of the two cases revealed a papillary proliferation with

biphasic cell pattern by inner eosinophilic columnar cells and outer cuboidal cells without atypia or mitoses. These findings were consistent with HP. Postoperative course was uneventful. No recurrence was observed after 14 months and 10 months follow-up respectively.

Conclusions/Discussion: Proctologists should consider the possibility of HP in the differential diagnosis of benign anal tumors. Surgical excision is necessary for diagnosis and treatment of HP.

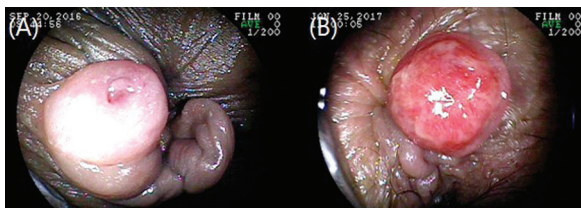


Figure 1. Hidradenoma papilliferum of the anus was seen.

INTRALUMINAL BURKITT LYMPHOMA PRESENTING AS PERFORATED APPENDICITIS.

P11

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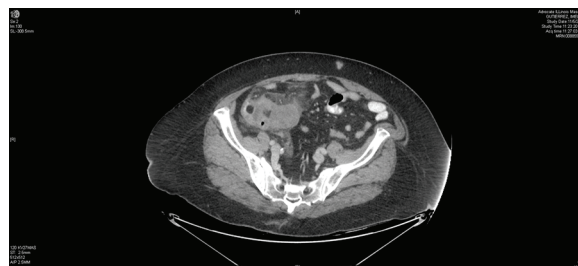
Purpose/Background: Appendicitis is a common cause of surgical abdominal pain in the right lower quadrant. It remains important for the general surgeon to understand the variety of imitators that can confound the diagnosis of appendicitis. Today we present a case and review of literature related to Burkitt lymphoma of the appendix. Complications of mass effect are the most common presentation due to its rapid growth. Although surgical resection is frequently performed due to local factors the most important element of treatment is high intensity chemotherapy.

Methods/Interventions: s

Results/Outcome(s): A 68yo female with PMH significant for HTN, morbid obesity, and urinary incontinence presented for evaluation of RLQ abdominal pain. She had a remote cholecystectomy and an unremarkable family history. She endorsed 3-4 days of sharp pain that was accompanied by anorexia, nausea, and emesis. Workup revealed focal RLQ peritonitis, a WBC of 29, and a large cystic inflammatory right lower quadrant mass consistent with perforated appendicitis on CT. Percutaneous drainage was anatomically limited so she was discharged on a course of IV antibiotics. Interval colonoscopy two months later revealed pan-diverticulosis and an inflamed ileocecal valve without any mass. Biopsies of the inflamed valve were benign so she was scheduled for exploration. Intraoperatively a 4cm perforated appendiceal intraluminal mass was noted intimately associated with the mid-ileum. Frozen section demonstrated malignant cells so a formal right hemicolectomy with en-bloc mid-ileum resection was performed. Final pathology revealed a 5.4x5.4x2.4cm

hemorrhagic intraluminal appendiceal mass consistent with Burkitt lymphoma. CSF and bone marrow studies were negative for malignancy making this stage IIIE. She completed 6 cycles of REPOCH chemotherapy including intrathecal therapy. Follow-up imaging and colonoscopy demonstrated no signs of recurrence.

Conclusions/Discussion: Burkitt lymphoma is divided into three broad classes based on etiology and genetics: endemic, sporadic, and immunodeficiency-associated. Sporadic variants are the most common resulting from rearrangement of the c-myc gene via translocation; most frequently t(8;14). Rapid growth leading to obstruction, intussusception, or bleeding is the natural history of disease. The appendix is a rare site of primary disease encompassing 0.015% of gastrointestinal lymphoma. The rapid growth with acute symptom onset results in frequent misdiagnosis as more common general surgical conditions. Diagnosis is frequently not made until the time of exploration. Perforation, appendicitis, obstruction, and intussusception all require surgical treatment in this setting. Post-operatively chemotherapy is the most important determinant of a positive outcome. While surgery is not the mainstay of treatment for Burkitt lymphoma, surgeons carry an important role in the diagnosis of this rare cause of right lower quadrant pain mimicking multiple surgical conditions.



LOCALLY INVASIVE OVARIAN TERATOMA: AN UNUSUAL CASE OF RECTAL PROLAPSE.

P12

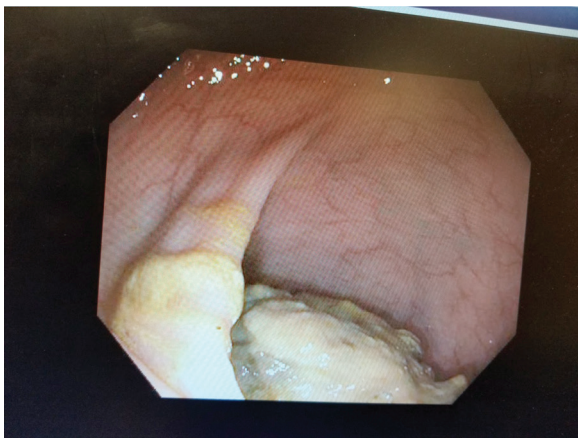
P. Shenoy, S. Vaid
Newark, DE

Purpose/Background: Rectal procidentia, defined as full thickness circumferential protrusion of the rectum through the anal muscles beyond the anal verge, occurs in about 1% of adults over 65 years. It can lead to variety of symptoms that result in a decreased quality of life such as rectal bleeding, pain and bowel dysfunction. Risk factors historically include female gender, and sources of pelvic floor strain such as multiparity, chronic constipation and prior pelvic surgery. In addition to pelvic physiology studies, preoperative colonoscopy is recommended in patients based on general screening guidelines but also in patients who have had new symptoms since their last colonoscopy.

Methods/Interventions: 69 year old female with history of multiple cesarean sections and previous exploratory laparotomy for a large ovarian teratoma presented to the emergency room with a difficult to reduce rectal prolapse. Though this prolapse had been symptomatic for about a year, this was the first time reduction required conscious sedation with the aid of surgical staff. She underwent an outpatient flexible sigmoidoscopy which revealed a large ulcerating mass in her rectum; the biopsy obtained revealed dysplasia concerning for adenocarcinoma. A computed tomography scan of the chest, abdomen and pelvis, as well as an magnetic resonance imaging of the pelvis were obtained to complete the staging workup for rectal cancer. No metastatic disease was identified. The rectal mass was again visualized at the rectosigmoid junction, with some enlarged pelvic lymph nodes; the degree of mural involvement could not be determined based on the tethering and prolapse of the mass itself.

Results/Outcome(s): After completion of imaging and pre-operative medical optimization, the patient presented for a laparoscopic hand-assisted low anterior colon resection, coloproctostomy and diverting loop ileostomy. Her pathology revealed the tumor to be bland mucinous cystic neoplasm of ovarian origin, supporting recurrence of a mucinous cystadenoma from within an ovarian remnant. Interesting, the serosa of the surgical specimen had a focal area of retraction, implying transmural migration of the mucinous cystic neoplasm that had evolved into an intraluminal pedunculated polypoid lesion.

Conclusions/Discussion: Rectal prolapse is traditionally considered a pelvic floor disorder, and the workup for its management is focused around evaluating both the patient's pelvic anatomy and physiology. This case report highlights the role of colonoscopy, particularly in a patient with a history of pelvic malignancy. In this case, the rectal prolapse was caused by a locally invasive mucinous cystic teratoma which had locally invaded at the level of the rectosigmoid junction.



MISDIAGNOSIS OF TRANSVERSE DIVERTICULITIS VIA COMPUTED TOMOGRAPHY.

P13

C. Zhang, D. Hart, W. Ambroze, M. Schertzer, E. King
Atlanta, GA

Purpose/Background: Colonic diverticulitis most commonly occurs in the left colon (90%) but may occur anywhere, except in the rectum. Transverse diverticulitis, with only a few reports in the medical literature is rare despite the 10-20% incidence of diverticula in the transverse colon in the US population. We present an unusual case of a delayed presentation of peptic ulcer disease presenting as transverse diverticulitis.

Methods/Interventions: A seventy-year-old female status-post sigmoidectomy for diverticulitis in 1996 twenty-one years prior presented with epigastric pain, nausea and vomiting. Her last episode of diverticulitis was twelve months ago treated with oral antibiotics. Computed tomography (CT) was concerning for transverse colonic diverticulitis. Her symptoms remained despite medical management. A colonoscopy did not demonstrate diverticulitis or recent inflammation. Because of persistent symptoms, she was prepped for abdominal exploration and partial colectomy. Intraoperatively the transverse colon was normal. A phlegmon was noted along the greater curvature of the stomach with densely adherent omentum encasing the mid-transverse colon.

Results/Outcome(s): While CT is a reliable diagnostic tool for left colon diverticulitis, with sensitivity as high as 97%, it is far less consistent for the diagnosis of transverse diverticulitis. Of the 35 cases of transverse diverticulitis in literature, many were masked as cholecystitis, appendicitis, hepatic abscess, pancreatitis, splenic and renal infection or mesenteric infarction.

Conclusions/Discussion: Convincing computed tomography findings can be misleading for the diagnosis of complicated intra-abdominal processes. Although a recent study by Kim et al. questioned the practice of routine colonoscopy for acute diverticulitis diagnosed by typical clinical symptoms and CT, it is necessary in evaluating atypical presentations. Clinical judgement is key in making the appropriate surgical decision.

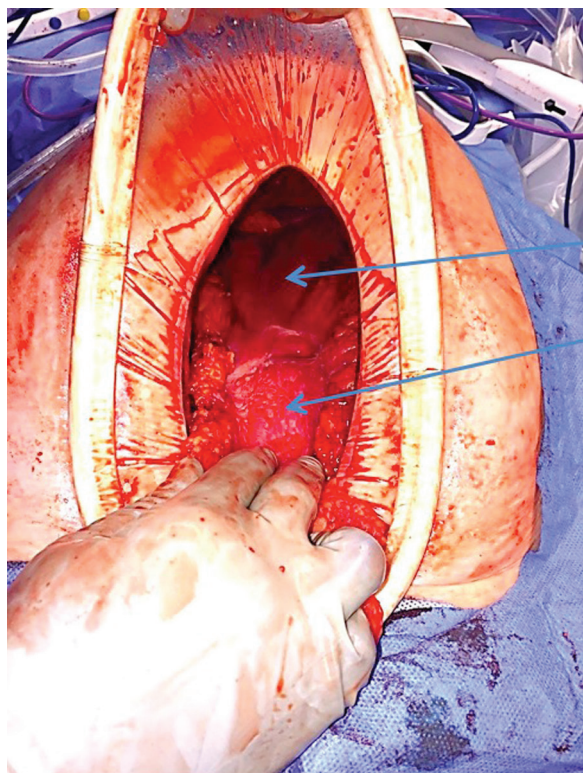


Figure 1. Arrows demonstrating stomach and omentum wrapped circumferentially around transverse colon.

STERCORAL ULCER PRESENTING AS A BOWEL OBSTRUCTION.

P14

D. Hart, C. Zhang, E. King, M. Schertzer, W. Ambroze
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Purpose/Background: Obstructive symptoms including abdominal pain, nausea, and vomiting brought a 69-year-old female to the hospital. Computerized tomography demonstrated an obstructing mass in the descending colon with significant colonic distension and small bowel dilation (figure 1). The patient was ultimately taken to the operating theatre for intervention.

Methods/Interventions: A 69-year-old female with history of irritable bowel syndrome mixed type presented with worsening constipation requiring fecal disimpaction by her husband at home. Increased fluids and miralax were recommended when she contacted her gastroenterologist. The patient had some response with two large bowel movements, but worsening of left lower quadrant pain, nausea, and vomiting prompted her to report to the emergency department two days later. Her last colonoscopy was five years ago with small benign polyps removed. Ten-pound unintentional weight loss had occurred over the last six months. Pertinent history includes irritable bowel syndrome, gastritis, and appendectomy. Family history is negative for colon cancer. Medications include Welchol, Levsin, Carafate, and Protonix. Computerized tomography in the

emergency room showed focal narrowing/stricturing of the mid descending colon with multiple dilated fluid-filled loops of small and large bowel proximal to this transition point. No intra-abdominal free air. Patient had a white blood cell count of 19.1 and lactate 1.1. The patient was admitted to the medical service with Colon and Rectal Surgery consultation. She was passing flatus at the time of consultation, however given laboratory and imaging findings the decision was made to proceed with surgical intervention.

Results/Outcome(s): Exploratory laparotomy, mobilization of the splenic flexure, fecal disimpaction, spy angiography, and colonoscopy was performed. The fecal impaction was at the splenic flexure with significantly dilated small bowel and colon. This was decompressed by milking the small bowel contents proximally and via colonoscopic decompression, which showed a stercoral ulcer at the level of the splenic flexure. Spy angiography demonstrated adequate flow to the area of concern therefore no resection was performed. Postoperatively the patient was treated like she had ischemic colitis with nil per os, total parenteral nutrition, and intravenous antibiotics. Patient had an expected postoperative ileus, which resolved and she began passing flatus on postoperative day five. Her diet was slowly advanced, and the patient was discharged at approximately postoperative day 12 as she developed respiratory insufficiency and some acute delirium during the course of her recovery.

Conclusions/Discussion: In review of the literature, stercoral ulcer location was either not mentioned, or was noted in the sigmoid and rectum. This case highlights that these ulcers can be found in other colonic locations and need to be considered in your differential diagnosis of colonic mass in a chronically constipated patient.



Figure 1. Computerized tomography demonstrating obstructing mass in the descending colon.

LAPAROSCOPY VIA THE STOMA SITE: A NOVEL USE FOR LAPAROSCOPY DURING DIVERTING LOOP ILEOSTOMY REVERSAL.

P15

A. Morgan, S. McClane
Camden, NJ

Purpose/Background: A protective ileostomy is often used to reduce the morbidity and mortality of anastomotic leakage for patients who undergo colorectal anastomosis. The ileostomy is then reversed with a peri-stomal incision but some patients may require laparotomy and adhesiolysis for reversal. In this report, we describe a new technique for using laparoscopy through the stoma site as a safe and effective method for adhesiolysis instead of laparotomy.

Methods/Interventions: We retrospectively reviewed the operative reports of a single colorectal surgeon, for patients who underwent closure of loop ileostomies that were created to protect downstream colorectal or ileocolic anastomoses. Operative techniques were reviewed. The planned procedure was to close the ileostomy without any incisions outside of the ileostomy exit site. If intra-abdominal adhesions prevented adequate evisceration of the ileum for an anastomosis, patients needed either a midline laparotomy or laparoscopy for adhesiolysis. Midline laparotomy was performed in standard fashion. For those requiring laparoscopy, a small capped wound protector (2.5-6 cm, Alexis Laparoscopic System, Applied Medical) was placed through the ileostomy exit site and a 12mm port was placed into the abdomen. Laparoscopy was then begun and 5 mm ports were placed based on the location of adhesions. Following laparoscopic adhesiolysis, the limbs of the ileostomy were then eviscerated and a tension-free anastomosis was created. The fascia and port sites were closed in standard fashion.

Results/Outcome(s): Between January 2014 and October 2017, 78 consecutive loop ileostomy reversals were performed by the same colorectal surgeon. 6 of these patients required laparoscopy, 1 required laparotomy, and 71 required no additional incisions. For the laparoscopic group, the average duration of the procedure was 132 minutes, with blood loss 19 cc, and length of stay 4.8 days. The average duration of procedure for peri-stomal approach was 91 minutes. The laparoscopic operations were 41 minutes longer on average, however this was not statistically significant ($p=0.14$). There was also no significant difference in blood loss ($p=0.50$), intra-operative fluids ($p=0.31$), or vasopressor use ($p=0.32$). The mean length of stay for patients who underwent laparoscopic assisted surgery was 4.8 days vs. 3.9 days ($p=0.62$). Only 1 patient in 78 required laparotomy, allowing 98.7% of patients to have their ileostomy reversed without laparotomy.

Conclusions/Discussion: Laparoscopy via the stoma site is a safe and effective way to perform adhesiolysis during ileostomy reversal and avoids the morbidity and

mortality of laparotomy. In this series, we found no significant difference in operative duration, blood loss, fluids, or length of stay when laparoscopy was compared to standard incision. Surgeons should consider this approach instead of laparotomy when adhesiolysis is needed for protective ileostomy closure.

A RARE CASE OF ENDOMETRIOSIS LESION IN CAECUM CAUSING ACUTE SMALL BOWEL OBSTRUCTION.

P16

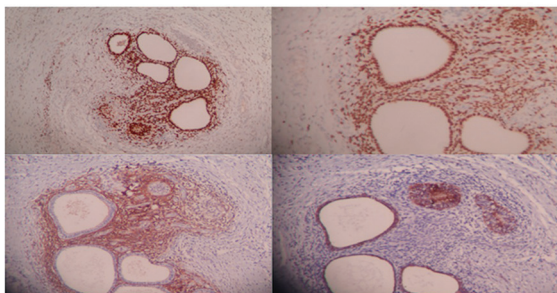
F. Halim
West Jakarta, Indonesia

Purpose/Background: Endometriosis in bowel is rare condition, about 3-37% of endometriosis cases. Most of bowel endometriosis rising in the rectosigmoid (90% of bowel endometriosis). Incidence of caecal endometriosis is very low (<5% of bowel endometriosis) and almost never causing acute small bowel obstruction. The aim of this paper is to show that although bowel obstruction caused by caecal endometriosis is difficult to diagnose as it is rare, and may require laparotomy to make definite diagnosis, but it should be considered in infertile female patient.

Methods/Interventions: The case is 37 years old woman infertile woman with intestinal obstruction with pre-operative diagnosis total acute small bowel obstruction caused by right colonic mass, with sepsis as the complication. Before the acute small bowel obstruction she complained of chronic right lower quadrant pain with chronic constipation alternate with chronic diarrhea, symptoms that happened both in bowel endometriosis and colorectal malignancy. She also complained of chronic pelvic pain and dysmenorrhea. She has married for 10 years with no child. The patient was never diagnosed with endometriosis and never seek medical attention for the infertility and the chronic pelvic pain. The patient underwent Abdominal CT Scan, with result: massive small bowel obstruction, and caecal mass that causing acute small bowel obstruction. Diagnosis of Acute small bowel obstruction due to right colonic mass was made and exploratory laparotomy was performed the patient. During the laparotomy, mass at caecum and ileocaecal that causing massive small bowel obstruction was found and standard right hemicolectomy and temporary ileostomy was performed

Results/Outcome(s): The pathology examination showed ectopic endometriosis lesions in caecum and ileocaecal valve. The histopathology also confirmed with the immunohistochemistry, in which positive ER, PR, CD 10 and CD7 was found the ileocaecal and caecal mass. In the second operation, reanastomosis of the ileum was done 3 months after the first operation. The chronic pelvic pain is decreasing dramatically after the first and second operation.

Conclusions/Discussion: Although bowel obstruction caused by caecal endometriosis is a rare cause of intestinal obstruction but it be considered as a cause in infertile female patient.



Immunohistochemistry shows that ER, PR, CK7 and CD 10(clock wise) are positive found in the caecum tissue

AWARENESS OF COLORECTAL CANCER AMONG PUBLIC IN ASIR REGION.

P17

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Khamis moshate, Saudi Arabia

Purpose/Background: To evaluate the awareness of Colorectal Cancer (CRC) in a random population of Asir region and identify the subpopulation that can be recipients of awareness and screening programs.

Methods/Interventions: Cross-sectional non-probable random sampling was employed to include healthy males and females from Asir region through self-administered questionnaire survey. The questionnaire included 10 questions in Arabic language and data was categorized according to gender, marital status, age and level of education to determine whether these demographic groups possess difference in knowledge about CRC. Pearson's Chi-square test was employed to evaluate the differences in responses in four demographic categories of the study population. $P < 0.05$ was considered as statistically significant.

Results/Outcome(s): Most of the respondents (51% and 71.6%) knew what is colon and rectum. 33.8% know the correct function of the colon while 22.5% know the correct incidence and 22.1% know the correct time of screening for CRC. Very few respondents know the symptoms, risks and screening modalities of CRC.

Conclusions/Discussion: Single less educated males lack knowledge of CRC. In addition, there is very low awareness of CRC symptoms, risk factors and screening modalities among the entire surveyed population.

IMPACT OF COLORECTAL ROBOTIC SURGERY ON GENERAL SURGERY RESIDENT EDUCATION.

P18

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Purpose/Background: A recent survey study of general surgery residency programs in the United States reported that the presence of the robot interfered with residents' participation in learning the surgical procedure. However, the study did not attempt to quantify the effect on traditional laparoscopic and open case numbers or assess whether or not robotic-assisted surgery was having an overall effect on the quality of their surgical education. While the gynecology and urology literature reports detrimental effects on resident education, these questions have not been addressed in the general surgery literature.

Methods/Interventions: An 11-item survey was sent via Survey Monkey to all current residents in a general surgery residency program at a tertiary care community hospital. Questions assessed experience and opinions of robotic surgery training. Medical records from all colectomy surgeries performed by a private practice colorectal surgery group from 2013-2017 were reviewed. Fisher's exact test was utilized to analyze survey responses.

Results/Outcome(s): Surveys were sent to 25 residents and 24 were completed. 40% of respondents reported that the presence of robotic-assisted surgery is detrimental to their overall surgical training while 58% reported that it is beneficial. Senior residents were more likely than junior residents to report an overall negative impact on their surgical training (56% vs 27%, $p=0.21$). When asked if the presence of robotic surgery is impeding their ability to learn common open or traditional laparoscopic general surgery procedures, 75% reported "yes" or "maybe" while 25% reported "no". Senior residents were more likely than junior residents to report "yes" to this question (67% vs 13%, $p=0.02$). 35% of respondents have participated as bedside assist during robotic-assisted surgeries. None of the respondents reported performing a significant portion of a colectomy procedure on the robot console. The number of robotic-assisted colectomies performed per year increased from 22 in 2013 (6%) to 110 in 2016 (25%) with a concurrent decrease in the proportion of laparoscopic procedures performed (68% vs 48%).

Conclusions/Discussion: The majority of senior residents report the presence of robotic-assisted surgery is detrimental to their overall surgical training, while the majority of junior residents report a beneficial impact on their training. Two-thirds of senior residents report that the robot is impeding their ability to learn common open or traditional laparoscopic surgeries including colectomies. The proportion of colectomies performed with robot assistance is increasing and residents are less likely to participate in these procedures. A future multi-institutional study investigating colectomy case numbers and resident

perceptions pertaining to robotic surgery is warranted to assess the wider impact of this technology on colorectal surgical training and determine if changes to the surgical residency curriculum is needed.

LANDING YOUR FIRST COLORECTAL SURGERY JOB: HOW TO FIND IT AND WHAT TO EXPECT.

P19

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¹Durham, NC; ²Cleveland, OH; ³Little Rock, AR

Purpose/Background: Few data-driven resources are available to help guide graduating colorectal surgery residents in the transition to their first job after training. We sought to identify how colorectal residency graduates obtained their first jobs, and elucidate variation in first job contract details.

Methods/Interventions: An anonymous cross-sectional online survey of colorectal surgery fellowship graduates between 2012 and 2016 was performed to examine assistance required, timing of the job search process, and details of the initial job contract including initial salary, benefits and perquisites.

Results/Outcome(s): A survey was sent to 486 graduates, of which 259 opened the survey and 149 responded (57.5% of opened surveys). Nine graduates without a job were excluded. Only 5.8% of residents started colorectal residency with a signed contract. Graduates were most likely to interview for a job in the late fall (46.3%) or winter (54.4%) of their colorectal residency, and sign a contract by the spring (50.4%). Only 8.8% of residents left training without a job. Respondents reported usage of multiple resources to guide their job search, including the ASCRS online job posting (39.4%), a colorectal surgeon or program director (38.0%), or cold calling groups/practices (29.2%). Respondents were most likely to have a colorectal surgeon help them negotiate the terms of their contract (46.7%), but 19% reported having no assistance with contract negotiation. Regardless of type of practice, geographic location and family were the most important factors in selecting their first job. Most respondents were hired at the assistant professor rank (53.8%). The median number of board-certified colorectal surgeon partners was 2. Over 60% of graduates practice colorectal surgery exclusively, with a minority (36.2%) practicing both general and colorectal surgery or taking general surgery call. While most respondents were fully clinical, 26.9% reported non-clinical time apportioned to research, administration, teaching, or quality improvement. Call responsibilities were most often 4 to 6 days per month (43.9%). The mean starting salary was \$273,100 and varied significantly by practice type, urbanization and additional training (Table 1). Geographic region, gender, and salary structure did

not influence mean salary. Funds to cover moving expenses were commonly included in contracts (64.8%) with a mean of \$8,400 ± 4,300. Signing bonuses were received by 45.6% with a mean of \$22,900 ± 13,000. Most respondents had a compensation structure which included a salary with an incentive or bonus structure (54.3%) or salary only (38.0%).

Conclusions/Discussion: Our data provide information both for job seekers and employers about first job and contract trends for newly trained colorectal surgeons as they begin their practice. This data can be helpful both to help shape early career expectations and provide objective data to all parties during contract negotiations.

Table 1. Initial base salary (shown in multiples of \$300 USD)

	n	mean	p	SD
All Respondents	124	273.1		66.5
Geographic Region			p<0.001	
East North Central (IL, IN, MI, OH, WI)	22	274.3		84.8
West North Central (IA, KS, MN, MO, NE, ND, SD)	11	275.5		80.2
Middle Atlantic (NJ, NY, PA)	12	262.3		36.2
New England (CT, MA, ME, NH, RI, VT)	14	275.8		43.5
East South Central (AL, KY, MS, TN)	7	267.8		55.5
South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA)	26	268.4		66.4
West South Central (AR, LA, OK, TX)	13	280.3		70.5
Mountain (AZ, CO, ID, NM, MT, UT, WY)	5	300.4		79.7
Pacific (AK, CA, HI, OR, WA)	14	271.3		73.4
Urbanization			p<0.0001	
urban	68	273.6		63.7
suburban	47	263.5		67.4
rural	9	329.4		71.1
Gender			p<0.305	
female	54	266.1		64.7
male	70	278.5		67.9
Practice Type			p<0.0001	
Academic/university-based	17	264.3		55.9
Military/VA	4	254.0		38.8
Physician-owned single specialty group	14	294.6		84.3
Physician-owned multi-specialty group	17	200.0		48
Hospital employed/non-teaching	20	328.8		43.1
Hospital employed/teaching	12	306.7		48.3
Medical School			p<0.058	
foreign medical graduate	19	299.7		73.3
US medical graduate	105	268.3		64.5
Advanced Training*			p<0.002	
advanced training	13	327.1		71
no advanced training	111	266.8		63.4
Total Professional Effort			p<0.005	
both clinical / non-clinical time**	33	255.0		59.3
only clinical time	91	279.6		68.1
Compensation Structure			p<0.002	
salary only	50	275.0		66.6
salary + bonus	72	271.6		67.8
productivity	2	280.0		28.3

SD = standard deviation, Q1 = first quartile, Q3 = third quartile
 *non-surgical, minimally invasive surgery, oncology, robotics, or additional subspecialty training
 **research, administrative, teaching, quality improvement

LEARNING CURVE IN ROBOTIC COLORECTAL SURGERY.

P20

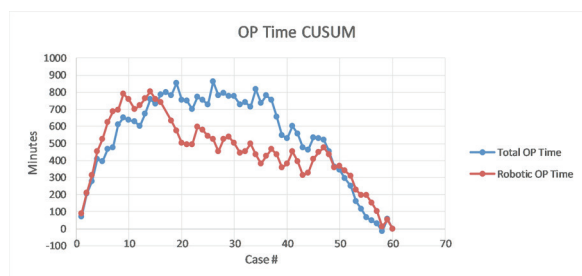
A. Alizadeh, A. Lee, H. Sax, J. Cohen, J. Ellenhorn, Y. Nasser
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Purpose/Background: Adoption of the da Vinci robot for colorectal surgery has been proceeding at a rapid pace. There is limited data on how quickly surgeons gain competency with this modality. Therefore, we sought to evaluate the learning curve for a colorectal surgeon performing total robotic colorectal procedures.

Methods/Interventions: First 60 totally robotic colorectal cases, performed by a single surgeon, experienced in laparoscopic colon surgery, were divided into four groups of 15 cases. These groups and the cumulative summation technique (CUSUM) were used to construct a learning curve by analyzing total operative time, console time, 30-day complications, length of stay, and 30-day readmission rates. Chi-squared test and ANOVA were used and $p < 0.05$ was considered statistically significant.

Results/Outcome(s): Operations included were: left or sigmoid colectomies (n=23), low anterior resections (n=18), right colectomies (n=15), proctocolectomies (n=2), abdominoperineal resections (n=1), and total abdominal colectomies (n=1). Mean operative and console times were 228 and 139 minutes respectively. Over the course of the study, both operative and console times significantly decreased ($p = 0.0012$ and $p = 0.0010$ respectively). The CUSUM graphs demonstrated an initial decrease in operative and console time around the 18th case and another decrease around the 45th case. Although not statistically significant, there was a downward trend in postoperative complications, hospital length of stay, and readmission rates, most notably at around the 35th case. There were no conversions from robotic to open.

Conclusions/Discussion: The learning curve for total robotic colorectal surgery can be divided into 3 phases. The initial learning phase was accomplished with 18 cases, while mastery was achieved after 45 cases. This can be used as a guide when training and credentialing new robotic surgeons.



DOES BMI INFLUENCE DECISION TO PERFORM ILEAL POUCH ANAL ANASTOMOSIS IN PATIENTS WITH ULCERATIVE COLITIS: A REVIEW OF THE ACS-NSQIP DATABASE.

P21

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Purpose/Background: Total proctocolectomy with ileal pouch-anal anastomosis (IPAA) is a definitive treatment for ulcerative colitis (UC). Mesenteric obesity is a limiting factor in the attainment of adequate pouch reach. Patient's BMI is often an influential factor in surgical decision making. An alternate treatment for UC is TPC with end ileostomy (TPC+EI). Our hypothesis is that, as BMI increases, the percentage of patients with UC undergoing IPAA will decrease. We expect post-op outcomes to be similar for the two surgeries with higher rates of wound complications in obese patients.

Methods/Interventions: The ACS-NSQIP database was queried from 2010-2016 for all adult patients with UC who underwent non-emergent IPAA (CPT44211, 44158) or TPC+EI (CPT 44212, 44155). Demographic information, including BMI, was analyzed. Patients were separated into groups based on BMI class (Underweight [<18.5], Normal [$18.5-24.9$], Overweight [$25-29.9$], Obese Class (OC) I [$30-34.9$], OC-II [$35-39.9$], and OC-III [>40]). Operative factors (operative time) and post-operative outcomes (length of stay, morbidity, and reoperation) were analyzed. Chi-squared and Student t-test were used for statistical analyses.

Results/Outcome(s): 2300 patients were included. Patients were divided into BMI categories as seen in Table 1. TPC+EI patients were significantly older (55.5 vs 41.7yrs, $p < 0.001$). Overall, 66.2% underwent IPAA versus TPC+EI. Normal BMI patients had the highest rate of IPAA (70%). OC I-III were significantly less likely to undergo IPAA. BMI did not predict post-op morbidity

P21 Table 1. Influence of BMI on Operative Modality and Outcomes in Patients with Ulcerative Colitis

	N (%)	IPAA (%)	IPAA Leak (%)	IPAA Reop (%)	OPTIME (min)	LOS (d)	Wound Comp (%)
Underweight (BMI < 18.5)	83 (3.6%)	56 (67.5%)	5 (8.9%)	5 (8.9%)	244.4 *	8.1	11 (13.3%)
Normal (BMI 18.5-24.9)	906 (39.4%)	634 (70.0%)	56 (8.8%)	56 (8.8%)	272.4	7.2	131 (14.5%)
Overweight (BMI 25-29.9)	778 (33.8%)	531 (68.3%)	50 (9.4%)	31 (5.8%)	288.4 *	7.7	114 (14.7%)
Obese Class I (BMI 30-34.9)	363 (15.8%)	222 (61.2%) *	27 (12.2%)	22 (10.0%)	296.9 *	8.1	76 (20.9%) *
Obese Class II (BMI 35-39.9)	108 (4.7%)	56 (51.9%) *	5 (8.9%)	3 (5.4%)	313.1 *	8.2	25 (23.1%) *
Obese Class III (BMI > 40)	62 (2.7%)	24 (38.7%) *	3 (12.5%)	1 (4.2%)	329.8 *	7.7	20 (32.3%) *
Overall	2300	1523 (66.2%)	146 (9.6%)	118 (7.7%)	284.1	7.6	377 (16.4%)

IPAA = Ileal Pouch Anal Anastomosis

LOS = Post-op Length of Stay

Wound Comp = Wound Complications (SSI, Deep Space, Organ Space)

* Denotes statistical significance ($P < 0.05$) in comparison to Normal BMI

or mortality in patients undergoing IPAA. Average operative time was 284.1 minutes and trended higher with increasing BMI classes. Average length of stay was 7.6 days and did not vary significantly between groups. Wound complications (superficial, deep, and organ space) occurred in 16.4%. OC I-III had significantly increased rates as compared to Normal BMI patients.

Conclusions/Discussion: Although utilizing a national database such as the ACS-NSQIP has its inherent limitations with interpreting results, particularly in respect to the nuances of surgical planning, there was clearly a trend towards decreasing creation of IPAA in patients as BMI increased. The majority of OC-III patients received a permanent stoma. Operative time and wound complications were also found to be higher as BMI increased. However, serious morbidity, such as anastomotic leak or reoperation, were not significantly influenced by BMI. The decreased IPAA rate in obese patients could be due to technical inability to achieve adequate length and reach of the pouch due to patient body habitus. Further studies to explore these findings are warranted.

SMALL BOWEL ADENOCARCINOMA IN CROHN'S DISEASE: A RARE BUT DEVASTATING COMPLICATION.

P22

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Purpose/Background: Small bowel adenocarcinoma (SBA) remains a rare entity but occurs at increased frequency in the setting of longstanding Crohn's disease. Our aim was to study the presentation, pathologic features, and prognosis of SBA in patients undergoing surgery for Crohn's disease at a single institution.

Methods/Interventions: We reviewed the medical records of all patients with Crohn's disease complicated by adenocarcinoma of the small bowel at our institution from 2000 to 2017. Details examined were demographics, preoperative assessment, operative findings, pathologic features, and patient outcome. We excluded carcinoma in situ, as well as duodenal adenocarcinoma.

Results/Outcome(s): In total, 22 patients (14 males) with Crohn's disease were diagnosed with SBA after surgical resection (8 isolated small bowel resections, 12 ileocolic resections, and 2 total proctocolectomies). Patients were diagnosed with Crohn's disease at a median age of 22 years. The diagnosis of SBA occurred after a median of 24 years following initial diagnosis of Crohn's disease (IQR 17-37 years). Ten patients (45.5%) had previous bowel resections and/or strictureplasties.

In that group, the median number of prior operations was 2 (range 1 to 4). Despite 17 patients (77%) undergoing cross-sectional imaging within 3 months of surgery, a cancer diagnosis was suggested radiographically in only one patient, as a mass in the proximal jejunum. In one other patient, SBA was diagnosed preoperatively on endoscopic biopsy of the terminal ileum. The remaining patients were operated on for obstruction (n=17), abscess or fistulizing disease (n=2), and sigmoid cancer (n=1). For these 20 patients not suspected to have SBA on preoperative assessment, 5 were diagnosed intraoperatively on frozen section and 15 were unexpectedly diagnosed postoperatively on final pathology. Twelve tumors (55%) were poorly differentiated, with 11 having evidence of extramural vascular invasion and 7 having signet ring features. T staging was characterized by more advanced tumors (T4: 59%, T3: 27%, T2: 9%, and T1: 5%). Nine patients (41%) had nodal involvement and 5 patients (23%) had hepatic metastases and/or peritoneal carcinomatosis. The 1-, 3-, and 5-year survival rates for our cohort were 90.5%, 49.7%, and 31.1%, respectively (Figure 1). Median survival was 30.5 months with median follow-up of 23 months.

Conclusions/Discussion: Small bowel adenocarcinoma in the setting of Crohn's disease is rarely diagnosed preoperatively. Most commonly, it is found incidentally after surgical resection for benign indications. As such, any suspicious finding at the time of surgery in a patient with longstanding Crohn's disease should warrant careful investigation with biopsy and/or resection. Prognosis for Crohn's disease complicated by SBA remains poor even in the modern era.

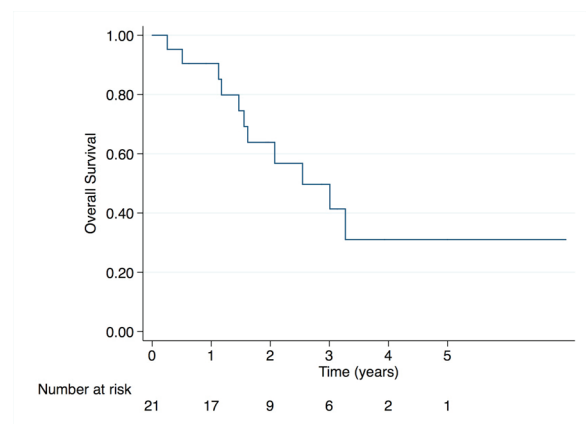


Figure 1. Overall survival of patients with Crohn's disease complicated by small bowel adenocarcinoma.

COMBINATION THERAPY FOR PERIANAL FISTULIZING CROHN'S DISEASE WITH INFLIXIMAB: WHAT IS THE OPTIMAL TIME FOR SURGICAL INTERVENTION?

P23

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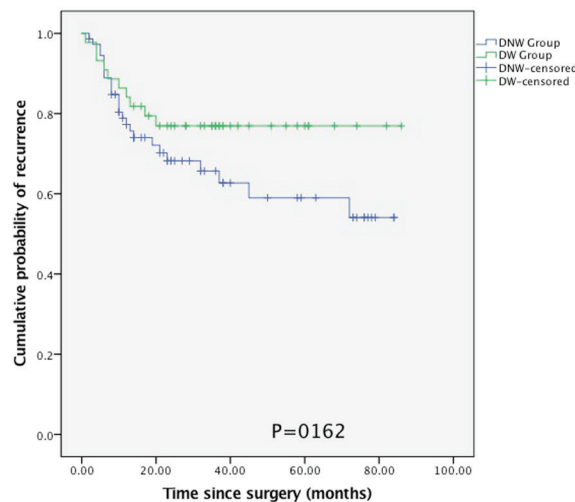
Purpose/Background: Management of complex perianal fistulizing Crohn's disease (pCD) continues to be challenging. Recent studies have recognized that combined surgery and anti-TNF α therapy could improve clinical outcomes in patients with pCD. However, the optimal timing of surgical intervention after infliximab infusion is still controversial. The aim of the present study was to determine the long-term efficacy of the treatment strategy with early surgical intervention based on infliximab therapy for pCD, and to explore risk factors associated with the recurrence of such combination treatment modality.

Methods/Interventions: In this retrospective cohort study, consecutive patients seen at Affiliated Hospital of Nanjing University of Chinese Medicine, which received combined infliximab and surgical treatment between July 2010 and January 2017 for active pCD were included. Patients received surgical intervention during the induction infliximab therapy (time interval < 6 weeks) were grouped into the do-not-wait (DNW) cohort, while with time interval > 6 weeks were grouped into the do-wait (DW) cohort. Baseline characteristics included age, gender, CD phenotype, fistula type, the presence of abscess, proctitis, and maintenance therapy. The long-term recurrence rate was compared using Kaplan-Meier curves and log-rank tests. Cox proportion hazard model was used to identify risk factors for the development of recurrence in DNW cohort.

Results/Outcome(s): One hundred and seventeen patients were included and followed-up for a median of 36.0 (IQR 23.5–58.5) months. Among them, 73 patients and 44 patients were grouped into DNW cohort and DW cohort respectively. There was no significant difference in baseline characteristics between two cohorts. The median interval between surgery and initial infliximab infusion was 9.0 (IQR 5.5–17.0) days in DNW cohort and 188.0 (IQR 102.25–455.75) days in DW group. Greater percentages of patients in the DNW cohort had anorectal stenosis compared with patients in the DW cohort (37% versus 20.5%, $P=0.061$). At the end of follow-up, 61.6% of patients in DNW group and 65.9% patients in DW group derived clinical remission respectively ($p=0.643$). The cumulative recurrence rate after initial perianal surgery was 23%, 32%, 35% in DNW group and 16%, 24%, 24% in DW group, at 1, 2, and 3 years respectively ($P=0.162$) (Figure). Using the Cox proportional hazards model, in DNW cohort, the presence of concurrent abscess at baseline (HR: 3.802; 95%CI, 1.413–10.229; $p=0.008$) and

maintenance infliximab therapy > 3 infusions (HR: 2.356; 95%CI, 1.012–5.488; $p=0.047$) predicted the development of recurrence.

Conclusions/Discussion: Based on infliximab therapy, early surgical intervention could provide long-term benefits for pCD. Presence of concurrent abscess and maintenance infliximab therapy more than 3 times were risk factors for recurrence with early surgical intervention.



OUTCOMES FOR FULMINANT ULCERATIVE COLITIS WITH DELAYED SURGERY ARE WORSE WHEN CONTROLLING FOR PREOPERATIVE RISK FACTORS.

P24

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Purpose/Background: Increasing evidence supports immediate surgery in acute fulminant ulcerative colitis (UC) compared to ongoing medical management. However, prior studies have been limited to inpatient-only administrative datasets or single institution experiences. The purpose of this study was to compare outcomes of early versus delayed surgery in patients with fulminant UC while controlling for known preoperative risks and acuity.

Methods/Interventions: Total abdominal colectomies performed emergently for UC were identified in the NSQIP participant use files from 2005–2015. We excluded any patient with a prior operation within 30 days and those whose surgery was 15 days or greater after admission. Early operation was defined as one within 2 days of admission. Risk factors and postoperative complications were obtained from the same dataset. The association between timing of surgery and preoperative risk factors was controlled using propensity score matching, and then significant outcomes identified on Chi-square bivariate analysis were regressed on preoperative risk factors.

Results/Outcome(s): We identified 508 total abdominal colectomies that after propensity score matching yielded an effective sample size of 572. Median time to surgery was 1 hospital day in the early group versus 6 (IQR: 4 – 9) hospital days in the delayed group ($p < 0.001$). After propensity score matching, there were no differences in early versus late surgery groups respectively by sex, age category, surgical approach, operative acuity, steroid use, acute transfusion need, preoperative sepsis rate, or preoperative renal failure. Early operation was associated with a lower mortality rate (4.9% vs 20.3%, $p < 0.001$) and lower complication rate (64.5% vs 72.0%, $p = 0.052$). Lower rates of wound infection (21.9% vs 22.3%, $p = 0.9$), postoperative sepsis (31.7% vs 35.1%, $p = 0.4$), prolonged postoperative mechanical ventilation (25.1% vs 30.1%, $p = 0.2$), unplanned reintubation (10.5% vs 15.4%, $p = 0.023$), postoperative renal failure (6.3% vs 10.1%, $p = 0.09$), postoperative cardiac arrest (13.6% vs 3.1%, $p < 0.001$), and postoperative bleeding (32.1% vs 39.9%, $p = 0.052$) contributed to the reduced complication rate in the early operation group. Multivariable logistic regression with propensity weighting of mortality on preoperative risk factors demonstrated early surgery to be associated with an 82% decrease in the odds of death compared to delayed surgery ($p < 0.001$). Regression of morbidity on preoperative risk factors demonstrated early surgery to be associated with a 35% decrease in the odds of a complication with delayed surgery ($p = 0.034$).

Conclusions/Discussion: Patients undergoing immediate surgical intervention for acute UC have decreased postoperative complications and mortality rates, despite being sicker preoperatively. Rapid and early transitioning from medical to surgical management may benefit those expected to require surgery on the same admission.

ENHANCED RECOVERY AFTER SURGERY PROTOCOL COMBINED WITH LAPAROSCOPIC TOTAL PROCTOCOLECTOMY AND ILEOANAL ANASTOMOSIS FOR ULCERATIVE COLITIS.

P25

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Purpose/Background: Enhanced Recovery After Surgery (ERAS) and the use of laparoscopy have potential patient benefits in colorectal surgery. The aim of this study was to investigate the outcomes of ERAS protocols combined with laparoscopic total proctocolectomy and ileal pouch-anal anastomosis (IPAA) for ulcerative colitis (UC).

Methods/Interventions: A retrospective review was conducted on 15 patients (9 women and 6 men; median age, 44 [range, 13-66] years) who underwent laparoscopic total proctocolectomy and IPAA for UC and were

enrolled for modified ERAS protocols between April 2015 and March 2017 at our institution. Primary endpoints were length of postoperative hospital stay and postoperative short-term morbidity and mortality. Differences in modified ERAS protocols compared with traditional care include epidural anesthesia, avoidance of salt and water overload, scheduled non-opioid analgesia, and stimulation of gut motility.

Results/Outcome(s): Indications included intractable UC ($n = 12$), and 3 patients required immediate surgery. Median postoperative fasting period was 3 days (1-18 days) and postoperative hospital stay was 19 days (12-48 days). Postoperative complications were observed in 9 patients (60%). According to the Clavien-Dindo classification, the overall incidence of grade 3 and higher morbidity was 20% (3 cases). Intestinal obstruction occurred in 4 patients (27%), and 2 had paralytic ileus, which resolved with watchful waiting. There were no deaths.

Conclusions/Discussion: ERAS protocols can be safely applied in laparoscopic total proctocolectomy and IPAA, and may improve short-term outcomes.

RECTAL EVERSION - SAFE AND EFFECTIVE WAY TO ACHIEVE LOW TRANSACTION IN ILEAL POUCH-ANAL ANASTOMOSIS SURGERY, SHORT AND LONG-TERM OUTCOMES.

P26

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Purpose/Background: Ileal Pouch Anal Anastomosis (IPAA) remains a gold standard in restoring continence in patient with Ulcerative colitis. Achieving low transaction can be challenging and may require mucosectomy with hand-sewn anastomosis. Rectal Eversion (RE) technique provides save and effective alternative for both open and minimally invasive approaches. The purpose of this study is to evaluate short and long term outcomes of patients who underwent RE when compared to conventional trans abdominal transection

Methods/Interventions: A retrospective review from a single institutional database was performed from November 2004 to January 2017. Summary statistics between groups were reported in percentages or means with standard deviation. Demographics, post operative complications as well as 1-year and 3-year functional outcomes were analyzed

Results/Outcome(s): Total of 176 underwent proctocolectomy with creation of an IPAA and 88 (50%) had the RE technique utilized. RE group had significantly higher rate of corticosteroid use at the time of surgery 59.1 vs. 39.8% ($p = 0.0156$), but otherwise groups were statistically similar including ASA class, BMI and rates of biologics use. 20 cases (26.1%) of RE group and 54 (61%) of conventional group cases were accomplished in minimally invasive fashion. There was no difference in rate of 30 and

90 day complications including similar rates of leak, intra abdominal abscess, return to operating room or readmission. Patients with RE had lower rates of blood transfusion (RE 4.6% vs 17.1%; $p = 0.007$). Functional outcomes data was available for up to 78.4% of patient with trans abdominal approach and 64.7% in RE group, although it was not always complete. At one and three years after surgery, there was no difference in number of bowel movements, fecal incontinence, nocturnal bowel movements, rates of pouchitis or antidiarrheal use. Rates of returning to ileostomy or pouch revision were also the same

Conclusions/Discussion: Rectal Eversion technique is safe and effective way to achieve low transaction in IPAA surgery. It is safe, and provides similar functional outcomes at one and three years after surgery and can be particularly useful in minimally invasive approaches

PATHOLOGICAL CHARACTERISTICS OF THE REMNANT RECTAL MUCOSA AFTER IPAA FOR ULCERATIVE COLITIS.

P27

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Purpose/Background: Ileal pouch-anal anastomosis (IPAA) is a standard procedure after proctocolectomy in patients with ulcerative colitis (UC). The development of neoplasia on the remnant rectal mucosa is one of the most serious complication after proctocolectomy. Recent studies demonstrated that the incidence of colorectal cancer after proctocolectomy in patients with ulcerative colitis is approximately 3-5%. Furthermore, patients with a history

of colorectal neoplasia is reported to have a higher risk of the development of second neoplasia. However, the pathological characteristics of the remnant rectal mucosa still remain unclear. The objectives of this study are to evaluate pathological findings of remnant rectal mucosa after proctocolectomy and to clarify a risk factor of neoplasia.

Methods/Interventions: Between 2002 and 2016 a total of 83 patients who underwent residual rectal biopsy after proctocolectomy were included in this study. All residual rectal biopsy specimens were obtained by a targeted biopsy. The histopathological grade of dysplasia was categorized according to the Japanese Ministry of Health, Labour and Welfare classification (UC-I: colitis, UC-IIa: Probably colitis, UC-IIb: Probably dysplasia, UC-III: Low-grade dysplasia or High-grade dysplasia, UC-IV: Carcinoma in situ or Invasive carcinoma). This criteria was established based on the riddell classification of dysplasia. In patients with UC-II or more, the immunohistochemistry with p53, Ki-67 was added to support a diagnosis of dysplasia.

Results/Outcome(s): Endoscopic findings of residual rectal biopsy were as follows: erosion (48.8%), redness (36.7%) and superficial elevation (9.4%). One patient was diagnosed with cancer, whilst nine were diagnosed with dysplasia (the histopathological UC-II or more of dysplasia). Of patients with dysplasia, UC-IIa was detected in 5 cases (55.6%), UC-IIb was in one case (11.1%) and UC-IV was in 3 cases (33.3%). All cases were positive of immunohistochemistry staining of p53-mutation (the histopathological UC-II or more of dysplasia). Compared to patients operated by refractory disease, those by neoplasia had a significantly higher risk of cancer/dysplasia on their remnant rectal mucosa (refractory disease: 11.1%, neoplasia: 88.9% chi-square test: $p < 0.01$). The 10-year cumulative incidence of dysplasia was 4.4% in patients

P26 Complications and Functional Outcomes of rectal eversion vs. abdominal transection

	Rectal Eversion N=88		Abdominal Transection N=88		p value
	Data available, N	N (%)	Data available, N	N (%)	
Leak	88	3(3.4)	88	3(3.4)	0.874
Intra abdominal abscess	88	2(2.3)	88	7(8.0)	0.088
Urinary complications	88	14(15.9)	88	21(23.8)	0.521
Return to operating room	88	3(3.4)	88	7(8)	0.08
Fecal incontinence	46	5(10.9)	67	2(3)	0.107
1-year					
Fecal incontinence	31	1(3.2)	34	0(0)	0.951
3-years					
>8 Bowel movements/day	35	15(42.9)	61	20(32.8)	0.347
1-year					
>8 Bowel movements/day	25	9(36)	29	8(27.6)	0.550
3-years					
Pouch failure	57	2(3.5)	63	3(4.8)	0.911

operated by refractory disease whereas 46.4% in those by neoplasia. In fact, the reason of an index operation was significantly associated with a risk of cancer/dysplasia.

Conclusions/Discussion: The reason of an index operation was a significant risk factor of cancer/dysplasia on the remnant rectal mucosa. Postoperative surveillance of ileal pouch should be considered based on the reason of index operation.

HIGH BODY MASS INDEX AS A RISK FACTOR FOR A LARGE AMOUNT OF RETAINED RECTAL MUCOSA AFTER STAPLED ILEAL POUCH-ANAL ANASTOMOSIS FOR ULCERATIVE COLITIS.

P28

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Purpose/Background: A stapled ileal pouch-anal anastomosis (stapled IPAA) is easy to construct and has a good functional outcome in patients with ulcerative colitis (UC). However, a large amount of retained rectal mucosa may lead to a subsequent risk for inflammation and cancer. This study aims to determine the risk factors associated with a large amount of retained rectal mucosa after stapled IPAA.

Methods/Interventions: The medical records of 106 patients who had undergone one-stage total proctocolectomy and stapled IPAA for UC with length measurement from the dentate line to the anastomosis in anterior and posterior wall between 2007 and 2016 were retrospectively reviewed. Forty-two women and 64 men, with a median age of 37.5 years at the time of surgery, were included in the study. Surgical indications were intractability (99 patients), severe disease (5 patients), and dysplasia (2 patients). Surgical procedures included hand-assisted laparoscopic surgery (HALS) (91 patients) and open surgery (15 patients). The patients were divided into two groups according to the length of the retained rectal mucosa. The high-anastomosis group (HIGH) was defined as having a retained mucosal length of more than 2.0 cm in the anterior wall, whereas the low anastomosis group (LOW) was defined as having a retained mucosal length of 2.0 cm or less in the anterior wall. Clinical factors were compared between groups. Factors with $p < 0.05$ were considered statistically significant.

Results/Outcome(s): Univariate analysis showed no significant differences in sex, type of colitis, or surgical indication. The age at surgery (HIGH vs. LOW: 43 years vs 34 years; $P = 0.014$) and body mass index (BMI) were significantly higher in the HIGH group (22 vs. 18; $p < 0.001$). There were many patients with HALS in the HIGH group ($p = 0.004$). Multivariate analysis showed that high BMI was the only significant factor associated with high anastomosis ($p < 0.001$, odds ratio 1.24).

Conclusions/Discussion: High BMI is a risk factor for a large amount of retained rectal mucosa after stapled IPAA. Patients with a high BMI should lose weight to reduce the risk of inflammation or cancer after stapled IPAA.

EVALUATING THE UTILITY OF URINARY TRACT SCREENING IN LYNCH SYNDROME PATIENTS.

P29

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Purpose/Background: Approximately 6-12% of patients with Lynch syndrome develop urothelial carcinoma. There is great variability in screening programs for this and, despite expert opinions, there is little data that supports routine use. Our program has utilized screening via urinalysis followed by additional evaluation if microscopic hematuria is present. This study reports the results of a single institution screening approach.

Methods/Interventions: A single institution hereditary colorectal cancer database was queried for Lynch syndrome patients who were screened for urothelial cancers by urinalysis. Demographics, genotype, family history of urothelial cancer, types of screenings, and results were reviewed and collated. Study period from 2008 – 2017. A positive urinalysis was defined as microscopic hematuria.

Results/Outcome(s): During the study review period, 209 patients underwent screenings by urinalysis without any urinary symptoms. 31 patients had abnormal UA (14.8%), all these patients were further investigated with urine cytology, positive finding in 10 patients. Additional evaluation of these patients included 12 renal ultrasounds, 17 computed tomography urograms, 12 cystoscopies, and 13 consults to Urology. None of the 31 patients with an abnormal urinalysis were found to have urothelial cancer on further evaluations. Of these 31 patients, the genotypes were as follows: *MLH1* (15), *MSH2* (9), *MSH6* (5), and *PMS2* (2). Other pathology to explain microscopic hematuria was identified in 17 patients and included 11 UTI's, 2 kidney stones, 1 recent hernia repair and hydrocele, 3 uterine or vaginal pathology. During the same study period, 10 patients were diagnosed with urothelial cancer, but these were all symptomatic.

Conclusions/Discussion: No urothelial cancers were detected by screening urinalysis in our cohort of asymptomatic Lynch syndrome patients, even in higher risk individuals with *MSH2* variants. False positive testing led to extensive, mostly uninformative studies. Larger populations need to be evaluated and the routine use of current urinary screenings should be questioned.

HOW SHOULD ADVANCED NEOPLASTIC POLYPS BE MANAGED? AN APPEAL FOR AN ENDOSCOPIC STEP UP APPROACH.

P30

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Purpose/Background: Novel endoscopic techniques (EMR, ESD, double channel endoscopy) are evolving for the definitive management of advanced neoplastic polyps. With the use of CO₂ endoscopy and a “hybrid” OR set up, an endoscopic step up (ESU) approach involves an initial colonoscopic assessment in the operating room with the flexibility to progress to advanced endoluminal treatment, combined endo-laparoscopic surgery (CELS), or colonic resection in one setting to definitively treat the lesion. This approach could lead to improved patient outcomes and reduce health care costs compared with up front colectomy.

Methods/Interventions: Consecutive patients referred to a single colorectal surgery department for advanced neoplastic polyps between 2011-2017 were identified from a prospectively maintained database. The 30-day outcomes and costs of care for patients undergoing an ESU approach were compared with those undergoing upfront colectomy. All ESU patients underwent at least one postoperative

surveillance colonoscopy to assess polypectomy completeness. Patients were excluded if the polyp was malignant based on preoperative biopsy, located in the rectum, or if the polyp size was <15mm (n=18) or >50mm (n=5).

Results/Outcome(s): We identified 52 patients undergoing upfront colonic resection (48 laparoscopic, 4 open) and 38 patients undergoing an ESU approach. In the ESU group, 30 (79.0%) of patients underwent endoscopic resection (EMR/ESD), 6 (15.8%) underwent CELS, and 2 (5.3%) underwent colonic resection after initial endoscopy. Patient characteristics including age, ASA, and BMI were similar between groups. Polyp characteristics were similar between groups with the exception of polyp location (table). Compared with upfront colectomy, ESU patients had fewer complications and shorter hospital length of stay (60.5% discharged on POD0 and 29.0% discharged on POD1). There was 1 readmission in the ESU group (post-polypectomy syndrome) and 5 in the colectomy group (1 anastomotic leak, 1 wound disruption, 1 arrhythmia, 1 C. difficile colitis, 1 incarcerated incisional hernia). Median 30-day hospital costs and insurer payments were significantly less for ESU patients (cost difference \$8,214, see table). At a median of one year endoscopic follow up, polyp recurrence was detected in 6 (15.8%) ESU patients. All were benign, less than 1cm in size, and were managed endoscopically at the time of surveillance.

P30

	Upfront Colectomy (n=52)	Endoscopic Step Up (n=38)	p-value
Polyp Location: n(%)			0.016
Right Colon	45 (86.5)	27 (71.1)	
Transverse Colon	5 (9.6)	2 (5.3)	
Left/Sigmoid Colon	2 (3.8)	9 (23.7)	
Polyp Pathology: n(%)			0.65
Adenoma	40 (76.9)	26 (68.4)	
Serrated/Hyperplastic	7 (13.5)	8 (21.1)	
Inflammatory	0 (0.0)	1 (2.6)	
Carcinoma in Situ	2 (3.9)	2 (5.3)	
Carcinoma	2 (3.9)	1 (2.6)	
Polyp Size: median (IQR)			0.34
Size (mm)	25 (20-31)	25 (20-30)	
Postoperative Outcomes			
Length of stay (days): median (IQR)	4 (3-6)	0 (0-1)	<0.001
Readmission: n(%)	5 (9.6)	1 (2.6)	0.19
Complications: n(%)	17 (32.7)	5 (13.2)	0.033
30-Day Financial Bundle (USD): median (IQR)			
30-Day Hospital Costs	13,004 (11,171-15,078)	4,790 (3,495-7,444)	<0.001
30-Day Insurer Payments	19,951 (18,140-21,781)	2,431 (1,376-4,403)	<0.001

Conclusions/Discussion: In patients referred for management of advanced neoplastic colonic polyps, an endoscopic step up approach is associated with shorter length of stay, fewer complications, and decreased cost of care compared with patients undergoing upfront colectomy. An ESU approach should be the preferred management strategy of colorectal surgeons for advanced colonic polyps.

MAPPING OF COLORECTAL POLYPS IN PATIENTS UNDER 50.

P31

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Purpose/Background: Background: The incidence of colorectal cancer (CRC) among young adults has been dramatically rising, but guidelines recommend CRC screening starting from the age of 50. Despite a rising incidence, absolute numbers of young onset CRC are low and without systematic screening of the young knowledge of the precursor adenomas is limited. Recent work from our group found that 83% of CRC among patients under 50 were left sided. The aim of this study was to analyze the adenomas found in a cohort of patients younger than 50 contemporary with the cancer patients, mapping the anatomical distribution of the polyps along the colon and the presence of advanced histology.

Methods/Interventions: Methods: We used the database in the department of pathology to retrospectively review the location and histology of all benign colorectal neoplasms under the age of 50 submitted to pathology examination between the years 2006-2016. Location was noted as that described on the request form. Right sided polyps included cecum/appendix, ascending colon,

transverse colon and both hepatic and splenic flexures. Left sided polyps included sigmoid and descending colons. We report rectal polyps separately. Data were described for each polyp individually. Patients with inflammatory bowel disease or hereditary colorectal cancer were excluded. Chart review was not part of this study.

Results/Outcome(s): Results: 3500 polyps were examined from 2279 patients, of which 52.7% were male and 47.3% were female. 1513 (66.4%) of the patients had only one polyp and the rest had multiple: 495 (21.7%) had two polyps, 180 (7.9%) had three polyps, and 55 (2.4%) had four polyps. Median age was 44 years (range 12-49) while 76.3% of the patients were between the ages of 40 and 49, 18.1% were between 30 and 39, and 4.8% were between 20 and 29 years old. 2049/3500 polyps (58.5%) were distal to the splenic flexure. Detailed distribution is shown in the table. The most common pathology was tubular adenoma (65.4%), with 17.7% hyperplastic polyps, 8.4% sessile serrated polyps (SSA/P), and 7.9% tubulo-villous adenomas. 68.7% of the SSA/P were in the right colon. Overall, high grade dysplasia (HGD) was found in 2.2% of the polyps, but 93.4% of those polyps were in the left colon and rectum. 16.8% of the adenomas were advanced. Advanced adenomas were significantly more common in the left colon and rectum than the right colon (78.8% versus 21.2%, respectively).

Conclusions/Discussion: Conclusions: While the distribution of adenomas overall was more even between right and left than that of cancer (as previously described), high risk adenomas (advanced adenomas, high grade dysplasia, tubulovillous and villous adenomas) were predominantly left sided. This focuses attention on the rectum and left colon where carcinogenesis is strong in the young.

P31

	Right Colon	Left Colon	Rectum	Total left side (left colon+Rectum)
All polyps	1451 (41.5%)	1312 (37.5)	737 (21.1%)	2059 (58.6%)
Tubular adenoma	1046 (45.7%)	872(38.1%)	371 (16.2)	1243 (44.3%)
Tubulovillous adenoma	62 (22.3%)	88 (31.7%)	128 (46.0%)	216 (77.7%)
Villous adenoma	2(14.3%)	0	12 (85.7%)	12 (85.7%)
Sessile serrated adenoma/polyp	202 (68.7%)	70 (23.8%)	22 (7.5%)	92 (31.3%)
Hyperplastic polyps	138 (22.3%)	280 (45.2%)	202 (32.6%)	482 (77.8%)
Juvenile polyp	1 (20%)	2	2	4
Advanced adenoma	64 (21.8%)	91(31.1%)	150 (47.1%)	241 (78.2%)
High grade dysplasia	5 (6.6%)	20 (26.3%)	51 (67.1%)	71 (93.4%)

DISAPPOINTING RESPONSE TO NEOADJUVANT CHEMORADIATION FOR MIDDLE AND LOW RECTAL CANCER IN PATIENTS WITH HEREDITARY NON POLYPOSIS COLORECTAL CANCER.

P32

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Purpose/Background: Neoadjuvant chemoradiation (nCXRT) followed by total mesorectal excision (TME) is the standard treatment for locally advanced middle and low rectal cancer. 5-fluorouracil (5-FU) has been the standard radiation sensitizer in patients undergoing preoperative long-course nCXRT. Hereditary non-polypoid colorectal cancer (HNPCC) is associated with bad response to fluorouracil based chemotherapy. Purpose of the study was to evaluate the efficacy of nCXRT on tumor regression and oncologic outcome in middle and low rectal cancer patients with HNPCC

Methods/Interventions: Study included patients with HNPCC having T3, T4 or N+ adenocarcinoma of rectum within 11 cm from anal verge. Patients received 50.4 Gy external beam radiation in 25- 27 fractions and concurrent capecitabine 825 mg/m² twice daily 5 days a week with or without oxaliplatin 60 mg/m² weekly. Exclusion criteria were recurrent cases and patients with positive resection margins. TME was done 8-10 weeks after completion of nCXRT. Modified Dworak tumor regression grade (TRG) was used to assess the tumor response to nCXRT. All patients received oxaliplatin based postoperative chemotherapy. Follow up was done for a mean of 26 months (14- 46 months). Disease free survival (DFS) and overall survival (OS) were reported

Results/Outcome(s): Fifty eight patients were included in the study. Mean age was 44.7 years \pm 12.7. 23 patients were females. Only 30 patients received oxaliplatin with the nCXRT. TNo patients reported grade 4 toxicity, however, drade 3 toxicity mainly diarrhea and vomiting were reported more with oxaliplatin (26.6% vs. 10.7%; p=0.04). All patients had negative resection margins. Only 38 % (22 patients) had tumor regression. There was a greater rate of tumor regression in oxaliplatin group (43 % vs 32 %; p = 0.11). No patients achieved clinical complete response or had tumor progression. TRG3, TRG2, and TRG1 were found in 9 (15.5 %), 9 (15.5 %), and 4 (7 %) patients, respectively with no significant difference of the grade of regression with or without oxaliplatin. After a mean follow-up of 26 months (range 14-46), local recurrences was reported in 11 patients (19 %), three of them had also distant metastasis while 5 patients (8.6 %) had only distant metastasis. DFS and OS were 72 % and 79 %, respectively. No significant difference in DFS and OS between groups with or without oxaliplatin (p= 0.45 and 0.67 respectively)

Conclusions/Discussion: Tumor regression after nCXRT for middle and low rectal cancer in patients with HNPCC is much lower than reported in sporadic rectal cancer cases. The addition of oxaliplatin to nCXRT led to higher rate of tumor regression yet not statistically significant. A prospective trial including larger number of patients and with longer follow-up is still needed to evaluate the efficacy of nCXRT on tumor regression, DFS and OS in HNPCC patients compared to sporadic rectal cancer

TOTAL NEOADJUVANT THERAPY FOR RECTAL CANCER: CRITICAL ASSESSMENT OF A PRACTICE CHANGE.

P33

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Purpose/Background: Total neoadjuvant therapy (TNT) for rectal cancer, with neoadjuvant radiation and full-dose systemic chemotherapy, before oncological resection, has been recently introduced with the promise of increased pathological complete response (30-40%) and the opportunity to provide a complete course of adjuvant chemotherapy without concern for limitations that may result from postoperative complications. The aim of this study was to evaluate our initial experience with TNT and determine if its promise is being realized.

Methods/Interventions: A single-center, retrospective study, of patients with stage II-III rectal cancer who were selected for TNT after multidisciplinary review. The goals of TNT were 8 cycles of oxaliplatin-based chemotherapy preceded or followed by 5 weeks of fluorouracil-based chemoradiotherapy (45-50.4 Gy). Pathological assessment of treatment effect was graded as none, partial, near complete, or complete; TME quality and margin-status were recorded. Chemotherapy-related toxicity during TNT, cancer progression, postoperative outcomes, and duration of diverting ostomy were determined by review of the medical record.

Results/Outcome(s): From October 2015 to October 2017, 23 of 32 eligible patients have completed all phases of TNT and surgery. Among these patients, median age was 56 years (range 38-74) and 44% (n=10) were male. Clinical stage was T3 in 19 (83%), T4 in 4 (17%), and node positive in 16 (70%) patients. The majority of patients (N=18, 78%) received neoadjuvant systemic chemotherapy, followed by chemoradiotherapy, and then surgery. The other 5 (22%) patients had chemoradiotherapy followed by chemotherapy and then surgery. The median number of completed chemotherapy cycles and radiation dose was 8 (range 6-9) and 50 Gy (range 45-50.4), respectively. Treatment-related toxicity resulted in chemotherapy dose reduction or dose omission in 16 of 23 (65%). A sphincter-saving operation or abdominal

perineal resection were performed in 15 (65%) and 7 (30%) patients, respectively, and 1 patient elected non-operative management. TME was complete in 19 (82%) and all resection margins were negative in 22 (95%). Treatment effect was none in 4 (18%), partial 5 (23%), near complete 8 (36%), and complete in 5 (23%) patients. Treatment related toxicity requiring dose reduction or omission was not associated with treatment effect ($p=0.14$).

Conclusions/Discussion: In our initial experience, the promises of total neoadjuvant therapy for rectal cancer were not realized. A meaningful increase in pathological complete responses was not observed and the majority of patients did not receive the planned full-dose of systemic chemotherapy. Further experience and critical evaluation of this novel approach are needed before it should replace the current standard of care.

INTERNAL HERNIA FOLLOWING LAPAROSCOPIC LOW ANTERIOR RESECTION: A CASE SERIES.

P34

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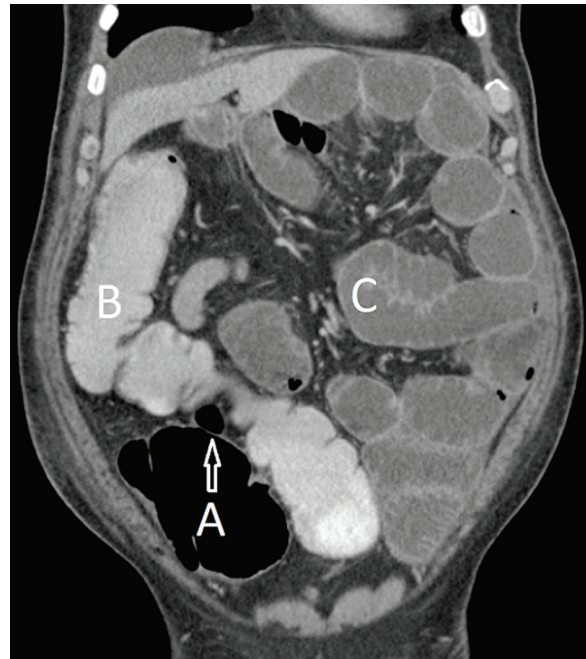
Purpose/Background: Internal herniation through a mesenteric defect following intestinal resection is a rare but serious complication. Delay in its recognition and treatment is associated with a high risk of morbidity and mortality. We aim to investigate the perioperative management and outcomes of patients suffering from internal hernia following laparoscopic low anterior resection (LAR).

Methods/Interventions: Retrospective database search was conducted to find every patient who required reoperation in the early post-operative period (60 days) for internal herniation following laparoscopic LAR between 2009 and 2016 in our centre. Standardized chart review was performed to collect demographic and perioperative data.

Results/Outcome(s): A total of 4 patients developed symptomatic internal herniation following laparoscopic LAR (0.76% of 525 patients). 2 patients had a diverting loop ileostomy at the initial operation while the other 2 had a pull-through coloanal anastomosis (Turnbull-Cutait). No patient had their mesenteric defect closed during the initial procedure. Surgery for reduction of internal hernia was required in every case. 2 patients had a CT-scan prior surgery but initial radiology report failed to identify internal herniation in both cases. 2 patients underwent upfront surgery without pre-operative CT-scan since they suffered from clinically significant leaks. 1 patient developed an early recurrence of internal herniation on post-operative day 10. Each patient suffered from an anastomotic leak. 1 patient died of post-operative multi-organ failure after a hospitalisation of 34 days. Mean length of stay was 27 days.

Conclusions/Discussion: Internal hernia following laparoscopic LAR is an unusual complication associated

with a high burden of morbidity, including anastomotic leak. This condition may be challenging to diagnose and acute onset of obstructive symptoms with compatible imaging findings should raise a high index of suspicion for internal hernia.



Caecum is represented by the letter A with the arrow pointing towards the terminal ileum. The letter B represents the descending colon which is displaced medially. Herniated small bowel (C) is located on the patient's left side and is occluded under the left mesocolon.

TREATMENT STRATEGIES AND SURVIVAL TRENDS FOR ANORECTAL MELANOMA: IS IT TIME FOR A CHANGE?

P35

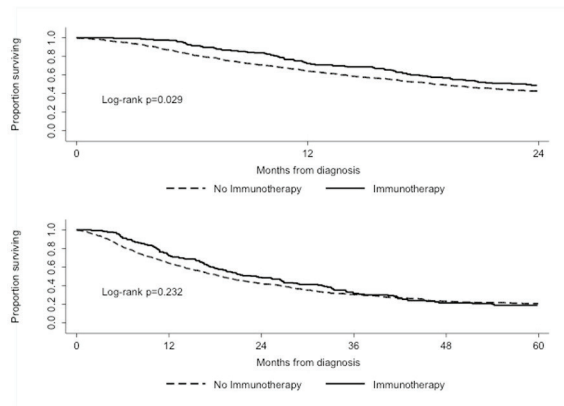
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Purpose/Background: Anorectal melanoma has a poor 5-year overall survival (OS), which has led to debate over the use of aggressive surgical therapy. Advances in immunotherapy for the treatment of cutaneous melanoma questions its efficacy in the treatment of anorectal melanoma. The aim of this study is to identify the prevalence, current management, and OS for anorectal melanoma.

Methods/Interventions: Patients ≥ 18 years old diagnosed with stage I–IV anorectal melanoma were queried from the National Cancer Database (2004 – 2015). Factors associated with immunotherapy were identified using multivariable logistic regression analysis. The primary outcome was 2- and 5-year OS, which was analyzed using the Kaplan-Meier survival curves, log-rank test, and Cox proportional hazards model. Subgroup analysis by treatment type was also performed.

Results/Outcome(s): 1,331 patients were identified. There was a significant increase in prevalence over the last decade (2004: 6.99%, 2015: 10.53%, $p < 0.001$). Anorectal melanoma patients were older, white, on Medicare, and from the South. The most common treatment was surgery alone (48.77%), followed by surgery with radiation (11.75%), surgery with immunotherapy, and surgery with chemotherapy (each 8.68%). Immunotherapy was administered to 16.93% of patients, and its utilization has increased in the recent years (7.24% in 2004 and 21.27% in 2015, $p < 0.001$). Younger age and greater tumor size were significantly associated with receipt of immunotherapy, while adjusting for other factors. 2- and 5-year OS rates were 43.57% and 20.50%. Patients who received immunotherapy had a significantly higher 2-year OS (FIGURE). Other therapies did not show a significant difference in OS. Adjusted analysis showed no difference in 2- and 5-year OS based on therapy type.

Conclusions/Discussion: The rates of anorectal melanoma diagnosis have increased in recent years. Surgery remains the most common management option, either employed on its own or in combination with another therapy. The use of immunotherapy has increased substantially, though only in the last 2 years. There may be some survival benefit with the administration of immunotherapy that has yet to be revealed. This data may suggest that a more aggressive treatment paradigm is warranted for anorectal melanoma.



Kaplan-Meier curves of 2- and 5-year overall survival rates for patients who received immunotherapy versus those who did not.

CURRENT PRACTICE PATTERNS AND SURVIVAL FOR STAGE IV SQUAMOUS CELL CARCINOMA OF THE ANAL CANAL: AN ANALYSIS OF THE NATIONAL CANCER DATABASE.

P36

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Purpose/Background: The incidence of squamous cell carcinoma (SCC) of the anal canal has increased by 2.2% per year in the past decade, and approximately 13% of individuals present with Stage IV disease. For decades, locoregional SCC of the anal canal has been treated with chemoradiation therapy with improved survival over surgery. Abdominoperineal resection (APR) with or without therapeutic lymphadenectomy has been reserved for persistent or recurrent disease. The National Comprehensive Cancer Network (NCCN) treatment guidelines for patients with Stage IV SCC of the anal canal include systemic chemotherapy with the option of using radiation for local disease control. While these guidelines do not include surgical treatment, many patients still undergo APR with or without regional lymphadenectomy. The aim of this study was to determine practice patterns and resulting survival in patients being treated for Stage IV SCC of the anal canal at American College of Surgeons Commission on Cancer accredited cancer centers.

Methods/Interventions: The National Cancer Data Base (NCDB) Participant User File (PUF) was queried to identify adult patients diagnosed with Stage IV SCC of the anal canal from 2004-2014. The type of treatment received was recorded including chemotherapy, radiation therapy, and surgery, either alone or in combination. Surgery was defined as APR with or without sentinel node excision or inguinal lymphadenectomy but did not include biopsy for diagnosis. Multivariate analysis included age, comorbidities, and type of treatment. Hazard ratios were used to compare overall survival.

Results/Outcome(s): The NCDB PUF contained 3,177 patients with stage IV SCC of the anal canal at time of diagnosis. Of these, 456 patients (14%) did not undergo any treatment, 897 (28%) received single modality treatment, 1697 (53%) received combinations of two modalities, and 127 (4%) received chemoradiation and APR. The

P36

Treatment	n	Survival (months)	Hazard ratio	p-value
Chemotherapy	623	13.6	1.83 (1.60-2.09)	0.01
Radiation	228	5.1	1.18 (0.99-1.40)	0.06
Surgery	46	10.4	2.00 (1.47-2.74)	0.01
Chemotherapy + Radiation	1,644	17.5	2.47 (2.21-2.77)	0.01
Chemotherapy + Surgery	53	16.2	2.36 (1.76--3.16)	0.01
Chemotherapy + Radiation + Surgery	127	18.7	2.54 (2.06-3.14)	0.01

median survival for all patients was 13.5 months. Hazard ratios and median survival for each treatment group are presented in the table.

Conclusions/Discussion: Despite the NCCN guidelines for the treatment of Stage IV SCC of the anal canal, a number of patients also undergo APR. While APR was performed in combination with chemoradiation in only 4% of patients, surgery was not associated with a clinical survival benefit. This retrospective study performed in the era of higher anal cancer incidence supports current NCCN guidelines for the treatment of Stage IV SCC of the anal canal.

FLEXIBLE SIGMOIDOSCOPY IS NOT SUFFICIENT SCREENING FOR THE RISING INCIDENCE OF COLORECTAL CANCER IN THE YOUNG AFRICAN AMERICAN POPULATION.

P37

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Purpose/Background: Screening for colorectal cancer (CRC) has been effective in reducing the incidence of the disease in the general population. However CRC rates are rising in patients less than 50 years of age. These patients are not covered by current screening guidelines, except for African Americans where average risk screening begins at age 45. CRCs diagnosed under age 50 are predominately left sided, suggesting a role for screening with flexible sigmoidoscopy. The goal of this study was to evaluate the distribution of CRCs in young African American patients compared to the general population.

Methods/Interventions: Patients with colon or rectal cancer diagnosed under the age of 50 during the years 2000-2016 were accessed from a departmental CRC database. Exclusion criteria included all races other than African American and Caucasian, and patients with hereditary colon cancer or inflammatory bowel disease. Patients were categorized by race and each group was subdivided by age into 4 subgroups; < 20, 20-29, 30-39 and 40-49 years old. The site of colorectal cancer was documented as right (cecum, ascending colon, hepatic flexure, transverse colon, splenic flexure), left (descending colon and sigmoid colon), or rectal.

Results/Outcome(s): 759 patients met the inclusion criteria: 695 (91.6%) were Caucasian while 64 (8.4%) were African American. The African American group had a similar male to female ratio as the Caucasian group (1.5:1 vs. 1.2:1, p=NS). Cancer location is shown in the table. Rectal cancer was most common in both races. Most cases were diagnosed in patients aged 40-49 (African American = 75%, Caucasian = 69.5%). Right colon cancer was more commonly found in African Americans (37.5%) compared to Caucasians (18%), p < 0.05. There was a different ratio of right sided to rectal cancer in African Americans compared to Caucasians (1.04 vs. 3.57).

Conclusions/Discussion: In our African American population, 37.5% of CRCs were right-sided, putting them beyond the reach of flexible sigmoidoscopy. The different ratio of right sided to rectal cancer in African Americans suggests unique biology of carcinogenesis and deserves further study.

A COMPARISON OF LAPAROSCOPIC RESECTION FOR RECTAL CANCER BEFORE AND AFTER ACOSOG Z6051: TRENDS AND PERIOPERATIVE OUTCOMES.

P38

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Purpose/Background: In 2015, The ACOSOG Z6051 Randomized Clinical Trial discouraged the use of laparoscopic surgery for the management of rectal cancer. The study found that laparoscopy failed to meet non-inferiority compared with open surgery and resulted in worse long term oncologic outcomes. With noted sustained increase in laparoscopic resection of rectal cancer from 2005-2014, this study was designed to monitor the impact of this pivotal trial on laparoscopic trends and perioperative outcomes.

Methods/Interventions: Using the 2014 and 2016 Participant Use Files from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database, cases with primary diagnosis of rectal cancer were identified by ICD-9 & 10 codes, and CPT codes were used to determine open or laparoscopic surgery. Procedures without resection were discarded. Demographic statistics were collected to compare the

P37 Demographics and distribution of cancers in African American and Caucasian patients under age 50.

	African American (n=64)	Caucasian (n=695)	P value
Mean Age (years)	42.4	41.6	NS
Male: Female (ratio)	41:27 (1.5:1)	396: 333 (1.2:1)	NS
Right Colon cancer (%)	24 (37.5%)	125(18%)	0.0002
Left Colon Cancer (%)	19 (23.4%)	124 (17.8%)	NS
Rectal Cancer (%)	25 (39.1%)	446 (64.2%)	<0.0001

NS= Non significant

similarity between the 2014 and 2016 cohorts. The proportion of surgeries performed laparoscopically was calculated for each year. Overall and yearly means and rates were then calculated for 18 30-day outcomes measures. Continuous data was compared using student's t-test, and frequency data was compared with chi-square test. Statistical power was calculated for all outcomes given a two-tailed test with an alpha of 0.05.

Results/Outcome(s): 4,307 and 5,164 procedures were identified for rectal cancer in 2014 and 2016, respectively. In 2014, 2,080 (48.3% of cases) were performed laparoscopically compared to 2,773 (53.7%) in 2016 ($p=0.002$). There were no differences found in the demographic statistics of the two groups. (Table 1) 61.5% of patients were male with a mean age of 61.2 years and a mean BMI of 27.8. Patients were ASA Class 2 in 39.3% and Class 3 in 54.8% of cases. Comparing the two cohorts, there was significant improvement between 2014 and 2016 in OR time, length of stay, superficial and deep incisional surgical site infection, and acute renal failure. There was no difference in outcomes in the remainder of the outcomes measures.

Conclusions/Discussion: There continues to be an increase in the use of laparoscopy in the surgical treatment of rectal cancer despite recommendations suggesting that laparoscopic resection failed to meet the criterion for non-inferiority for pathologic outcomes compared to open resection. Additionally, perioperative outcomes continue to improve with laparoscopic resection. Further recommendations are needed to change current trends if laparoscopic surgery is not the preferred treatment method for rectal cancer.

Table 1: Baseline Characteristics and Perioperative Outcomes in Patients Undergoing Laparoscopic Resection of Rectal Cancer in 2014 and 2016

	2014 (n=2,082)	2016 (n=2,773)	P-value
DEMOGRAPHICS			
Gender, male (%)	62.1%	61.0%	0.286
Age, years (mean)	61.3	61.2	0.597
BMI (mean)	27.8	27.8	0.745
ASA (%)			0.131
1	1.9%	1.9%	
2	40.1%	41.2%	
3	53.9%	53.4%	
4	4.0%	3.5%	
OUTCOMES			
OR time (minutes)	283.57	279.43	<0.001
Length of stay (days)	6.52	6.12	<0.001
Renal insufficiency	1.58%	1.44%	0.691
Acute Renal Failure	0.91%	0.40%	0.024
Urinary Tract Infection	2.69%	2.74%	0.916
Unplanned Readmission	0.34%	0.29%	0.768
Unplanned Reoperation	5.91%	4.90%	0.145
Organ Space Infection	6.44%	5.59%	0.245
Superficial SSI	3.99%	2.78%	0.024
Deep Incisional SSI	1.83%	0.50%	<0.001
Pneumonia	1.34%	1.33%	0.975
Vent >48h	0.82%	0.40%	0.057
DVT/Thrombophlebitis	0.96%	0.79%	0.537
Pulmonary Embolism	0.38%	0.22%	0.282
Stroke	0.19%	0.14%	0.684
Myocardial Infarction	0.38%	0.47%	0.658
Cardiac Arrest w CPR	0.29%	0.36%	0.664
Death	0.72%	0.75%	0.883

BMI: Body mass index; ASA: American Society of Anesthesiologists; SSI: Surgical site infection; DVT: Deep vein thrombosis; CPR: Cardiopulmonary resuscitation

DISTAL MARGINS OF RESECTION IN COLORECTAL CANCER SPECIMENS: DIFFERENCES IN ASSESSMENT BETWEEN THE SURGEON AND THE PATHOLOGIST.

P39

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Purpose/Background: There is a discrepancy between the distal resection margin (DRM) estimated by the surgeon and that reported by the pathologist. This study aims to investigate the accuracy of the colorectal surgeon in assessing DRM, the discrepancy between the DRM accessed by the surgeon and by the pathologist, and the impact of this phenomenon in oncologic safety of the DRM.

Methods/Interventions: This observational prospective study was conducted between June 2013 and December 2016. Patients with colorectal cancer (CRC) scheduled to undergo elective colorectal resection were eligible. Patients with unresectable tumor, inflammatory bowel disease, familial adenomatous polyposis or being submitted to abdominal perineal resection of the rectum were excluded. The DRM was measured by four different techniques: (1) in vivo subjective (IVS), measured intraoperatively by the surgeon before the resection, based on his visual and palpatory assessment; (2) in vivo objective (IVO), measured by the surgeon before the resection using a ruler; (3) ex vivo objective (EVO), measured with a ruler immediately after the resection and opening of the surgical specimen; and (4) post-fixation objective (PFO), measured by the pathologist after fixation in formalin.

Results/Outcome(s): This study included 116 patients: 67 (58.8%) with rectal cancer (RC) and 49 (42.2%) with colon cancer (CC). In Table 1 we present measurements of DRM in patients with CC and RC. Additionally, we present the results in RC according to the performance or not of neoadjuvant CRT (nCRT). The comparison between the DRMs (IVS vs IVO) accessed intraoperatively did not show significant differences. The mean IVS and IVO of the CC group were 10.97 and 10.85 cm ($p=1.000$) respectively. There were no significant differences between the IVS and the IVO in the RC group (3.39 vs. 3.45 cm, $p=1.000$). There were also no differences in the subgroups not submitted (3.88 vs. 3.94, $p = 1.000$) and submitted (2.25 vs. 2.31 cm, $p=1.000$) to nCRT. Significant differences were observed between the IVO and the PFO in the CC group (10.85 vs. 6.43 cm, $p<0.001$), as well in the subgroup of RC not submitted to nCRT (3.94 vs. 2.29 cm, $p<0.001$). No difference was seen in those submitted to nCRT (2.31 vs. 2.04 cm, $p=1.000$). Considering as safe a DRM ≥ 2 cm for RC and ≥ 1 cm for RC submitted to nCRT and total mesorectal excision, 19 (40.6%) patients not submitted and 5 (25%) patients submitted to nCRT who were judged by the surgeon (IVS

or IVO) as having a “safe DRM” were classified by the pathologist (PFO) as having an “unsafe DRM”.

Conclusions/Discussion: Colorectal surgeons correctly evaluate the DRM of patients with CRC. Surgical specimens of CRC usually exhibit a progressive shrinkage of the DRM, except in cases of RC submitted to nCRT. A proportion of patients with RC have DRM classified as unsafe when the pathologist’s measure is adopted instead of that measured by the surgeon.

SUBMUCOSAL VARIANT OF ANAL SQUAMOUS CELL CARCINOMA.

P40

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Purpose/Background: The overall incidence of squamous cell carcinoma of the anus (SCCA) is increasing. High-grade squamous intraepithelial lesion (HSIL) is the immediate SCCA precursor arising in the mucosa or perianal skin. HSIL can undergo malignant transformation to SCCA. Submucosal SCCA without mucosal involvement is rare and diagnosis challenging. We describe six cases of submucosal SCCA. This phenomenon has been described in the cervix post ablation of HSIL.

Methods/Interventions: We present a group of six consecutive patients diagnosed with SCCA and no apparent mucosal lesion among all patients evaluated in our practice since 2005.

Results/Outcome(s): Six patients developed submucosal SCCA (Table 1). The first case occurred in 2009 and five subsequent cases occurred within the past three years. The median age at diagnosis was 58 (range 41-83) years, 4 were male, 5 were HIV+, and none had inflammatory bowel disease. While 5 patients had a prior or concurrent HSIL, the SCCA was remote from the HSIL without an obvious point of invasion from the mucosa to deeper tissue. Two HIV+ patients (TJ and JG), developed SCCA within perianal fistula tracts approximately three years after initial abscess drainage. Two (JE and YW) developed submucosal SCCA despite multiple HSIL electrocautery ablations (ECA) over 3-7 years. Two HIV+ patients (LR and JP)

developed submucosal SCCA in locations remote from any areas of prior HSIL. LR was diagnosed with SCAA presenting as a submucosal, rectal nodule after having a hemorrhoid rubber band ligation and JP developed SCCA deep to the mucosa within an anal canal sinus tract diagnosed initially by PET/CT scan.

Conclusions/Discussion: We recently identified multiple cases of SCCA without apparent mucosal involvement. Our data suggest that the incidence is increasing. It is important to maintain a high index of suspicion in individuals with a history of HSIL, HIV, recurrent perianal abscesses and fistulae, or submucosal lesions. Prior anal procedures may be a risk factor for the development of submucosal variant SCCA.

ORAL VS. INTRAVENOUS ACETAMINOPHEN WITHIN AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL IN COLORECTAL SURGERY.

P41

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Purpose/Background: Multimodal pain management within Enhanced Recovery After Surgery (ERAS) protocols is designed to decrease opioid use, promote mobilization, and decrease postoperative complications. Our institution recently converted from an ERAS protocol utilizing only intravenous (IV) acetaminophen to one managed with primarily oral (PO) acetaminophen. We sought to evaluate the effect of this recent change on pain scores, opioid requirements, and postoperative outcomes.

Methods/Interventions: From November 2015 to October 2017, 91 consecutive elective colorectal resections performed according to an ERAS protocol using only IV acetaminophen were compared to 84 consecutive resections performed using one dose of IV acetaminophen followed by subsequent administration of oral acetaminophen. Our multimodal pain management strategy also included TAP blocks, celecoxib, and ketorolac medications for both groups. Patient baseline characteristics,

P39 TABLE 1. Distal resection margins of patients with colon and rectal cancer (with and without neoadjuvant chemoradiotherapy) measured by four different techniques

Distal Resection Margin	Colon Cancer (n = 49)	Rectal Cancer (n = 67)	Rectal Cancer Without	Rectal Cancer With
			nCRT (n = 47)	nCRT (n = 20)
In vivo subjective	10.97 (7.94)	3.39 (0.22)	3.88 (0.27)	2.25 (0.18)
In vivo objective	10.85 (7.72)	3.45 (0.21)	3.94 (0.26)	2.31 (0.17)
Ex vivo objective	9.13 (6.83)	2.99 (1.16)	3.24 (0.19)	2.39 (0.24)
Post-fixation objective	6.43 (5.76)	2.22 (0.14)	2.29 (0.16)	2.04 (0.26)

Measures present as mean in cm (±SD). nCRT indicates neoadjuvant chemoradiotherapy.

opioid requirements, maximum and average daily pain scores by the visual analog scale (VAS), and postoperative outcomes were recorded and compared between groups. A p-value <0.05 was considered statistically significant for all comparisons.

Results/Outcome(s): There were no differences in age, gender, BMI, procedure type, operative approach, procedure time, or average intraoperative blood loss between groups. There were no differences in maximum

or average pain scores on postoperative days 0-3 or at time of discharge. Compared to the IV acetaminophen only group, the oral acetaminophen group received significantly more perioperative opioids through postoperative day 3 (84.6 morphine equivalents PO group vs. 66.4 morphine equivalents IV group, $p = 0.0085$). Significantly more patients in the oral acetaminophen group required opioid patient-controlled analgesia (PCA) (46.4% PO group vs. 8.8% IV group, $p < 0.0001$), and more patients in the oral

P40 Table 1. Patient information

Patient Initials	Age at SCCA Diagnosis	Sex	HIV status	Year of SCCA Diagnosis	Year of Initial Anorectal Disease Diagnosis	History of HSIL Prior to SCCA Diagnosis?	Case summary
TJ	41	M	HIV+	2016	2013 (perianal abscess)	No	<ul style="list-style-type: none"> - Left sided perianal abscess drained 2 years prior - HRA showed left sided external fistula opening and no HSIL - Fistulotomy performed, pathology negative for dysplasia - Fistula recurred, MRI showed horseshoe fistula with sub-centimeter perirectal lymph nodes, no mass - Fistula treated with wide drainage. No dysplasia - Two months after setons removed CT revealed rectal mass. - Mass excised and pathology showed SCCA
JG	56	F	HIV+	2017	2013 (perianal abscess)	Yes	<ul style="list-style-type: none"> - Perianal abscess 2 years prior to presentation - HRA showed internal HSIL that was ablated and 2 external fistula openings - MRI showed an abscess fistula treated with debridement and setons. - Drainage did not resolve and 1 year later external openings became indurated. Biopsy revealed SCCA - Circumferential HSIL ablated - One HSIL persisted for 3 years despite multiple ablations - Developed a discrete submucosal SCCA deep to this HSIL without point of invasion
JE	57	M	HIV+	2009	2006 (HSIL)	Yes	<ul style="list-style-type: none"> - HSIL found by colonoscopy 8 years prior - Initial HRA showed circumferential HSIL - One HSIL persisted despite multiple ablations and was excised - Repeat HRAs showed no dysplasia - 18 months after excision, she developed SCCA in the distal rectum, above the anal canal
YW	83	F	HIV-	2014	1997 (HSIL)	Yes	<ul style="list-style-type: none"> - Ablation of left sided hemi-circumferential HSIL and ligation of left lateral internal hemorrhoid - 6 months later, he developed a submucosal left posterior rectal nodule above areas of prior dysplasia - Nodule biopsy revealed SCCA
LR	59	M	HIV+	2016	2016 (HSIL)	Yes	<ul style="list-style-type: none"> - PET/CT for B-cell lymphoma staging showed hypermetabolic activity in the left anus - HRA showed LLAT HSIL and it was ablated - Repeat PET/CT 1 year later showed increased activity in the left and right anus. - MRI showed internal sinus tracts - HRA showed friable tissue protruding from anterior sinus tract. Biopsy revealed SCCA
JP	59	M	HIV+	2015	2014 (HSIL)	Yes	

acetaminophen group experienced postoperative nausea and vomiting (47.6% PO group vs. 33.0% IV group, $p=0.0311$). There was a trend towards increased length of stay (6.04 days PO group vs. 5.88 days IV group, $p=0.8038$) and increased time to return of bowel function (2.84 days PO group vs. 2.47 days IV group, $p=0.1330$) in the oral acetaminophen group.

Conclusions/Discussion: A switch from intravenous to oral acetaminophen significantly increased opioid use in our ERAS protocol, leading to worse postoperative outcomes. To achieve full benefit from ERAS pathways, pain control regimens must be optimized.

POSTOPERATIVE OUTCOMES OF SUPER-ELDERLY PATIENTS UNDERGOING COLORECTAL SURGERY IN A COMMUNITY SETTING.

P42

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Purpose/Background: This study reviewed post-operative outcomes of super-elderly patients (≥ 80 years-of-age) undergoing colorectal surgery (CRS). This is the first study that the authors are aware of conducted in a community setting. We hypothesized that CRS in a community setting will result in low morbidity and mortality in the super-elderly. A critical risk factor for developing colorectal cancer is advancing age, therefore it is important to assess outcomes in this subset of patients.

Methods/Interventions: This cohort study reviewed medical records of all super-elderly patients who underwent CRS from 2013 to 2017 at a community hospital. The study was approved by the institutional review board.

Results/Outcome(s): 109 super-elderly patients (mean age 84.8 years, range 80-93, 55% female) were included. 29% underwent emergency surgery, 78% were ASA class

III or IV, and 18% had comorbidities \geq four organ systems. Rates of 30-day morbidity and mortality were 50% and 9%, respectively (literature 12-72%, 0-31%). Of the 30-day morbidity, 58% were Clavien-Dindo classification I or II. The median postoperative hospital stay was 7 days, the 30-day readmission rate was 5%, and 30-day reoperation rate was 9%. The anastomotic leak rate was 6% and the surgical site infection (SSI) rate was 11%. Patients undergoing emergency surgery had worse outcomes compared to those undergoing elective surgery including: 30-day morbidity (66% vs 45%, $p=0.05$), 30-day mortality (19% vs 5%, $p=0.03$), 30-day reoperation (19% vs 5%, $p=0.03$) and postoperative hospital stay (21 vs 11, mean, $p=0.006$). Surgery ≥ 3 hours, open approach, non-neoplastic indication, and low preoperative serum prealbumin and albumin had higher risk for worse surgical outcomes (Table 1). The super-elderly patients who underwent elective CRS was also compared to an internal control cohort ($N=142$) of non-super-elderly (age < 80 years) patients who underwent elective CRS. The super-elderly cohort had higher ASA classes ($p=0.02$), worse preoperative nutrition ($p=0.01$), and more preoperative comorbidities ($p<0.01$) compared to the non-super elderly cohort. There were no significant differences in 30-day morbidity ($p=0.43$), SSI ($p=0.16$), anastomotic leak ($p=0.17$), 30-day readmission ($p=0.46$), or reoperation ($p=0.47$) between super-elderly and non-super-elderly patients. There was a higher 30-day mortality in super-elderly patients compared to non-super elderly patients in this comparison (2 vs 1%, $p=0.01$).

Conclusions/Discussion: CRS in super-elderly patients in a community setting results in low mortality in elective surgery. Surgical outcomes were comparable to previously reported rates and to a cohort of non-super elderly patients undergoing CRS. CRS should be carried out electively with a laparoscopic approach when possible, and is considered to be safe in a community setting.

P42 Table 1. Patient and operative factors and corresponding relative risks of surgical outcomes in super-elderly patients undergoing colorectal surgery

Outcome	Patient or operative factor	RR	95% CI	P
30-day morbidity	Emergency surgery vs. elective surgery	1.54	1.08-2.19	0.02
	Surgery ≥ 3 hours vs. surgery < 3 hours	1.78	1.29-2.45	0.003
	Open approach vs. laparoscopic approach	1.48	1.00-2.18	0.04
30-day reoperation	Emergency surgery vs. elective surgery	3.53	1.07-11.6	0.03
	Non-neoplastic indication vs. neoplastic indication	3.74	1.18-11.8	0.02
	Open approach vs. laparoscopic approach	11.1	1.45-84.3	0.002
30-day readmission	Prealbumin < 150 mg/L vs. prealbumin ≥ 150 mg/L	8.00	0.79-81.0	0.04
	Surgery ≥ 3 hours vs. surgery < 3 hours	6.14	1.09-34.4	0.02
30-day mortality	Albumin < 35 g/L vs. albumin ≥ 35 g/L	4.14	0.91-18.8	0.04
	Open approach vs. laparoscopic approach	4.08	0.91-18.3	0.04
SSI, any	Surgery ≥ 3 hours vs. surgery < 3 hours	3.70	1.31-10.4	0.01

RR: relative risk, CI: confidence interval, SSI: surgical site infection

MINIMALLY INVASIVE COLECTOMY – A SIMPLIFIED NOMOGRAM TO PREDICT CONVERSION TO OPEN PROCEDURE.

P43

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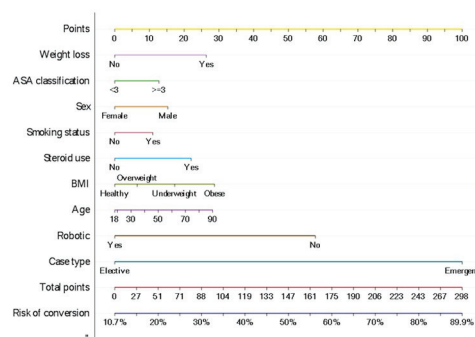
Purpose/Background: Despite the expertise and experience of laparoscopic and robotic approaches to colectomy over the last several decades, conversion to open still remains a necessity in certain cases. Additionally, enhanced recovery after surgery pathways (ERAS) may differ slightly for open and minimally invasive procedures (e.g., epidural catheters, alvimopan use). Quantifying the risk of conversion may therefore allow appropriate pathway initiation. We sought to create a nomogram that can be easily applied in a clinical setting to predict conversion and aid the surgeon in decision-making and counseling of patients.

Methods/Interventions: The National Surgical Quality Improvement Program database was queried from 2012-2015 to identify patients undergoing right (CPT 44160, 44205) or left-sided (CPT 44140, 44204, 44145, 44207) colectomy via a laparoscopic or robotic approach. Patients undergoing hand-assisted, hybrid, NOTES, SILS, other, open, or unknown approach were excluded. The targeted colectomy database colectomy approach variable “unplanned conversion to open” was identified as the primary outcome. A multivariable model was created to predict conversion; variables were chosen based upon univariate significant and/or clinical significance. A nomogram was created using this analysis to predict conversion.

Results/Outcome(s): A total of 15,184 patients were identified as having undergone laparoscopic or robotic left or right-sided colectomy and 2,906 underwent unplanned conversion to an open procedure. On multivariate analysis, significant risk factors ($p < 0.05$) for conversion included: male gender, laparoscopic (vs. robotic), emergency operation, obese BMI, underweight BMI, male gender, age, steroid use, weight loss, and ASA class greater than 3. A predictive nomogram was then created utilizing these risk factors (Figure). The final model was shown to have good fit under the Hosmer-Lemeshow goodness of fit test ($p > 0.05$).

Conclusions/Discussion: This study provides surgeons with a clinically useful to predict conversion to an open procedure. This nomogram provides clinicians a quick and simple method to predict conversion from laparoscopic to open procedures in both the elective and emergent setting. Those with a higher chance of conversion in an elective setting may be considered for preoperative alvimopan, epidural, or may be elected to be done open. Patients can also be counselled as to their risk of conversion to an open procedure.

Nomogram for prediction of conversion from MIS to open colectomy



HOSPITALIZATIONS PRIOR TO ELECTIVE OPERATION FOR INFLAMMATORY BOWEL DISEASE ARE ASSOCIATED WITH INFERIOR OUTCOMES AND HIGHER COST.

P44

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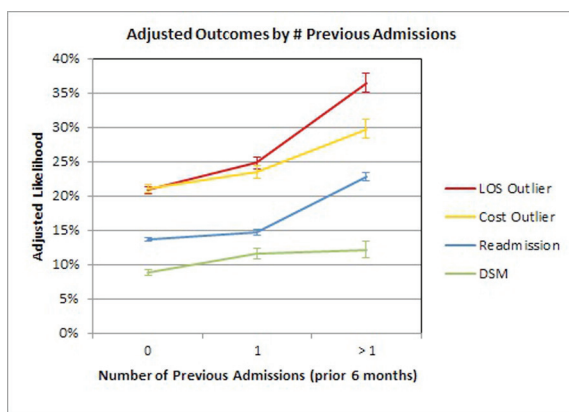
Purpose/Background: Inflammatory bowel disease (IBD) affects approximately 1.6 million patients and exceeds \$2 billion in annual healthcare expenditure in the United States. The introduction of biologic medical therapy for IBD has resulted in longer periods of remission and an increased threshold for surgical treatment. Patients who receive biologic therapy, however, may be at risk for worsened outcomes if medical treatment fails. In this study we hypothesized that patients with recent inpatient treatment would have worse outcomes after elective surgery for IBD.

Methods/Interventions: Data from the 2013/2014 National Readmissions Database, a population-based database associated with the Healthcare Cost and Utilization Project and the Agency for Healthcare Research and Quality, were used to generate a population-based cohort of patients undergoing elective bowel surgery for IBD. Outcomes of interest in the study were 1) death or serious morbidity (DSM), 2) prolonged LOS (defined as 8 or more inpatient days), 3) cost outlier status (defined as greater than the 75th percentile of cost), and 4) 30-day readmissions. Within this cohort, hospitalization in the 6 months (categorized as 0, 1, or 1+ hospitalizations) prior to the index surgery was examined as the exposure of interest. Weighted multivariate logistic regression was used to quantify the relationship between this exposure and patient outcomes. The analysis was adjusted for age, gender, Charlson score, diagnosis (Crohn’s disease vs. ulcerative colitis) and type of operation.

Results/Outcome(s): A total of 4033 patients were included in the analysis, of which the average age was 44 years and 50.4% were female. Of these patients, 67.1% had no previous hospitalization, 21.0% had 1 previous

hospitalization, and 12.0% had more than 1 previous hospitalization. After adjustment for patient and treatment factors, a significant relationship was seen between prior hospitalizations and higher rates of DSM, readmission, prolonged length of stay, and cost (Figure). Multivariate analyses showed a significant association between prior hospitalization and each of the four outcomes.

Conclusions/Discussion: A total of 4033 patients were included in the analysis, of which the average age was 44 years and 50.4% were female. Of these patients, 67.1% had no previous hospitalization, 21.0% had 1 previous hospitalization, and 12.0% had more than 1 previous hospitalization. After adjustment for patient and treatment factors, a significant relationship was seen between prior hospitalizations and higher rates of DSM, readmission, prolonged length of stay, and cost (Figure). Multivariate analyses showed a significant association between prior hospitalization and each of the four outcomes.



LOS: length of stay, DSM: death or serious morbidity

DO WE KNOW THE REAL COST OF A COMPLICATION AFTER COLORECTAL RESECTION? IS THERE ANY ECONOMICAL INFLUENCES OF THE ERAS (EARLY RECOVERY AFTER SURGERY) PROGRAM IN THAT OCCURENCE?

P45

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Purpose/Background: “Real life” in-hospital costs are rarely precisely known. Such study has never been realised in France. Due to health systems differences in Europe previous published studies from other countries aren’t transferable. Our aim is to exactly calculate hospital financial balance with or without complication occurrence. We also investigate the potential impact of an ERAS program on that balance

Methods/Interventions: Data from all patients undergoing scheduled colorectal resection from May 2015 to January 2017 were systematically recorded both in the

hospital patients file management system and a collaborative French database (GRACE). In-hospital costs, length of stay, compliance to ERAS items, occurrence and severity of morbidity (according to Dindo classification) were analysed

Results/Outcome(s): Among the 227 patients operated on, median age was 65 years old and 27% were ASA 3 or 4. 82 complications occurred in 68 patients. Median length of stay was 8.7 days. Median in-hospital cost without morbidity was 5,337€. Complication occurrence added an additional in-hospital cost of 3,167€ (additional treatment cost ≈ 1,030€ and prolonged length of stay ≈ 2,058€). Additional public health system reimbursement in case of complication was 2,777€ but didn’t balance the additional costs. Median negative balance for hospital stay was 390€. Profit margin was 29.7% when no complication occurred but was lowered to 21.8% by any complication (median). In case of severe complication (Dindo III/IV) the hospital profit balance was negative: profit margin -4%, 544€ deficit. Compliance to ERAS program decreased morbidity and length of stay. ERAS program had a positive impact on total in-hospital costs but a negative impact on specific surgical costs.

Conclusions/Discussion: Hospital profit balance is negatively affected in case of morbidity occurrence in a public health system. In case of severe morbidity (DINDO III/IV) 544€ are lost by the hospital. Compliance to an ERAS program helps minimizing these negative financial impacts.

IMPACT OF FRAILTY ON THE ACS-NSQIP RISK CALCULATOR IN LAPAROSCOPIC COLECTOMY PATIENTS.

P46

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Purpose/Background: Risk stratification is critical when counseling colorectal patients preoperatively. While the ACS-NSQIP surgical risk calculator provides estimations on patient-specific risk across a range of complications, it does not specifically account for frailty which has emerged as a unique predictor of surgical morbidity. Our study evaluates the representation of frailty in the ACS-NSQIP calculator in elective laparoscopic colectomy patients.

Methods/Interventions: An IRB-approved, single institution, retrospective review of laparoscopic colectomies from January 2016 through June 2017 was performed. Exclusion criteria were: emergent cases, ostomy creation, and missing a prospective frailty score. At our institution, frailty is measured prospectively on elective surgery patients using the modified Fried Frailty score. Frailty grades of low (0), intermediate (1-2), and high (≥3) are determined by: shrinking, handgrip strength, hemoglobin, and ASA classification. Demographics were obtained from

institutional procedure-targeted NSQIP data. A risk profile was calculated for each patient using the ACS-NSQIP surgical risk calculator and stratified by frailty. Kruskal-Wallis test compared the distribution of predicted risk with significance at $p < 0.05$.

Results/Outcome(s): Eighty-four subjects were included: 23 (28%) with low, 54 (64%) with intermediate, and 7 (8%) with high frailty. Subjects in the high frailty group were older than in other frailty groups ($p < 0.05$). There was a significantly higher BMI in the intermediate frailty group ($p < 0.05$). There were more smokers in the low frailty group ($p < 0.05$). There was no difference in hypertension among frailty groups ($p > 0.05$). There was no difference between right versus left colectomies in the distribution of subjects in the frailty groups, age, gender, BMI, or hypertension ($p > 0.05$). There were more smokers in the left colectomy group ($p < 0.0001$). Predicted risk of any NSQIP outcome, serious NSQIP outcome, ileus, 30-day readmission, unplanned reoperation, and mortality all increased with frailty (all $p < 0.004$, Table), while predicted risk of anastomotic leak did not change with frailty.

Conclusions/Discussion: When stratified by frailty, the ACS-NSQIP surgical risk calculator predicted increased surgical risk in a stepwise fashion. Frailty is well-represented in the elements captured in the NSQIP risk calculator. The ACS-NSQIP risk calculator should remain an important pre-operative tool when counseling colorectal patients and adjunct to the growing interest in pre-operative frailty assessment.

HIGH COMPLIANCE TO AN ENHANCED RECOVERY PATHWAY FOR FRAIL PATIENTS UNDERGOING GASTROINTESTINAL SURGERY IS ASSOCIATED WITH IMPROVED POSTOPERATIVE OUTCOMES.

P47

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Purpose/Background: Frailty is a well-validated predictor of adverse postoperative outcomes, including greater incidence of serious complications, extended length of stay (LOS), and increased mortality rates. Enhanced Recovery Pathways (ERP) are designed to optimize surgical recovery and improve outcomes. The effectiveness of ERP in frail patients has not been established. Therefore, the purpose of this study is to determine if ERP implementation would improve postoperative outcomes in frail patients following major abdominal surgery.

Methods/Interventions: From 1/2013 – 6/2017, patients undergoing major abdominal surgery prior to and following ERP implementation at the Johns Hopkins Medical Institutions were entered into the ACS-NSQIP database. Inclusion was based upon age (≥ 18 yrs) and procedure type (ICD9/10 codes for abdominal surgery). Emergency surgeries were excluded. Outcomes of interest were LOS, postoperative major complications (Clavien-Dindo, "CD" ≥ 2), and 30-day readmission rate. Frailty was scored using a modified 5-item frailty index (mFI; "frail" ≥ 2). CR-POSSUM was used for risk-adjusted analyses. ERP compliance rates were compared amongst frail and non-frail ERP patients using 14 Enhanced Recovery in

P46 Predicted Risk based on prospective frailty score; risk is reported as a percent with median and interquartile range.

	Low Frailty (n=23)	Intermediate Frailty (n=54)	High Frailty (n=7)	P-value
Any NSQIP	9.5%	14.2%	18.8%	<0.0001
Complication	(8.9, 10.8)	(11.7, 16.6)	(14.2, 23.9)	
Serious NSQIP	7%	10.4%	15%	<0.0001
Complication	(6.5, 8)	(8.8, 12.2)	(11.1, 17.1)	
Ileus	6.7%	9.2%	11%	0.004
	(4.8, 10.1)	(6.4, 12.3)	(9.1, 16.1)	
Anastomotic Leak	2.7%	2.4%	2.5%	NS
	(1.9, 2.8)	(2, 3)	(2, 3.2)	
Readmission	6.4%	9.2%	11.8%	<0.0001
	(5.9, 6.7)	(8.2, 10.7)	(9.6, 13.8)	
Unplanned	3.2%	3.7%	4.2%	0.003
Reoperation	(2.8, 3.6)	(3.3, 4.3)	(3.8, 4.8)	
Mortality	0.1%	0.3%	1.1%	<0.0001
	(0.1, 0.1)	(0.2, 0.7)	(0.9, 1.8)	

ACS-NSQIP (ERIN) variables. High compliance was defined as patients achieving $\geq 75\%$ of the 14 ERIN variables.

Results/Outcome(s): 1158 patients were included in this study: 512 prior to and 646 following ERP implementation. Overall, ERP implementation was associated with a significant decrease in LOS (4 vs. 6 days, IRR: 0.254, $p=0.019$, CI: 0.08-0.79) and highly compliant patients were significantly less likely to develop major complications (9.2% vs. 22.7%, OR: 0.34, $p<0.01$, CI: 0.21-0.56). Characteristics of frail pre-ERP ($n=41$, 8.0%) and ERP ($n=62$, 9.6%) patients are shown in table 1. There was a significant reduction in LOS for frail ERP patients compared to frail pre-ERP (4.5 vs. 8 days, IRR: 0.049, $p=0.018$, CI: 0.004-0.60). However, there was no difference in major complication rate (23% vs. 22%, $p=1.00$), and although frail ERP patients had a reduced readmission rate (15% vs. 27%, $p=0.14$), this difference was not statistically significant. There was also no difference in destination after discharge between the 2 cohorts. Rates of high compliance were similar in both the frail and non-frail ERP groups (51.6% vs. 50.2%, $p=0.829$). High compliance among frail ERP patients was significantly associated with a reduction in LOS (3 vs. 6 days, IRR: 0.072, $p=0.048$, CI: 0.005-0.973).

Conclusions/Discussion: Following ERP implementation, LOS improved significantly overall as well as specifically for frail patients. Among frail ERP patients, high compliance further improved LOS, and for the general ERP cohort was associated with reduced complications. Interventions should target high levels of compliance with ERP.

TABLE 1. Demographic, Clinical, and Operative Characteristics: Frail Patients (mFI ≥ 2)

Characteristic	Total ERP		Pre-ERP		ERP		p-value
	N=103		n=41		n=62		
Age, years, median (IQR)	64.6	58.4-74.2	62.0	57.0-67.7	66.4	58.6-76.1	0.10
Sex, n (%)							0.42
Male	58	56.3%	21	51.2%	37	59.7%	
Female	45	43.7%	20	48.8%	25	40.3%	
Race, n (%)							0.74
White	63	61.2%	24	58.5%	39	62.9%	
Black	31	30.1%	14	34.2%	17	27.4%	
Other*/Unknown	9	8.7%	3	7.3%	11	17.7%	
Current Smoker, n (%)	13	13.0%	5	12.2%	8	12.9%	1.00
Disseminated Cancer, n (%)	8	8.0%	2	4.9%	6	9.7%	0.48
BMI, kg/m ² , median (IQR)	30.3	26.7-36.7	30.8	27.2-35.5	29.7	26.1-37.2	0.95
CR-Possum Scores, mean (SD)							
Physiology Score	10.64	2.74	10.8	2.58	10.53	2.85	0.623
Operative Severity Score	7.08	0.39	7.1	0.44	7.06	0.36	0.675
Mortality risk (%)	4.92	5.56	4.98	5.57	4.88	5.57	0.926
mFI Variables, n (%)							
Diabetes Mellitus	90	87.4%	36	87.8%	54	87.1%	1.00
Partially/totally dependent	4	3.9%	3	7.3%	1	1.6%	0.300
History of severe COPD	12	11.7%	4	9.7%	8	12.9%	0.76
Recent History of CHF	2	1.9%	1	2.4%	1	1.6%	1.00
Hypertension	102	99.0%	41	100.0%	61	98.4%	1.00
Operative Approach, n (%)							0.062
Laparoscopic	47	37.0%	18	27.7%	29	46.8%	
Open	80	63.0%	47	72.3%	33	53.2%	
Procedure Type, n (%)							0.003
Colectomy	70	68.0%	25	61.0%	45	72.6%	
Proctectomy	25	24.3%	16	39.0%	9	14.5%	
Other	8	7.8%	0	0.0%	8	12.9%	

Abbreviations: ERP = Enhanced Recovery Pathway; BMI = Body mass index; mFI = modified Frailty Index; COPD = Chronic obstructive pulmonary disease; CHF = Congestive heart failure.

THE EFFECTS OF INTRAOPERATIVE ICG FLUORESCENCE ANGIOGRAPHY IN LAPAROSCOPIC LAR: A PROPENSITY SCORE-MATCHED STUDY.

P48

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Purpose/Background: Anastomotic leakage (AL) is the most common complication after rectal cancer surgery. Despite technical improvements and instrumental developments, recent studies have reported that the rate of AL following LAR remains at approximately 10%. Despite the multifactorial etiology of AL, sufficient vascular perfusion is important for successful anastomosis. In recent years, near-infrared (NIR) fluorescence technology with indocyanine green (ICG) has been the most promising method that intraoperatively allows for a real-time evaluation of intestinal perfusion. However, it remains unclear whether ICG angiography can decrease the rate of anastomotic leakage (AL).

Methods/Interventions: This is a retrospective single-institution study of a prospectively maintained database of 149 rectal cancer patients who underwent laparoscopic LAR with double stapling technique (DST) anastomosis between January 2009 and May 2016. Propensity score matching (PSM) was used to compare groups of patients with and without ICG angiography. We also evaluated the risk factors for AL by univariate and multivariate analyses.

Results/Outcome(s): Before PSM, the overall rate of symptomatic AL was 10.4% (5 of 48) in patients with ICG angiography, compared with 6.9% (7 of 101) in cases without ICG angiography ($P = 0.52$). In patients with ICG angiography, poor perfusion of the proximal colon judged by ICG angiography led to additional colon resection in 27.1% (13/48). Symptomatic AL occurred in 4 (4/13: 30.8%) of the patients who had revision of the transection site, whereas it occurred in only 1 case (1/35: 2.9%) of the patients who did not need proximal change of the transection site ($P = 0.015$). After PSM, the 2 groups were nearly balanced, and the incidence rate of symptomatic AL was 8.8% (3 of 34) in patients with ICG angiography, compared with 14.7% (5 of 34) in cases without ICG angiography ($P = 0.71$). In univariate analysis, high BMI ($P = 0.017$), preoperative chemotherapy ($P = 0.042$), and lateral lymph node dissection ($P = 0.0015$) were significantly associated with symptomatic AL. Multivariate analysis identified that only lateral lymph node dissection remained significantly correlated with AL (odds ratio [OR], 10.05; 95% confidence interval [CI], 1.75 - 58.61; $P = 0.011$).

Conclusions/Discussion: This is the first study to investigate the effect of ICG angiography in laparoscopic LAR with DST anastomosis using a propensity score matched analysis. The incidence rate of AL in patients with ICG angiography was fewer than that of AL without ICG angiography, but there was no significant difference between both groups. Regarding the risk factors for anastomotic leakage in this series, multivariate analysis identified that only lateral lymph node dissection remained significantly correlated with AL. Intraoperative ICG angiography to evaluate the perfusion of the proximal colon might decrease the AL rate following laparoscopic LAR.

THE USE OF LAPAROSCOPY IN THE MANAGEMENT OF COMPLICATIONS FOLLOWING LAPAROSCOPIC COLORECTAL SURGERY.

P49

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Purpose/Background: There is an expanding role for the use of laparoscopy in the treatment of post operative complications. Advantages of the laparoscopic approach include its ability to be used as both a diagnostic and therapeutic tool, while maintaining the known benefits of minimally invasive surgery in the recovery period. This study aimed to assess the 30-day outcomes of the re-laparoscopic vs. the re-laparotomy approach to manage complications occurring after laparoscopic colorectal surgery using the NSQIP database.

Methods/Interventions: The NSQIP database was searched for all laparoscopic colorectal resectional operations performed from 2012-2014. Patients who required re operation within 30 days due to post-operative intra-abdominal complications were identified. Data on demographics,

ASA, co morbidities, and indication for original operation was collected. Data on re operation including time to re operation, type of complication, re operative time, length of hospital stay, post op 30 day morbidity were collected.

Results/Outcome(s): There were no significant differences between the groups in terms of demographics, including age, sex, BMI, ASA or co morbidity. There were no significant differences in the urgency or indication for the first colorectal operation. Of note, intestinal obstruction was the most common indication in the re laparoscopy group. The most common operative procedures performed were "Exploratory Laparotomy" and "Re opening of a recent Laparotomy". For laparoscopy specific operation codes, the most common were "Laparoscopy, abdomen, peritoneum and omentum, diagnostic", "Laparoscopy, surgical; ileostomy or jejunostomy, non tube" and "Laparoscopy, surgical, enterolysis". There were significant differences in 30 day morbidity, with less organ space SSI, pneumonia, renal insufficiency, unplanned intubation and post operative septic complications in the re laparoscopy group vs. the re laparotomy group. The total length of stay was significantly shorter in the re laparoscopy group. There was no difference in need for subsequent operation within 30 days.

Conclusions/Discussion: Complications following laparoscopic colorectal resection surgery can be successfully managed using re laparoscopy in selected patients, with equivalent outcomes to re laparotomy, and potential benefits in terms of reduced 30-day morbidity and length of hospital stay.

P49 30 day outcomes

Outcome	Laparotomy- re op (N = 613)	Laparoscopy- re op (N= 175)	Test statistic
Superficial SSI	60 (10%)	14 (8%)	0.570
Deep SSI	34 (6%)	5 (3%)	0.212
Wound Dehiscence	37 (6%)	5 (3%)	0.144
Organ space SSI	313 (51%)	63 (36%)	0.001
Pneumonia	65 (10%)	4 (4%)	0.012
Unplanned Reintubation	79 (13%)	8 (5%)	0.003
Renal Insufficiency	28 (5%)	1 (<1%)	0.025
Sepsis Post Op (N (%))	187 (31%)	39 (22%)	0.043
Septic Shock	129 (21%)	16 (9%)	0.001
Total Length of Stay (mean)	17	14	0.015
2nd operation required	70 (11%)	13 (7%)	0.168
3rd operation required	18 (5%)	1 (1%)	0.127
Death (N(%))	40 (7%)	7 (4%)	0.288

THE DETERMINANTS OF PALLIATIVE CARE UTILIZATION IN COLORECTAL CANCER PATIENTS: A CALL FOR AN IMPROVED MULTIDISCIPLINARY APPROACH.

P50

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Purpose/Background: Among patients with incurable colorectal cancer, palliative care is reported to be associated with improved patient survival and quality of life. Despite this, the use of palliative care varies greatly and it is not clear what the determinants of those variations are. The purpose of this study is to provide clarity with respect to the patient and institutional characteristics associated with an increase in palliative care usage among patients who died with a diagnosis of colorectal cancer.

Methods/Interventions: Using the 2016 American College of Surgeons National Cancer Data Base, we identified 287,923 deceased patients treated for colorectal cancer between 2004 and 2013. To evaluate the associations between palliative care usage and characteristics of deceased patients and the treating institutions, we employed multivariable logistic regression analyses. Patients were classified based on their length of survival (<6 months, 6-24 months, and 24+ months) to provide timing context.

Results/Outcome(s): Multivariable analyses show that patients who received palliative care were more likely to be younger, recently diagnosed, receive their treatment at institutions with academic cancer programs, and have stage IV disease. In addition, patients living in Mountain and Pacific regions had higher odds of palliative care utilization compared to those in the East Coast. Palliative care usage was also higher among patients who received their care in institutions that had greater palliative care services, represented by the percent of institutions with palliative care. Patients without insurance had increased odds of palliative care if they survived for less than 24 months. Medicaid and other government insurance were associated with increased palliative care usage in those in the 6-24 months survival group. Finally, an increase in distance of > 9 miles from treating/reporting institutions, represented by the Greater Circle Distance, was associated with increased palliative care utilization among patients who survived for less than 6 months.

Conclusions/Discussion: The strongest factors associated with palliative care usage among patients with colorectal tumors are the AJCC cancer stage and the availability of palliative care at the treating institutions. Factors captured by NCDB associated with increased palliative care utilization among this patient population include age, year of diagnosis, insurance status, income,

geographic region and facility type. Despite recent progress in colorectal cancer treatment, palliative care utilization is variable, and continues to lag behind other treatment modalities.

THE INCIDENCE AND RISK FACTORS FOR COMPLICATIONS IN GERIATRIC PATIENTS UNDERGOING COLORECTAL SURGERY.

P51

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Purpose/Background: With an increasing geriatric population, colorectal surgeons are commonly dealing with the complexities of this unique cohort. Elderly patients may experience a higher complication risk due to their comorbidities, polypharmacy, and malnutrition. Risk stratification models for these patients are shifting from chronologic to physiologic age as independent predictors of risk. Often, these patients are offered stoma creation to decrease the risk of bowel anastomosis. The aim of this study was to estimate the incidence of complications in patients over 85 years old undergoing primary bowel anastomoses and to identify factors that contributed to the complications.

Methods/Interventions: This was an IRB approved retrospective review of a single institution database of 50 patients over the age of 85 that had primary small bowel, colocolonic, and colorectal anastomoses between January 2010 and March 2013. Examined complications included anastomotic leak, ileus, readmission, and postop hemorrhage. The percentage of patients that had complications was calculated along with 95% confidence intervals. We also reported an overall complication rate which was defined as having one or more complications. The Mann Whitney U test was used to analyze the association between the presence or absence of complications and a continuous risk factor.

Results/Outcome(s): Fifty patients that fit our criteria were included in the study. We had 10 patients that suffered a complication resulting in an overall complication rate of 20% (10%, 33.7%). The mean age and BMI of those with and without complications were not significantly different. Examination of specific complications yielded the following results, leak rate was 4.0% (0.5, 13.7%), ileus 4.0% (0.5, 13.7%), and readmission rate was 10% (3.3%, 21.8%). Review of risk factors (sex, surgical technique, diagnosis, diabetes, heart failure, atrial fibrillation, coronary disease, surgical history, and tobacco or alcohol abuse) that were associated with any complications yielded two that were statistically significant (Table 1). Patients that had open surgery experienced a

higher complication rate than patients that had laparoscopic surgery (38.9% v. 9.4%; $p=0.024$). Also, tobacco abusers had a higher complication rate than nonabusers (50% v. 12.5%, $p=0.041$)

Conclusions/Discussion: Our data indicate that the overall complication rate of patients over the age of 85 undergoing primary bowel anastomoses is 20%. This is consistent with published overall complication rates of all patients undergoing CRS (28-34%). Similar to the general population, tobacco abuse and open abdominal surgery significantly contributed to this overall morbidity. Thus, we conclude that octa and nonagenarians have risk profiles similar to the general population and that age alone should not be used as a factor to determine surgical candidacy.

Table 1: Risk Factors Associated with Complications

	Any Complication (n=10) n (%)	No Complications (n=40) n (%)	p-value
Gender			
Female	4 (40.0%)	30 (75.0%)	N.S.
Male	6 (60.0%)	10 (25.0%)	
Technique			
Open	7 (70.0%)	11 (27.5%)	0.0239
Laparoscopic	3 (30.0%)	29 (72.5%)	
Diagnosis			
Malignancy	7 (70.0%)	33 (82.5%)	N.S.
Inflammatory or other	3 (30.0%)	7 (17.5%)	
Diabetes			
Yes	1 (10.0%)	7 (17.5%)	N.S.
No	9 (90.0%)	33 (82.6%)	
CHF			
Yes	2 (20.0%)	4 (10.0%)	N.S.
No	8 (80.0%)	36 (90.0%)	
Atrial Fibrillation			
Yes	3 (30.0%)	7 (17.5%)	N.S.
No	7 (70.0%)	33 (82.5%)	
CAD			
Yes	4 (40.0%)	13 (32.5%)	N.S.
No	6 (60.0%)	27 (67.5%)	
History of Past Major Surgery			
Yes	2 (20.0%)	10 (25.0%)	N.S.
No	8 (80.0%)	30 (75.0%)	
Smoking History			
Heavy	5 (50.0%)	5 (12.5%)	0.0410
Occasional/Light/Moderate	1 (10.0%)	9 (22.5%)	
Never	4 (40.0%)	26 (65.0%)	
Alcohol Use			
Regular	2 (20.0%)	2 (5.0%)	N.S.
None/Occasional	8 (80.0%)	38 (95.0%)	

COST-EFFECTIVENESS OF EXTENDED THROMBOPROPHYLAXIS IN PATIENTS UNDERGOING COLORECTAL SURGERY FROM A CANADIAN HEALTHCARE SYSTEM PERSPECTIVE.

P52

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Purpose/Background: There are increasing data to support extended thromboprophylaxis after colorectal surgery to minimize the incidence of post-discharge thromboembolic events, especially in patients with malignancy and

inflammatory bowel disease (IBD). However, the absolute number of thromboembolic events is small, and extended thromboprophylaxis may require significant time, costs, and resources to the patient and healthcare system. Therefore, the objective of this study is to determine the cost-effectiveness of extended thromboprophylaxis in patients undergoing colorectal surgery for malignancy or IBD.

Methods/Interventions: A individual patient micro-simulation model (100,000 patients; 1-mo cycle length) comparing standard management (inpatient administration only) versus extended thromboprophylaxis (using low molecular weight heparin subcutaneous injections up to 28 days postoperatively) after colorectal surgery was constructed using inputs from the ACS-NSQIP 2012-2016 database and targeted literature searches. Costs, quality-adjusted life years (QALYs), and VTE-related deaths avoided were calculated over a 1-yr time horizon starting with hospital discharge from the perspective of the Canadian (Quebec) healthcare system. Costs are reported in 2017 Canadian dollars (1 CAD = 0.79 USD). The results were stratified by malignancy or IBD. Probabilistic and deterministic sensitivity analyses were performed.

Results/Outcome(s): In patients with malignancy, extended prophylaxis was associated with higher costs (+123\$; 95% CI 116-130), but increased QALYs (+0.04; 95% CI 0.02-0.06), resulting in an incremental cost-effectiveness ratio of 3075\$/QALY. In patients with IBD, extended prophylaxis also had higher costs (+110\$; 95% CI 98-122) and more QALYs (+0.04; 95% CI 0.02-0.07) with an incremental cost-effectiveness ratio of 2750\$/QALY. Extended prophylaxis also prevented 17 (95% CI 18-40) VTE-related deaths per 100,000 patients for malignancy and 21 (95% CI 13-32) per 100,000 for patients with IBD. For both malignancy and IBD, there was a 99.7% probability of cost-effectiveness at a willingness-to-pay threshold of 50,000\$/QALY. Sensitivity analysis demonstrated that the incidence of post-discharge VTE would have to be greater than 2.1% for extended prophylaxis to be associated with lower overall costs.

Conclusions/Discussion: Extended thromboprophylaxis was associated with acceptable costs, higher QALYS, and fewer VTE-related deaths compared to standard management in patients undergoing colorectal surgery for malignancy and IBD. Despite the rarity of VTE-events, extended thromboprophylaxis is a cost-effective strategy to prevent VTE and VTE-related mortality.

RETROSPECTIVE NON-INFERIORITY STUDY OF PERPHENAZINE COMPARED TO APREPITANT FOR THE TREATMENT OF POSTOPERATIVE NAUSEA AND VOMITING (PONV) IN ENHANCED RECOVERY AFTER SURGERY (ERAS) COLORECTAL SURGERY PATIENTS.

P53

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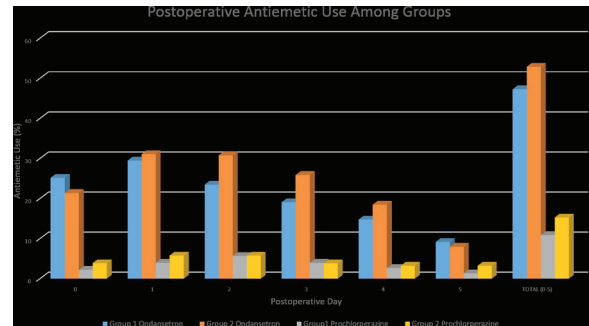
Purpose/Background: Postoperative nausea and vomiting (PONV) is an important clinical problem among colorectal surgery (CRS) patients. Enhanced recovery after surgery (ERAS) programs are designed to provide optimal perioperative care for patients undergoing surgery. Aprepitant is the favored PONV prophylaxis medication for patients undergoing CRS. However, the cost associated with aprepitant use is very high for patients and hospitals alike. This study compares preoperative use of a more cost effective drug perphenazine compared to aprepitant for effectiveness in the prevention of PONV among CRS patients undergoing an ERAS protocol.

Methods/Interventions: Patients who underwent ERAS based CRS at a single hospital from July 2015-July 2017 were evaluated retrospectively. Only subjects who received either aprepitant alone (Group 1) or perphenazine alone (Group 2) preoperatively for PONV prophylaxis were included. Analysis of baseline characteristics, simplified Apfel PONV risk scores, intraoperative parameters, postoperative medications, and PONV incidence were compared between groups. PONV was defined as the need for rescue antiemetics on postoperative day (POD) 0 through 5. Continuous parameters were analyzed using Mann-Whitney U test, and the dichotomous variables were analyzed by Chi2 test. An alpha level of 0.05 was used to determine statistical significance.

Results/Outcome(s): A total of 600 patients underwent CRS during the study period of which 498 met inclusion criteria. 231 (46.4%) received aprepitant and 267 (53.6%) received perphenazine. Baseline characteristics, simplified Apfel scores, and intraoperative medications were similar between groups except for intra-operative ketamine. Patients in Group 1 received significantly more ketamine than patients in Group 2 ($P < 0.001$). The incidence of early PONV (POD0-1) was 46.32% in Group 1 and 53.36% in Group 2 ($P = 0.1075$). The incidence of late PONV (POD2-5) was 48.48% in Group 1 and 51.31% in Group 2 ($P = 0.5298$). Postoperative pain medication amount and the incidence and frequency of postoperative antiemetic use were not significantly different between groups.

Conclusions/Discussion: There is no significant difference in the effectiveness of aprepitant or perphenazine for prevention of PONV in patients undergoing CRS within an ERAS protocol. The incidence of early and late PONV

remains high despite most patients receiving 3 prophylactic antiemetic medications and requires improved antiemetic strategies. The costs associated with these medications are disproportionate with aprepitant costing about \$130 per dose compared to \$2 per dose of perphenazine. We conclude that perphenazine is cost effective and non-inferior to aprepitant for the treatment of PONV in this patient population.



LOOP ILEOSTOMY WITH COLONIC LAVAGE IS A SAFE TREATMENT OPTION FOR SEVERE CLOSTRIDIUM DIFFICILE COLITIS AND DOES NOT RESULT IN SUBSEQUENT COLECTOMY.

P54

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Purpose/Background: Total abdominal colectomy (TAC) is the standard of care for patients with severe Clostridium difficile infection (CDI). In recent years, loop ileostomy (LI) with colonic lavage has been proposed as an alternative approach allowing for colonic preservation. Despite growing popularity, little evidence supports or refutes the use of LI in this setting. The purpose of study is to compare outcomes between LI and TAC using a large clinical database.

Methods/Interventions: The 2011-2016 ACS-NSQIP database was queried for patients who underwent either TAC or LI for severe CDI. Postoperative diagnoses were restricted to ICD-9 or ICD-10 diagnoses codes for "enterocolitis due to Clostridium difficile." Using CPT codes, we identified patients who underwent open or laparoscopic LI creation without an associated colectomy as well as those patients undergoing open or laparoscopic TAC. Patient demographics, perioperative variables, and postoperative outcomes were analyzed. Patients with data outside the 95th percentile for age, length of stay, and operative time were excluded. Descriptive statistics including Pearson's chi-square test, student t-test, and Mann-Whitney U test were performed using IBM SPSS v.23.0, with $\alpha = 0.05$.

Results/Outcome(s): A total of 373 patients underwent TAC and 43 underwent LI for severe CDI. Age, BMI,

Race, preoperative functional status, and ASA score did not significantly differ between the groups. Women were more likely to undergo LI (72.1%) compared to TAC (55.2%) ($p=0.034$). An equivalent percent of patients required emergent surgery and were ventilator dependent prior to surgery. Preoperative probabilities of mortality were similar for patients undergoing LI (median 0.33) compared to TAC (median 0.41) ($p=0.234$). Median operative time was significantly less for LI (98 minutes) compared to TAC (135 minutes) ($p<0.001$). No difference in mortality was identified between LI (37.2%) and TAC (31.1%) ($p=0.696$). Postoperative complication rates including unplanned reintubation, cardiovascular events, pneumonia, deep venous thrombosis requiring treatment, and reoperation were similar between LI and TAC (Table 1); however, intra- or postoperative transfusion was more common in TAC (55.0% versus 20.9%, $p<0.001$). None of the four patients in the LI group who required reoperation underwent subsequent colonic resection. Length of

stay was similar between LI (18 days) and TAC (17 days) ($p=0.838$).

Conclusions/Discussion: This is the largest study to date comparing the safety and efficacy of LI and TAC in patients with severe CDI. Our data demonstrates that compared to TAC, LI allows for colonic preservation without increased risk of mortality. Loop ileostomy with colonic lavage may be a safe and less morbid option in select patients with severe CDI.

P54

Table 1: Outcomes in patients undergoing surgery for clostridium difficile colitis

Variable	Loop Ileostomy (N=43)		Total Abdominal Colectomy (N=373)		p value
	N	%	N	%	
Age (years, median)	67		68		0.944
Sex					0.034
Female	31	72.1%	206	55.2%	
Male	12	27.9%	167	44.8%	
BMI (median)	28.9		26.4		0.307
ASA score 4 or 5	30	71.4%	281	75.5%	0.559
Independent prior to admission	31	77.5%	259	70.4%	0.463
Diabetic	10	23.3%	72	19.3%	0.537
Probability of morbidity (median)	0.37		0.64		0.001
Probability of mortality (median)	0.33		0.41		0.234
Emergent surgery	33	76.7%	296	79.4%	0.690
Ventilator dependent	15	34.9%	116	31.1%	0.613
Preoperative labs (median)					
WBC count	22.8		22.9		0.657
Albumin	2.2		2.1		0.243
Sodium	137.0		136.0		0.500
Creatinine	1.6		1.5		0.987
INR	1.4		1.4		0.819
Operative time (median, minutes)	98.0		135.0		<0.001
Transfused during or after surgery	9	20.9%	205	55.0%	<0.001
Unplanned reintubation	6	14.0%	55	14.7%	0.889
Reoperation	4	9.3%	38	10.2%	1.000
Cardiovascular complication	7	16.3%	33	8.8%	0.165
Pneumonia	11	25.6%	79	21.2%	0.507
DVT requiring treatment	2	4.6%	25	6.7%	0.518
Mortality	16	37.2%	116	31.1%	0.696
Length of stay (median, days)	18.0		17.0		0.838

COMPOSITE ANATOMICAL RECONSTRUCTION OF THE PERINEUM - IMPROVED PERINEAL WOUND OUTCOMES.

P55

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Purpose/Background: Perineal wounds after complicated proctectomy, such as those preceded by radiation, are notoriously difficult to heal and have frequent wound complications. Without any additional tissue, major wound complications are as high as 60%. Gracilis muscle flaps have been used in the past to provide better tissue bulk and vascularization to the wound bed to try to minimize the incidence of complications, but have been abandoned because they do not provide adequate bulk when used alone. This study was performed to determine if a composite anatomical reconstruction (CAR) with acellular dermal matrix (ADM) in addition to gracilis flap is advantageous in regards to wound complications.

Methods/Interventions: A retrospective chart review was performed of patients undergoing abdominoperineal resection (APR) with gracilis flap reconstruction alone, CAR, rectus flap reconstruction (with and without mesh) and gluteus flap reconstruction from March 2012 to September 2017. Patient demographics, medical comorbidities, periprocedural and wound complications were evaluated retrospectively. Wounds were evaluated using the Southampton wound scoring system. CAR involves sewing Strattice mesh to the lowest aspect of the pelvic

floor musculature left after APR in a watertight fashion. The gracilis muscle is then laid in the space between the mesh and the skin and the skin is closed primarily.

Results/Outcome(s): Thirty-Two patients were evaluated, 21 of whom had mesh as part of their reconstruction. Seventeen underwent CAR, 9 underwent gracilis flap reconstruction without mesh, 5 underwent rectus flap reconstruction with or without mesh, and 1 underwent a gluteal flap without mesh. Neoadjuvant chemoradiotherapy was used in 29 patients. Twenty-two percent were smokers at the time of surgery. An additional 16% that were former smokers. Diabetes was present in 22% of patients. Mean BMI was 26.3. Fifty-six percent were male. More anatomical composite reconstructions were done with assistance from minimally invasive surgery (41%) than with the other reconstructions (7%) ($p=0.04$). The CAR cohort had a major complication rate of 18% and a minor complication rate of 47%. Hospital readmission rates were significantly lower (24%) for CAR compared to other reconstructions (67%) ($p=0.03$). The reoperation rate for anatomical composite reconstructions was 18%. Post-operative Southampton wound scoring did not differ significantly between the CAR and other reconstruction techniques. Further comparisons in Table 1.

Conclusions/Discussion: The use of ADM combined with gracilis flap in the reconstruction of perineal wounds after proctectomy leads to fewer hospital readmissions, a greater ability to perform minimally invasive surgery, all with similar postoperative wound complications rates. This study argues for further prospective trials to confirm the superiority of mesh with gracilis flap over gracilis flap alone.

P55 Table 1

	CAR	Other Reconstructions	P value
Number of Patients	17	15	
Age (mean)	56.9	65.8	0.023
Male (%)	64.7	46.7	NS
BMI (mean)	26.8	25.8	NS
Diabetes (%)	24	20	NS
Current or Previous Smoker (%)	41	27	NS
Neoadjuvant Therapy (%)	82	60	NS
Radiation History (%)	100	80	NS
Preoperative Steroids (%)	12	13	NS
Preoperative Albumin (mean)	3.82	3.63	NS
Minimally Invasive Surgery (%)	41	7	0.041
Pelvic Exenteration (%)	24	27	NS
Vaginal Wall Reconstruction (%)	12	53	0.021
Length of Stay (mean)	12.1	14.1	NS
Major Complications (%)	18	40	NS
Minor Complications (%)	47	40	NS
Southampton Score (median)	2.5	9.0	NS
Readmission (%)	24	67	0.031
Reoperation (%)	17.65	53.3	NS

PREDICTION OF URINARY RETENTION AFTER SURGERY FOR RECTAL CANCER BY USING A NOVEL SCALING SYSTEM IN THE 24-HOUR VOIDING STATUS FOLLOWING FOLEY CATHETER REMOVEAL.

P56

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Purpose/Background: Background: Postoperative urinary retention (PUR) is one of the most annoying adverse effects of rectal surgery. However, no effective evaluation methods have been established to predict the occurrence of PUR in the early times after rectal surgery. Voiding efficiency (VE) has been demonstrated as a good indicator for evaluating PUR. The purpose of this study was to predict which patients would have PUR after rectal surgery by evaluating patients' VE in the initial 24 hours after urinary catheter removal.

Methods/Interventions: Materials and methods: We analyzed prospectively collected data of 503 patients who underwent rectal cancer surgery in the National Cancer Center Hospital East between April 2012 and May 2016. Residual urine volume (RUV) was measured after catheter removal for all the patients. When the amount of RUV was ≥ 100 mL in more than 2 measurements, the patient was treated with oral medication and re-catheterization. Patients were considered to have PUR in case re-catheterization was needed until the day of hospital discharge. VE was calculated using data from the first 24 hours after catheter removal as follows: $VE = \frac{[\text{Total voiding volume}]}{(\text{Total voiding volume} + \text{Total RUV})} \times 100$.

Results/Outcome(s): Results: The incidence of PUR was 18.3% (92/503). In the univariate and multivariate analyses, the independent risk factors of PUR were male sex, preoperative RUV of ≥ 50 mL, open surgery approach, and unilateral or no pelvic plexus preservation. When the cutoff value for poor VE was defined as $< 50\%$, poor VE was a more accurate predictor of PUR than RUV of ≥ 100 mL (area under the curve, 0.969 vs. 0.934, $p < 0.001$). Among patients with large RUVs but good VEs (RUV ≥ 100 mL and VE $\geq 50\%$), only 5.2% (4/77) would have PUR; thus,

the remaining 73 patients would not require treatment for PUR.

Conclusions/Discussion: Conclusions: Our study shows that poor VE is a useful and accurate prediction tool for the occurrence of PUR in patients with rectal cancer. By using VE, patients who would require prolonged catheterization for PUR can be more accurately identified and unnecessary therapy in normal patients can be avoided.

DOES HOSPITAL VOLUME IMPACT THE RISK OF LOCAL RECURRENCE OF RECTAL CANCER? A RETROSPECTIVE COHORT STUDY.

P57

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Purpose/Background: Rectal cancer treatment is becoming increasingly complex and centralization of care has inherent disadvantages for some patients. The main objective of this study was to compare the risk of local recurrence and overall survival in patients who underwent rectal cancer surgery in Manitoba in high versus low volume centers. Our secondary aim was to assess differences in selected treatment-related processes and short-term outcome measures.

Methods/Interventions: A retrospective cohort study was conducted using population-based data collected from the Manitoba Cancer Registry and chart reviews. All patients with stage II or III rectal adenocarcinoma who underwent curative resection between 2004-2014 were included. High volume centers were defined as those performing greater than ten rectal cancer resections per year. A univariable competing risk regression model with death as the competing risk was used to compare the risk of local recurrence. A multivariable model was used to control for age, gender, distance from anal verge, collaborative stage, neoadjuvant/adjuvant therapy and margin positivity. Cox proportional hazards regression was used to assess differences in overall survival and logistic regression was used to analyze our secondary outcomes of interest.

**P57 Table 1: Differences in Treatment-Related Processes and Short-Term Outcomes
High versus Low Volume Centers**

	Univariable OR (95% CI)	P-value	Multivariable OR (95% CI)	P-value
Locoregional staging*	2.56 (1.9-3.4)	<0.01	2.34 (1.6-3.4)	<0.01
Neoadjuvant chemoradiation	2.09 (1.6-2.7)	<0.01	2.02 (1.5-2.6)	<0.01
Sphincter sparing surgery	0.88 (0.67-1.17)	0.4	0.93 (0.69-1.25)	0.6
Negative margin status	0.52 (0.36-0.76)	<0.01	0.59 (0.39-0.87)	<0.01
Lymph node yield ≥ 12	1.42 (1.1-1.9)	0.01	1.46 (1.06-2.0)	0.02

* Pre-operative magnetic resonance imaging and/or endorectal ultrasound.

Results/Outcome(s): A total of 1,189 patients diagnosed with stage II or III underwent curative resection for rectal cancer during the study period. The overall incidence of local recurrence was 9.7% (n=115). The overall local recurrence rate was 12.2% (n=44) in low volume centers versus 8.6% (n=71) in high volume centers. Four of the 18 centers were considered high volume and together performed 69.6% of the total operations over the study (n=827). In the univariable competing risk analysis, patients receiving surgery in high volume centers had 36% less risk of local recurrence compared to low volume centers (SHR 0.64, 95% CI=0.44-0.95, p=0.025). Low volume centers remained a significant predictor of local recurrence in the multivariable model (SHR 0.64, 95% CI=0.43-0.97, p=0.028). Overall survival was not significantly associated with hospital volume in the univariable (HR 0.9, 95% CI 0.6-1.2, p=0.5) or multivariable analysis (HR 1.2, 95% CI 0.9-1.5, p=0.12). Our secondary analyses demonstrated there were significant differences in uptake of emerging treatment paradigms in high versus low volume centers (Table 1).

Conclusions/Discussion: Our study demonstrates important differences in rectal cancer treatment-related process measures between high and low volume centers, some of which have not previously examined. These variations could explain the association between hospital volume and surgical outcomes observed in our study and many others. These findings have important implications for the practice of developing rectal cancer surgery centers of excellence.

**TELL US WHAT YOU REALLY THINK:
A QUALITATIVE EVALUATION OF
IMPLEMENTATION OF AN ENHANCED
RECOVERY PATHWAY.**

P58

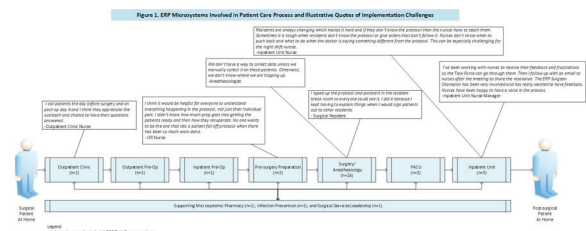
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Purpose/Background: Enhanced Recovery Pathways (ERPs) improve post-surgical recovery and patient outcomes by reducing complications, decreasing hospital length of stay, and improving patient satisfaction; however, they are challenging to implement. Hospitals underestimate the complexity of implementing a multifaceted intervention that requires coordination of large teams of multi-specialty providers who provide care at different phases and in different healthcare settings. Our goal was to evaluate front-line provider perspectives during early ERP implementation to identify and overcome cultural and contextual barriers and facilitators to successful implementation and to address the implementation challenges that front-line clinicians and staff face when translating best practice evidence into existing patient care processes.

Methods/Interventions: We conducted an in-depth qualitative evaluation of ERP implementation for elective colorectal resections at a large urban tertiary care teaching hospital. We conducted semi-structured interviews with Task Force members (n=39) including attending surgeons, anesthesiologists, pharmacists, nurses, and surgical trainees, and analyzed Task Force meetings (n=10) from September 2016 to August 2017 (Figure 1). Interviews were audio recorded and transcribed using notes expansion methodology. We conducted thematic analysis using the constant comparative method to identify common themes and specialty and unit-specific implementation barriers and facilitators. Researchers created a feedback loop to share interviewee recommendations to concurrently improve the implementation process.

Results/Outcome(s): Key facilitators of successful ERP implementation include stakeholder unity and improved documentation through incorporation of ERP components into the electronic medical record. The comprehensive patient education booklet successfully set patient expectations and focused patients toward earlier discharge and opioid-sparing analgesia. Task Force members suggested improvements to the implementation process, including earlier feedback of patient outcome data to all involved care teams to highlight success of the pathway, development of a sustainable trainee education plan to ensure that each rotating resident team is prepared to manage ERP patients, and identification strategies to address and allay front-line staff concerns regarding ERP components that are new aspects of patient care.

Conclusions/Discussion: The qualitative feedback gave rise to a duplexed cultural communication framework which enabled us to identify and overcome early barriers to successful ERP implementation while simultaneously validating our implementation scheme. The results of this analysis may be generalizable to institutions seeking to implement ERP with high fidelity, as well as guide ERP expansion to non-colorectal surgery services across a variety of settings.



NON-HOME DISCHARGE AFTER COLORECTAL SURGERY IS ASSOCIATED WITH HIGHER 30-DAY READMISSION RISK.

P59

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Purpose/Background: The risk profiles of the different non-home discharge subgroups are unclear. We aimed to assess index hospitalization characteristics, the readmission risk of home and facility discharge groups, and time-to-readmission.

Methods/Interventions: We identified adults who underwent elective colorectal resection from 2011-2015 for malignancy, inflammatory bowel disease, diverticulitis, or benign neoplasm based on ICD 9 codes using the University HealthSystem Consortium (UHC) national database. Those who died during index hospitalization were excluded. Descriptive statistics including chi-square analysis and analysis of variance compared baseline demographics, clinical characteristics and index hospitalization outcomes. Discharge subgroups were categorized into home, home with service (HWS), skilled nursing facility (SNF), rehabilitation facility (rehab), and long-term care hospitals (LTCH) based on UHC discharge codes. Kaplan-Meier curves described time-to-readmission. Multivariable logistic regression models estimated odds of 30-day readmission based on discharge dispositions.

Results/Outcome(s): Of 97,455 patients, 70% were discharged home, 24% HWS, 5% SNF, 1% rehab and <1% LTCH. Mean age was 58 years; half were male and 78% were White. Patients with ICU stay, more post-operative complications and longer length of stay were more likely to be discharged to HWS or to facility ($p < 0.0001$) (Fig. 1A). Overall readmission rate was 12%; specifically, 10% from home, 20% from HWS, 24% from SNF, 53% from rehab and 28% from LTCH ($p < 0.0001$). After adjustment for clinically significant confounders, discharge to HWS, SNF, or rehab incrementally increased risk of readmission by 40% (OR 1.4 (95%CI 1.3-1.4)), 60% (OR 1.6 (95%CI 1.5-1.8)), or 200% (OR 3.0 (95%CI 2.5-3.6)), respectively. LTCH discharge did not increase readmission risk (OR 1.1 (95%CI 0.8-1.5)). The covariate, length of stay (LOS), was the strongest confounder in our model. Adjustment for LOS alone yielded readmission risks similar to those listed above for the discharge groups. Median time-to-readmission in days was similar among home (7), HWS (8), SNF (8), Rehab (9) but longer for LTCH (12) ($p < 0.0001$).

Conclusions/Discussion: Our data suggests that the type of discharge disposition impacts the risk of readmission, even after appropriate adjustments for clinical characteristics and index hospitalization complications. These findings also suggest that the care offered through these services and facilities, except for LTCH, may be inadequate in preventing readmissions. Future studies

are necessary to identify directed interventions aimed at improving care beyond the hospital setting and reducing readmissions from these specific facilities.

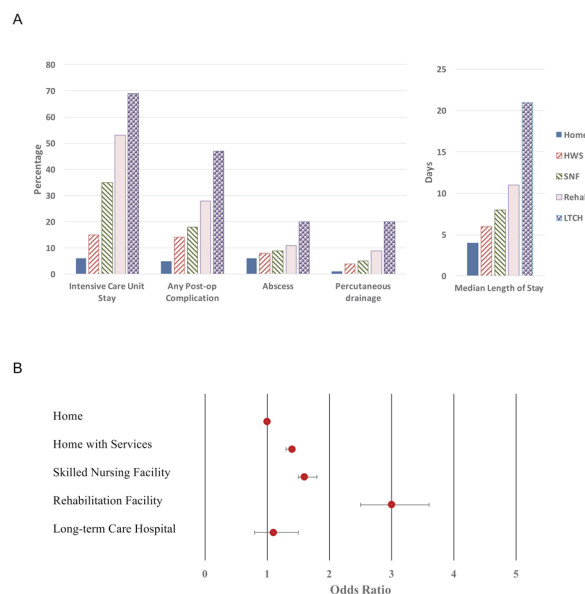


Figure 1. A) Index Hospitalization Complications and B) 30-day Readmission Risk by Discharge Disposition. Multivariable logistic regression model in B is adjusted for age, sex, race, insurance carrier, primary diagnosis, index hospitalization severity of illness score, procedure, any post-operative complications, ileostomy creation, length of stay and ICU stay.

ROBOTIC VERSUS LAPAROSCOPIC RIGHT COLECTOMY: POST-OPERATIVE HEMOGLOBIN TRENDS IN A COMMUNITY COLORECTAL SURGERY GROUP.

P60

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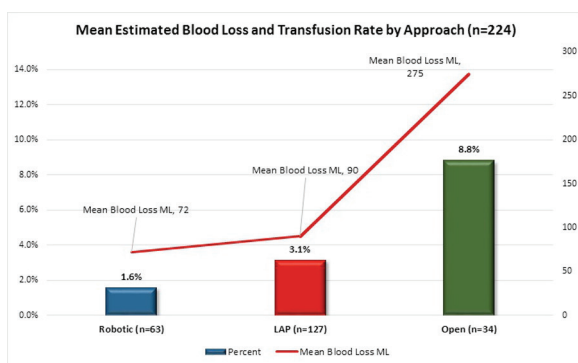
Purpose/Background: The evolution of minimally invasive surgery represents one of the most important milestones in modern day surgery over the past few decades. In the setting of robotic colorectal surgeries, majority of the studies have concentrated on rectal and deep pelvic operations and very few studies have been published comparing robotic versus laparoscopic right colectomy with controversial results. In view of this background, we designed our study to analyze patients undergoing elective right colon resection by a community colorectal surgery group by either a laparoscopic or robotic approach to determine the hemoglobin trends post-operatively.

Methods/Interventions: We conducted a retrospective chart review of 227 adults that underwent robotic or laparoscopic right colon resection by our practice. All emergent or urgent cases were excluded from the study. All elective procedures were included in the study. Our primary objective was to determine the difference in hemoglobin trends between the two groups perioperatively and in the immediate days post operation. Secondary objectives

included intra operative fluid administration, operative times, intra operative blood loss, length of stay, post-operative complications and patient quality of life after either operation.

Results/Outcome(s): The most common indication for surgery was malignancy, followed by benign neoplasms. The mean skin to skin time for robotic approach was 167 minutes compared with 116 minutes for laparoscopic with a p value of 0.005. The average length of stay for the robotic approach was the shortest compared to laparoscopic and for open cases. The blood loss for the robotic approach was 72 ml which was significantly lower than the laparoscopic approach (90ml) and open (275ml) with a p value of 0.005. The blood products administered by different approaches were also statistically significant, with 1.6% of robotic cases needing blood transfusions as compared to 3.1% of laparoscopic cases.

Conclusions/Discussion: Although EBL was less in robotic procedures than in laparoscopic cases, this number was statistically but not clinically significant. Both procedures had statistically and clinically significant lower blood loss as compared to open procedures. The conversion rate for laparoscopic to open was significantly higher than for robotic to open. Overall, the retrospective analysis shows that the robotic approach is equally safe and efficacious as compared to the laparoscopic approach if performed at expert institutions with statistically lower EBL and lower hospital length of stay. With increased operative times being the only significant disadvantage but this can be lowered with experience and further training of staff. Further studies are needed to compare overall hospital costs between the two as it is possible that enhancing surgical experience and technology but improve overall outcomes in these patients.



Mean estimated blood loss and transfusion rate by approach

CLINICAL & QUALITY OF LIFE BENEFITS IN FECAL INCONTINENCE AFTER TRANSCUTANEOUS POSTERIOR TIBIAL NERVE STIMULATION: A PROSPECTIVE SINGLE-ARM STUDY FROM A MEXICAN REFERRAL CENTER.

P61

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Purpose/Background: Fecal incontinence (FI) is a multifactorial condition with profound impact not only on evacuation rhythm, but also on patient's quality of life. Transcutaneous Posterior Tibial Nerve Stimulation (TPTNS) is a safe option for the treatment of patient with FI, especially in developing countries. The aim of this study was to assess clinical & quality of life benefits in FI after TPTNS, in the Hispanic population attended at a referral center from Guadalajara, México.

Methods/Interventions: Observational, analytic, longitudinal, prospective single-arm study, from June-2016 to October-2017. Endo-anal ultrasound, anal manometry, Wexner's Score and fecal incontinence quality of life (FIQOL) scale were recorded before undergoing TPTNS. Patients underwent TPTNS twice weekly, for 16 weeks. Follow-up assessment included anal manometry performed one month after TPTNS full therapy; Wexner's score and FIQOL scale were performed 1, 3 and 6-months after TPTNS therapy. Variables were described in mean or median, according to statistical distribution (Shapiro-Wilk test), and contrasted through follow-up with corresponding hypothesis testing. Analyses were performed using R v3.4.2 (R Foundation for Statistical Computing, Vienna, Austria).

Results/Outcome(s): 25 patients were included. Mean age was 54,32 ± 13,5 yo. 21/25 (84%) were female: 20/21 (95%) with history of pregnancy and ≥1 vaginal delivery, 17/20 (85%) had vaginal tear ≥1 occasion. 14/25 (56%) patients had prior anorectal surgery that included: 5/14 (36%) hemorrhoidectomy, 4/14 (29%) fistulotomy, and 5/14 (36%) others. 3/25 (12%) patients had diabetes mellitus. 17/25 (68%) patients had partial FI (liquid/gas); of this, 3/17 (18%) complained of urinary incontinence (UI) as well. 8/25 (32%) had total FI (solid/liquid/gas). Internal and external anal sphincter defects were identified by endo-anal ultrasound (100% cases). No complication related to TPTNS was shown. After one month of full treatment, anal manometry resting and squeeze pressure increased from 26.6 to 43.0 mmHg and 40.5 to 60.7 mmHg, respectively (p<0,001). Median Wexner's score was 15 before TPTNS (severe FI), decreasing to 8 after 1-month (moderate FI) and 7 after 3 and 6-months (mild FI) (p<0,001). Quality of life (FIQOL scale) increased

significantly through the follow-up ($p < 0.001$). UI improved completely in 100% cases after 6-months follow up. Follow-up assessment outcomes sub-analysis for partial and total FI presented also significant statistical difference.

Conclusions/Discussion: Due to its significant positive clinical and quality of life benefits related to evacuation rhythm and patient's life style, TPTNS constitutes a valid treatment in the management of FI in our population. TPTNS benefits seems to be independent from each FI type, although it is necessary to confirm this with a larger sample.

Table 1. Transcutaneous Posterior tibial Nerve Stimulation (TPTNS) outcomes on study population.

	Pre-TPTNS	Post-TPTNS 1 month follow-up	Post-TPTNS 3 months follow-up	Post-TPTNS 6 months follow-up	p-value
Anal manometry pressure (mmHg), median (range min-max)					
Resting	26,6 (9,8 – 72,3)	43,0 (10,1 – 90,5)	n/a	n/a	<0,001 ^a
Squeeze	40,5 (14,6 – 120,0)	60,7 (15,0 – 141,0)	n/a	n/a	<0,001 ^a
Anal manometry pressure [mmHg] [Partial Fecal Incontinence], median (range min-max)					
Resting	23,0 (9,8 – 72,3)	43,0 (16,2 – 74,3)	n/a	n/a	<0,001 ^a
Squeeze	35,3 (14,6 – 120,0)	67,0 (17,9 – 120,2)	n/a	n/a	<0,001 ^a
Anal manometry pressure [Total Fecal Incontinence] (mmHg), median (range min-max)					
Resting	35,6 (10,1 – 64,7)	41,9 (10,1 – 90,5)	n/a	n/a	<0,001 ^a
Squeeze	43,7 (15,0 – 95,8)	57,4 (15,0 – 141,0)	n/a	n/a	<0,001 ^a
Wexner's score					
Median (range min-max)	15 (7 – 20)	8 (3 – 12)	7 (1 – 12)	7 (1 – 12)	
Mild (0 – 7), n (%)	1 (4,0)	11 (44,0)	18 (72,0)	18 (72,0)	<0,001 ^b
Moderate (8 – 12), n (%)	6 (24,0)	14 (56,0)	7 (28,0)	7 (28,0)	
Severe (13 – 20), n (%)	18 (72,0)	0	0	0	
Wexner's score [Partial Fecal Incontinence]					
Median (range min-max)	14 (7 – 18)	7 (3 – 10)	6 (1 – 9)	6 (1 – 9)	
Mild (0 – 7), n (%)	1 (5,9)	10 (58,8)	13 (76,4)	13 (76,4)	<0,001 ^b
Moderate (8 – 12), n (%)	6 (35,3)	7 (41,1)	4 (23,5)	4 (23,5)	
Severe (13 – 20), n (%)	10 (58,8)	0	0	0	
Wexner's score [Total Fecal Incontinence]					
Median (range min-max)	0	1 (12,5)	5 (62,5)	5 (62,5)	
Mild (0 – 7), n (%)	0	7 (87,5)	3 (37,5)	3 (37,5)	<0,001 ^b
Moderate (8 – 12), n (%)	0	0	0	0	
Severe (13 – 20), n (%)	8 (100,0)	0	0	0	
FIQOL scale, median (range min-max)					
Lifestyle	1,0 (1,0 – 2,0)	3,0 (2,6 – 3,0)	3,0 (2,6 – 3,0)	3,0 (2,6 – 3,0)	<0,001 ^b
Coping	1,0 (1,0 – 3,0)	3,0 (2,5 – 3,0)	3,0 (2,5 – 3,0)	3,0 (2,5 – 3,0)	<0,001 ^b
Depression	1,7 (1,0 – 2,5)	3,0 (2,6 – 3,3)	3,0 (2,6 – 3,3)	3,0 (2,6 – 3,3)	<0,001 ^b
Embarrassment	1,0 (1,0 – 3,0)	3,0 (2,7 – 3,0)	3,0 (2,7 – 3,0)	3,0 (2,7 – 3,0)	<0,001 ^b
FIQOL scale [Partial Fecal Incontinence], median (range min-max)					
Lifestyle	1,0 (1,0 – 2,0)	3,0 (2,6 – 3,0)	3,0 (2,6 – 3,0)	3,0 (2,6 – 3,0)	<0,001 ^b
Coping	1,0 (1,0 – 3,0)	3,0 (2,4 – 3,0)	3,0 (2,5 – 3,0)	3,0 (2,5 – 3,0)	<0,001 ^b
Depression	1,6 (1,0 – 2,5)	3,0 (2,6 – 3,3)	3,0 (2,6 – 3,3)	3,0 (2,6 – 3,3)	<0,001 ^b
Embarrassment	1,0 (1,0 – 3,0)	3,0 (2,8 – 3,0)	3,0 (2,8 – 3,0)	3,0 (2,8 – 3,0)	<0,001 ^b
FIQOL scale [Total Fecal Incontinence], median (range min-max)					
Lifestyle	1,0 (1,0 – 2,0)	2,7 (2,7 – 3,0)	2,7 (2,7 – 3,0)	2,7 (2,7 – 3,0)	<0,001 ^b
Coping	1,0 (1,0 – 2,0)	3,0 (2,6 – 3,0)	3,0 (2,6 – 3,0)	3,0 (2,6 – 3,0)	<0,001 ^b
Depression	1,8 (1,0 – 2,5)	2,0 (2,8 – 3,3)	2,9 (2,8 – 3,3)	2,9 (2,8 – 3,3)	<0,001 ^b
Embarrassment	1,0 (1,0 – 2,0)	3,0 (2,7 – 3,0)	3,0 (2,7 – 3,0)	3,0 (2,7 – 3,0)	<0,001 ^b

TPTNS: 32 sessions of Transcutaneous Posterior Tibial Nerve Stimulation; FIQOL: Fecal Incontinence Quality of Life; n/a: no data available; a. Wilcoxon signed-rank test; b. Friedman test.

TRANSANAL IRRIGATION FOR REFRACTORY FECAL INCONTINENCE AND/OR CONSTIPATION: A PROSPECTIVE MULTICENTER CLINICAL STUDY.

P62

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Purpose/Background: Transanal irrigation (TAI) is designed to assist the evacuation of the feces from the left colon and rectum by introducing water into the bowel through the anus. It could be the last resort of conservative therapy for patients with refractory fecal incontinence (FI) and/or constipation who want to avoid surgery such as colostomy. Although its efficacy has been reported for the management of such patients, there are only a few prospective robust studies. The aim of this study is to prospectively evaluate the efficacy and safety of TAI for the management of refractory FI and/or constipation.

Methods/Interventions: This is a prospective multicenter clinical study. Patients with FI and/or constipation who had not responded to standard conservative therapies were treated with TAI for 10 weeks. The primary endpoint was their satisfaction about current bowel management, which was evaluated with Visual Analogue Scale (VAS, 0: unsatisfied - 10: satisfied) regarding their satisfaction before and after TAI. The secondary endpoint included the proportion of patients who wished to continue TAI after the study (Success rate) and the daily time required for bowel management. The Cleveland Clinic Florida Fecal Incontinence Score (CCFIS, 0: no FI - 20: worst), Constipation Scoring System score (CSS, 0: no constipation - 30: worst), Neurogenic Bowel Dysfunction score (NBD, 0: no NBD - 47: worst) and Low Anterior Resection Syndrome score (LARS, 0: LARS - 42: worst) were used to evaluate the severity of FI, constipation, NBD and LARS, respectively.

Results/Outcome(s): TAI was performed in 32 patients (median age: 55.5 yo; Male: 19), including 14 with NBD, 8 with FI, 6 with constipation and 4 with LARS. The 25 patients (78%) completed the 10 week TAI therapy, out of whom 23 wished to continue TAI after the study (Success rate: 72%). The VAS of their satisfaction significantly improved from a median of 2.2 to 7.5 before and after TAI ($P < 0.0001$). The average time required for bowel management was significantly reduced from a median of 43 minutes/day to 26 after TAI ($P = 0.02$). CCFIS and CSS score significantly improved from a median of 10 to 7 ($P = 0.008$) and from 12 to 8 ($P = 0.0003$), respectively after TAI, whilst the improvement of NBD score from 17 to 12 after TAI did not reach statistical significance ($P = 0.17$) and the statistical analysis was not possible for LARS score due to its small number of patients. Colonic perforation occurred in 3 patients (9.4%). Out of them, 2 patients with LARS required diverting colostomy, while one with a surgical history of rectopexy for rectal prolapse was successfully treated with conservative therapy.

Conclusions/Discussion: TAI is effective in a majority of patients with refractory FI and/or constipation, although colonic perforation could occur. Some patients could avoid surgery, but sufficient education and supervision should be provided so that patients can properly and safely perform TAI.

OUR RECTAL PROLAPSE EXPERIENCE: LETTING IT ALL HANG OUT!

P63

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Purpose/Background: The best type of repair is yet to be defined.

Methods/Interventions: Retrospective chart review of our rectal prolapse (RP) experience. Our Electronic Medical Record, utilized since Aug, 2012, was searched

for all encounters with a diagnosis code of rectal prolapse (ICD-9 569.1, and ICD-10 K62.3). Available operative reports were reviewed, and information tabulated regarding patient and operative characteristics.

Results/Outcome(s): 327 patients were identified who had been seen for RP; 237 were confirmed to have had either primary or recurrent RP; 175 had undergone at least one RP repair. A total of 221 operations were performed on 175 patients, 28 of them by outside surgeons (predating a subsequent repair by our group). A variety of operations were performed with 95% falling into one of four categories: 1. Resection rectopexy, 2. Suture rectopexy, 3. Mesh rectopexy, 4. Perineal proctectomy. Resection rectopexy (RR) was performed as 74 initial repairs (11 by outside surgeons), with 20 (27%) undergoing at least 1 subsequent repair and 9 with documented recurrence (DR) but no subsequent repair (total failure 39.2%). Seven patients had a RR as a second repair, with 1 undergoing a third operation and 2 additional DR. This gives a total failure of 39.5%. Excluding procedures by outside surgeons, the **Total failure was 33.8%**. Suture rectopexy (SR) was performed as 32 initial repairs (2 by outside surgeons) with 8 (25%) undergoing a subsequent repair and an additional 5 DR, Total failure 40.6%. SR was only utilized once, by an outside surgeon, as a second repair, and that patient went on to have subsequent repairs. **Total failure = 41.2%**. Mesh rectopexy (MR) was performed as 21 initial repairs, 22 second repairs, 8 third repairs, and 1 fourth repair. Interestingly, none of our patients had received a mesh rectopexy by an outside surgeon. Of the 21 primary MR, 2 (9.5%) had a subsequent operation + 1 additional DR for a Total failure of 15%. Of the 22 secondary MR, 4 (18%) had a subsequent repair + 1 additional DR for Total failure of 22.7%. Of the 8 tertiary MR, 1 (12.5%) had a subsequent repair. That one patient had a total of three mesh repairs, accounting for 30% of the MR failures. Overall, **Total failure was 19.6%**. Perineal proctectomy (PP) was performed as 36 initial repairs (4 by outside surgeons), as 6 second repairs, and as 1 third repair. Of the 36 initial PP, 6 (16.7%) had a subsequent repair (all but 1 having a repeat PP) + 3 additional DR; Total failure of 25%. Of the 6 secondary PP, 1 (16.7%) had a third operation, which was a repeat PP. Thirty percent of the PP failures were in one patient who had three PP. **Total Failure = 23.3%**.

Conclusions/Discussion: Our results suggest that mesh is superior to non-mesh repair. Bias may be present due to shorter follow up in mesh patients. Likewise, the superior results of perineal proctectomy are likely related to selection bias. Final analysis, including evaluation of length of follow up, is still ongoing.

RECTAL FOREIGN BODIES: A REVIEW OF THE EXPERIENCE OF A BUSY PRIVATE PRACTICE.

P64

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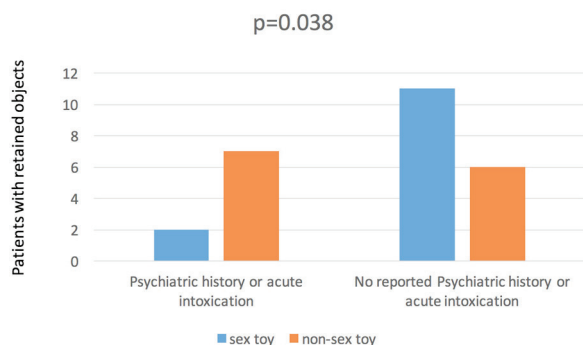
Purpose/Background: Retained rectal foreign bodies have long been a topic of discussion with the first case report in 1919. Though some practices report an increase in cases [1], in our practice we experienced a decrease in retained objects as well as a decline in significant injury. Therefore, we elected to review our experience over the past 6 years of retained rectal foreign bodies.

Methods/Interventions: We performed a retrospective review of all cases from our colorectal clinic of retained rectal foreign bodies (ICD-9-CM 937 and ICD-10-CM T18.5XXA) from 11/1/2011-10/31/2017. These cases were spread over two hospital systems encompassing a sampling of our metropolitan area. Patients' clinical data were reviewed. The statistical analyses performed utilized R, R Core Team (2017).

Results/Outcome(s): During the 6-year period, the records reviewed included 33 patients with retained rectal foreign bodies from November 1st, 2011 to October 31st, 2017. The mean age was 47 (20-88) and our M:F ratio was 2.67:1. We found that 12 patients (38%) required anesthesia for retrieval. All objects were successfully retrieved without colostomy. Only one patient required cautery for a significant mucosal injury. While the exact number of cases reported annually varied (per year: 9, 5, 8, 4, 1, 6), we identified a gradual decline in non-sex toy objects annually (per year: 4, 1, 3, 2, 1, 2). Of interest for prevention, there was a significant association with intoxication or psychiatric disorder associated with non-sex toy insertion, (15% vs 54% P=0.038).

Conclusions/Discussion: Since our practice does not receive a consult for all retained rectal foreign bodies, the data is slightly limited, but is complete for our practice. Upon review we discovered several cases of repeat patients with retrieval by the ER or by general surgeons. Based on the experience of our practice, it appears that in our metropolitan area the insertion of sex toys has reached a steady state. However overall we noted a decrease in the incidence of insertion of objects not designed for pleasure. The insertion of objects not intended for pleasure is associated with a psychiatric illness or experiencing acute substance intoxication at the time of insertion. This finding illuminates the key preventative role colorectal surgeons may take to reduce such events. When patients presenting due to retained objects exhibit signs of substance abuse or psychiatric illness, they should be referred for appropriate treatment. All patients presenting with retained objects should receive education on the risks of foreign body insertion and best practices. These include the use of objects designed to prevent retention with either a flared base that

is large enough to not pass through the sphincter or with a ring or reinforced pull cord for easy removal as well as abstinence from foreign body insertion.



COMBINED TREATMENT OF METASTATIC COLORECTAL CANCER IN AN ORTHOTOPIC MOUSE MODEL WITH 5-FLUOROURACIL AND CALCITRIOL.

P65

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Purpose/Background: To evaluate the effect of combined treatment of metastatic colorectal cancer in an orthotopic mouse model using 5-fluorouracil (5FU) and calcitriol. Colon cancer is the third most common cancer and a leading cause of cancer-related deaths in the United States. The rates of cancer recurrence in the colon, as well as in distant organ metastases, approach 50% despite optimal treatment with surgery and chemotherapy. Further investigation into new, unique strategies is needed to decrease this rate. Vitamin D has an uncertain role in tumor biology. It has been found to have anti-proliferative, anti-inflammatory, pro-differentiating, and pro-apoptotic effects, and has been demonstrated to synergize with a well-known chemotherapy drug, 5FU in the treatment of colon cancer. Previous *in vivo* studies have demonstrated increased expression of the vitamin D receptor when the cancer cells are injected directly into the mouse rectum as compared to subcutaneous injections, suggesting the importance of the tumor microenvironment. In addition to numerous cell types and cell products, the tumor microenvironment is also contributed to by lymph node stroma. Our lab has previously developed lymph node stromal “HK” cells, which simulate the lymph node stromal component of the tumor microenvironment. Previous studies in our lab have shown our HK cells to promote colorectal cancer growth and development of distant organ metastases, allowing us to develop a metastatic model.

Methods/Interventions: Luciferase-labeled colon cancer cells, including commercially available lines; HT29, SW480, and Hct116, were employed. These cell lines were cultured in standard fashion and intra-rectally

co-injected along with HK cells into the rectal submucosa of male NOD/SCID mice. Tumor growth and metastasis were measured weekly by bioluminescent imaging (BLI) of Living Image software for a total of four weeks, after which the mice were treated with calcitriol, 5FU/leucovorin, or combined treatment, for an additional four weeks. The mice were then sacrificed and their organs harvested and analyzed.

Results/Outcome(s): No significant decrease in total body BLI, tumor or organ BLI, or tumor weight was noted in the combined treatment group for any of the three cell lines.

Conclusions/Discussion: Combined treatment of metastatic colorectal cancer using 5FU and calcitriol is not observed to significantly decrease the growth of primary colorectal tumors or liver or lung metastases in our orthotopic mouse model.

CYTOKINE ANALYSIS MAY PREDICT SUCCESSFUL HEALING OF ANAL FISTULAS.

P66

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Purpose/Background: The aim of the current study was to see whether cytokine analysis of anal fistula (AF) tissue samples could be predictive of non-healing.

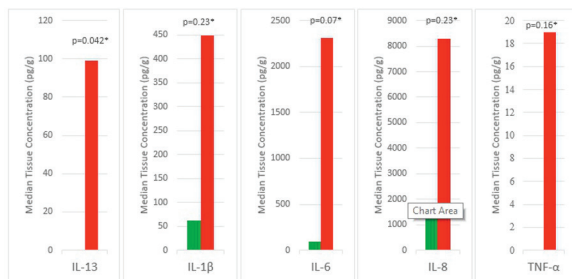
Methods/Interventions: A prospective pilot study was performed at a single institution beginning in October 2015 enrolling patients who were undergoing surgery to treat their AFs. All patients were required to have a draining seton in place prior to enrollment. Patients with inflammatory bowel disease or who underwent fistulotomy were excluded. At the time of each fistula operation, tissue was collected for this research by coring out the external opening and performing a curettage (CT) of the fistula tract. Prior to analysis, the skin (SK) was separated from the distal fistula (DF) tissue. The DF, CT, and SK samples were then homogenized and processed. Electrochemiluminescence was used to quantify cytokine concentrations of each sample. Cytokines analyzed included IFN- γ , IL-10, IL-12p70, IL-13, IL-1 β , IL-2, IL-4, IL-6, IL-8, and TNF- α . Cytokines concentrations were compared between the sample types and between healers and non-healers. Patients who developed fistula recurrence after sphincter-sparing repair (SSR) or who developed recurrent infection despite draining seton placement were considered non-healers.

Results/Outcome(s): Nineteen patients underwent 22 operations (13 SSRs, 9 replacement of setons) to treat their fistulas and were enrolled in the study to date. They were followed for a median time of five (range, 1-17) months. Postoperatively, 11 operations (50%) resulted in healing, 9 (41%) resulted in non-healing, and 2 (9%) were

lost to follow-up. There were significantly higher concentrations of proinflammatory cytokines IFN- γ , IL-13, IL-1 β , IL-6, IL-8, and TNF- α in the CT samples compared to the DF and SK samples. Comparing DF to SK, there was a significantly higher concentration of IL-6 in the DF tissue (461 vs 285 pg/g, respectively; $p=0.008$) with a trend toward higher concentrations of IL-1 β (141 vs 85 pg/g, respectively; $p=0.2$) and IL-8 (10,605 vs 3,734 pg/g, respectively; $p=0.14$). Comparing the cytokine concentrations of the DF tissue between healers and non-healers, there was a trend toward increasing expression of IL-13 (16 vs 96 pg/g, respectively; $p=0.11$) and IL-6 (316 vs 1325 pg/g, respectively; $p=0.13$) in the non-healers. In those patients who underwent SSR, there was increased expression of IL-13, IL-1 β , IL-6, IL-8, and TNF- α in the non-healers (Figure). IL-10, IL-12p70, IL-2, and IL-4 were not highly expressed in any of the samples.

Conclusions/Discussion: Select cytokine analysis of AF tissue demonstrated differences in proinflammatory cytokine expression between tissue within the fistula tract and between healers and non-healers. This pilot study supports the hypothesis that proinflammatory cytokines likely play a role in the pathogenesis behind non-healing AFs. This knowledge may help predict response to surgery and may lead to the development of novel therapeutic options in the future.

Figure: Cytokine concentrations within the distal fistula tissue of healers (green) versus non-healers (red) at time of sphincter-sparing repair.



No difference in IFN- γ , IL-10, IL-12p70, IL-2, IL-4
*Mann-Whitney U Test

CANCER VACCINE TARGETING MYB IN EPITHELIAL CANCERS: PRE-CLINICAL MODEL TO CLINICAL TRIAL.

P67

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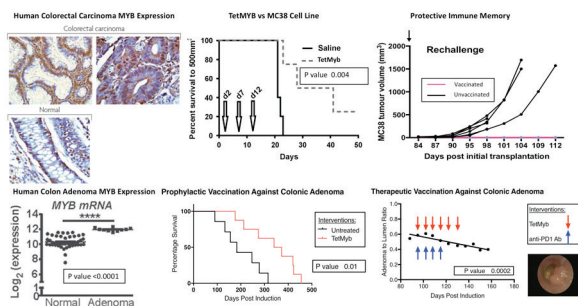
Purpose/Background: MYB, a transcription factor, is overexpressed (o/e) in >80% of colorectal cancer. MYB o/e correlates with lower T-cell infiltrate and poorer prognosis. Patients with MYB o/e are therefore the ideal target for cancer vaccines that increase recruitment of tumour infiltrating lymphocytes. The Peter MacCallum Cancer Centre (Melbourne, Australia) has engineered a DNA vaccine against MYB; TetMYB. Published pre-clinical data has

shown remarkable efficacy against MC38 mouse colorectal cancer; a C57BL/6 model. This vaccine induces tumour regression and protective immune memory against further tumour rechallenge. These promising data have led to a first-in-human phase I/II clinical trial; MYPHISMO Trial (NCT03287427). We also conducted studies of *prophylactic* and *therapeutic* applications against colonic adenoma.

Methods/Interventions: *MYPHISMO Trial* This single-arm, multi-centre clinical trial in patients with Stage IV colorectal cancer, evaluates the safety profile of TetMYB as a monotherapy and in combination with a PD-1 inhibitor (phase I), and assess the efficacy of the combination therapy in a larger cohort (phase II). The target sample size is 32 patients: 12 in phase Ia and 20 in phase II. The expected trial duration is 3 years with 15 months recruitment and 18 months follow-up. *TetMYB in Pre-Clinical Colonic Adenoma Model* Colonic adenoma was induced in APC^{580S/+}Villin-Cre-ERT2 model with tamoxifen enriched feed for 24 hours. Prophylactic Study: 15 mice Treatment arm (8 mice): 3 vaccinations using TetMyb at weeks 7, 9 and 11 followed by tamoxifen induction at week 13. Control arm (7 mice): tamoxifen induction at week 13. Mice were culled upon reaching ethical endpoints. Therapeutic Pilot Study: 7 mice Tamoxifen induction at week 9 followed by weekly colonoscopy. Upon detecting adenoma, weekly vaccinations with TetMYB (6 doses) & anti-PD1 antibody (4 doses). Adenoma progression quantitatively assessed with adenoma area to lumen ratio. Endpoint is bowel obstruction confirmed on colonoscopy.

Results/Outcome(s): *TetMYB in Pre-Clinical Colonic Adenoma Model* Prophylactic study: median survival of TetMyb cohort was 356 days vs 183 days of the control group ($p = 0.0118$). Hazard ratio of control vs TetMyb was 3.087 (95% CI: 0.9114-10.46). Therapeutic pilot study: all mice alive at 235 days. Adenoma detected in 5/7 mice. Median time to adenoma detection was 155 days. All mice with adenoma completed all treatment. One mouse developed a large colonic adenoma whose regression after intervention, over a period of 62 days, was statistically significant ($p = 0.0002$).

Conclusions/Discussion: Our pre-clinical data suggests TetMYB vaccine is protective against colorectal carcinoma. The MYPHISMO clinical trial will provide safety and early efficacy data to allow progression to a phase III trial. Our pre-clinical data suggests TetMYB also has anti-adenoma activity. This result will be validated in a larger scale experiment before progression to clinical trial.



Pre-clinical Data of TetMYB versus Colorectal Carcinoma (top row) and Adenoma (bottom row).

ALTERED MIRNA PROFILES IN STOOL OF PATIENTS WITH COLORECTAL CANCER OR ORE CANCEROUS LESIONS DETECTED BY NEXT-GENERATION SEQUENCING.

P68

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Purpose/Background: microRNAs (miRNAs) are small noncoding RNAs (sncRNAs) that act as key gene regulators in most biological and pathological processes, including colorectal cancer (CRC). The possibility of using circulating or fecal miRNA expression as non-invasive biomarkers opens interesting possibilities for their potential clinical utility, grouping individuals on the basis of their molecular profiles and characterizing specific cancer subtypes. Interestingly, recent findings also point to a link between microbiome composition and miRNA regulation. We aim at studying miRNA expression profiles in stool samples by Next-Generation Sequencing for the first time from healthy subjects and patients with CRC or precancerous lesions (adenomas) and inflammatory diseases.

Methods/Interventions: Samples have been collected from more than 350 subjects recruited at colonoscopy. Total RNA has been isolated from stool by a specific kit. miRNA expression profiles have been characterized by small RNA-sequencing. An optimized workflow for quantification of miRNAs and other sncRNAs by deep sequencing and an analysis pipeline have been developed for pre-processing the raw sequences, aligning the data to a known reference sequence and finally, analyzing the compiled sequence. Together with clinical records, detailed information on diet, lifestyle habits and drug assumption have been collected. Furthermore, for a subset of subjects gut microbiome composition has also been investigated.

Results/Outcome(s): Small RNA-sequencing in stool samples provides reliable and comparable results to other specimens. Preliminary results from 194 subjects shows that, adjusting for sex and age and controlling for multiple comparisons, several miRNAs are dysregulated in stool of patients with CRC (n=43, grade I-III), adenomas (n=31)

or inflammatory bowel diseases (n=35) in comparison with healthy subjects (adj.p-value <0.05). Many altered miRNAs are shared among disease categories (such as miR-21, miR-92a known from literature to be altered in CRC tissue), showing trends of over- or under-expression also for disease severity. After stratification for tumor localization, 11 unique miRNAs have been identified as deregulated only in colon cancer patients while 9 in rectal ones. The pipeline for the analyses of sequencing data has shown that several other sncRNAs of similar size as miRNAs (such as piRNAs and tRNAs) can be detected in stool. Analyses for their distribution across disease categories are currently ongoing, as well as the relationship between miRNAs and dietary/lifestyle factors and microbiome composition.

Conclusions/Discussion: High-throughput techniques and complex computational analyses may globally define in surrogate specimens miRNA signatures altered in CRC, its subtypes as well as in precancerous lesions.

EXTERNAL ILIAC VEIN AND ITS TRIBUTARIES VARIATIONS, EASY OR COMPLEX?

P69

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 Bangkok, Thailand

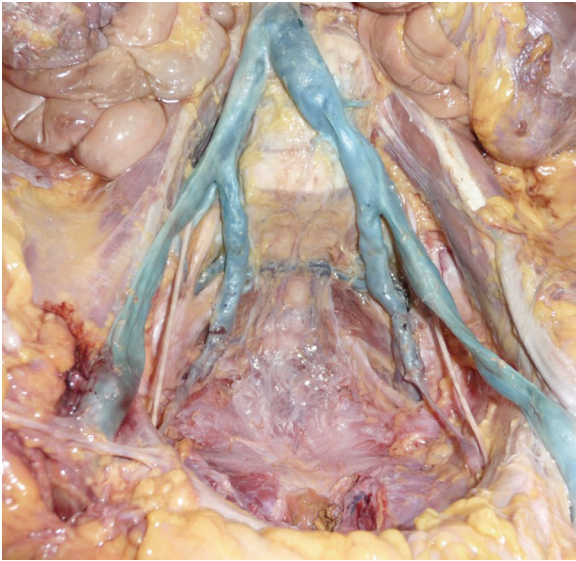
Purpose/Background: Pelvic surgery is a sophisticated and challenging procedure. The complexity of vascular structures can mislead surgeons, causing serious and difficult situations, especially intraoperative bleeding. Therefore, ability to demonstrate the anatomical variations of the external iliac vein and its tributaries could prevent the devastating complications.

Methods/Interventions: We study on 20 soft cadavers (10 males, 10 females), mean age 74.14 years old, in the Division of Anatomy, Department of Surgery, Chulalongkorn university, Bangkok, Thailand, (December 2015 - October 2016). Our soft cadavers were prepared by special formulation and before the dissection a blue resin dye was infused from IVC to fill the EIA and its tributaries. Then EIV and its tributaries were meticulously dissected and identified.

Results/Outcome(s): The tributaries of external iliac vein were identified in all cadavers (n=20) we dissected (100%). Our results can categorize into 3 patterns of its tributaries. Pattern I. the iliac vein normally one internal iliac vein joins one external iliac vein on each side to become the common iliac vein which we found in 9/20 cadaveric dissection. The pattern II. were 2 trunks of right internal iliac vein in 3 cases, 2 trunks of left internal iliac vein in 2 cases, 2 trunks of left and right internal iliac vein in 2 cases, and Pattern III. one case of which right and left internal iliac vein form the common trunk before joining the bifurcation of common iliac vein. Furthermore, we also

identify the lateral tributaries of the CIV and EIV in every cases and venous valves of EIV in 12 cases.

Conclusions/Discussion: To know the pelvic vein variation is paramount importance for the sophisticate pelvic surgery. As we proposed the category of pelvic vein into 3 patterns, we expect it will facilitate the surgeon in practically used.



MICRORNA-940 AND MICRORNA-351 REPRESS CELL PROLIFERATION OF COLORECTAL CANCER CELL LINES BY TARGETING MYD88.

P70

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Purpose/Background: Colorectal cancer (CRC) is the third most prevalent malignancy worldwide. CRC incidence rates are rapidly rising in Asian countries. MicroRNAs (miRNAs) are short non-coding RNAs which have emerged as key players in carcinogenesis. The aim of our study is to explore the key miRNAs in CRC development.

Methods/Interventions: The CRC cell lines of human and mouse were used for transfection with mimics and inhibitors of miR-940 and miR-351. The quantitative real-time PCR (qRT-PCR) and western blot (WB) analysis were employed to detect the expressions of miRNAs and target gene in clinical tissues and cell lines of CRC. Human and mouse CRC cells with upregulation or downregulation of miRNAs were subject to cell proliferation assay by MTT and apoptosis assay by FACS. The luciferase reporter assay was conducted to validate the association between two miRNAs and their target gene, MyD88.

Results/Outcome(s): Initial screening by over-expressing miRNAs in CRC cell lines led to identify several potential miRNAs on CRC proliferation. Among them, miR-940 showed the strongest inhibition of cell

proliferation in human CRC cell lines, while miR-351 showed the strongest inhibition in mouse CRC cell lines. Next, the miR-940 and miR-351 expression levels were knocked down in the corresponding CRC cell lines. Down-regulation of miR-940 and miR-351 increased cellular proliferation and decreased cell apoptosis. Furthermore, our data revealed that expression of miR-940 was significantly lower in human CRC clinic tissues and cell lines comparing to the matched normal tissues or cell lines, and expression of miR-351 was also lower in mouse CRC cell lines. Mechanically, the targeted genes were predicted by bioinformatic analysis, and dual luciferase reporter assays confirmed that miR-940 and miR-351 exerted their effects by targeting the 3'UTR of MyD88.

Conclusions/Discussion: MiR-940 and miR-351 have an important role on regulating cell proliferation and apoptosis in CRC by downregulation of MyD88. MiR-940 and miR-351 might serve as a potential diagnostic or therapeutic marker for CRC.

TOWARDS A BIOSENSOR FOR COLORECTAL ANASTOMOTIC LEAK: DETERMINING THE STABILITY OF PERITONEAL FLUID BIOMARKERS.

P71

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Purpose/Background: Anastomotic leak (AL) following colorectal surgery leads significant morbidity and mortality, its detection remains a challenge leading to delayed diagnosis. It is now possible to manufacture low-cost biosensors capable of measuring samples as small as several microlitres. Development of a tiny implantable or degradable biosensor to monitor the post-operative anastomotic environment is an achievable aim. Lactate and pH emerged from a literature review of biomarkers from the perianastomotic environment as the most promising biomarkers of AL. The study aimed to determine their stability in peritoneal fluid to inform the design of a future biosensor for AL.

Methods/Interventions: Patients undergoing elective drainage of ascites with an ascitic drain were used as a surrogate group to obtain fresh samples of peritoneal fluid. 20mls of fluid was taken when the drain was inserted. Lactate and pH were measured at 5 minutes, 1 hour, 2 hours and 24 hours. A sign test was used to look for statistically significant changes over time, $P < 0.05$ was considered significant. A change in lactate $> 0.2\text{mmol/l}$ and in pH of > 0.10 was considered clinically significant.

Results/Outcome(s): 20 patients were eligible for the study and had samples obtained. The majority were male (90%) and had an underlying diagnosis of alcoholic liver disease (85%). Lactate and pH both rose over time. The median changes in lactate were 0.1mmol/l , 0.2mmol/l and 0.3mmol/l at 1, 2 and 24 hours respectively. The change

at 1 and 2 hours was statistically significant ($P < 0.05$) but not clinically significant. For pH, the median changes were 0.09, 0.15 and 0.38 at 1, 2 and 24 hours respectively. These changes were all statistically significant ($P < 0.05$) but only clinically significant beyond 1 hour.

Conclusions/Discussion: Overall, clinically significant changes occur in the lactate and pH levels in peritoneal fluid from 2 hours and 1 hour onwards respectively. These findings will help to inform the design and development of a biosensor for colorectal AL.

COMPARISON OF MUTATIONAL PATTERNS AND SURVIVAL IN COLORECTAL CANCER WITH AND WITHOUT LYMPHOVASCULAR INVASION.

P72

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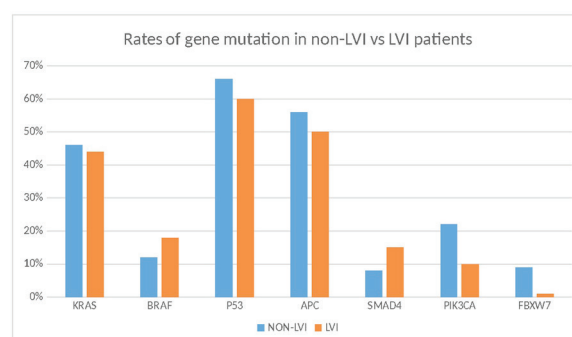
Purpose/Background: Lymphovascular invasion (LVI) is a well-known indicator of poor prognosis in patients with colorectal cancer (CRC). However, the nature of the causal relationship between LVI status and worsened prognosis is not completely elucidated. This study aims to compare the patterns in mutation status, as well as survival, in CRC with and without LVI.

Methods/Interventions: Patients who underwent molecular profiling (MP) and tested positive for at least one mutation, while they were being treated for CRC at Fox Chase Cancer Center were retrospectively reviewed. MP was tested with an in-house next-generation sequencing targeted cancer panel, Foundation One or Caris. Samples for MP were obtained from primary tumors or metastasis. Other clinical and pathological data considered relevant were also collected. Comparisons were performed using t-test, chi-squared, or Kaplan-Meier tests as appropriate.

Results/Outcome(s): A total of 186 patients were included for review. Of these, 57% ($n=106$) were male. Mean age for the entire cohort was 59 years (range 30-89). The primary tumor was located in the colon in 69% ($n=129$) patients, and in the rectum in 31% ($n=57$). Tumors with LVI accounted for 38% ($n=71$), while 62% ($n=115$) had no LVI. Mean age for LVI and non-LVI groups was 58 (30-84) vs 60 (34-89) years ($p=0.2$), respectively. Mutation in p53 was present in 60% ($n=37$) vs 66% ($n=58$) ($p=0.5$), APC in 50% ($n=31$) vs 56% ($n=50$) ($p=0.5$), KRAS in 44% ($n=27$) vs 46% ($n=43$) ($p=0.4$), BRAF in 18% ($n=12$) vs 12% ($n=12$) ($p=0.2$), PIK3CA 10% ($n=6$) vs 22% ($n=19$) ($p=0.068$), and FBXW7 in 2% ($n=1$) vs 12% ($n=9$) ($p=0.029$). Microsatellite instability (MSI) was present in 15% ($n=11$) vs 24% ($n=27$) of LVI and non-LVI patients, respectively. Mean number of mutations per patient was 2.5 for both groups (range 1-9) ($p=0.6$). Advanced tumors (stages III-IV) were more

prevalent in LVI vs non-LVI (93 vs 54%; $n= 66$ vs 62, $p=<0.001$). Mean overall survival was 52 vs 78 months ($p=0.03$) for LVI and non-LVI, respectively. Mean disease free survival (DFS) was 28 vs 32 months ($p=0.25$).

Conclusions/Discussion: Mutations in FBXW7 were more frequently found in patients without LVI, along with a trend for increased incidence of PIK3CA, p53, APC, and KRAS. Mutational burden is also similar between the two cohorts. Overall survival was significantly lower in the LVI cohort; likely due to the increased proportion of late stage tumors. Larger studies are needed to confirm these findings.



COLLAGEN GENE COL11A1 IS OVER-EXPRESSED IN EARLY-ONSET RECTAL CANCER AND CO-EXPRESSED WITH EMT MARKERS.

P73

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Purpose/Background: The overall decline in incidence of rectal cancer (RC) in the US has mostly been attributed to improvement in treatment modalities and introduction of age-based screening. Recent studies, however, have shown a rise in the incidence of RC in patients younger than 50 years. The etiology of this early-onset (EO) RC is still not well understood. Increased expression of Collagen, Type XI, Alpha-1 (COL11A1), normally expressed in cartilage, has been shown to confer resistance to neoadjuvant therapy in breast cancer, poor survival in kidney cancer, and other adverse clinical outcomes. Resistance to neoadjuvant therapy has also been linked to epithelial-mesenchymal transition (EMT), a developmental process characterized by cell separation and invasion that is recapitulated in metastasis. The aim of this study is to elucidate the molecular features of EORC and show its uniqueness compared to late-onset (LO) disease, and demonstrate correlation of EORC gene expression and EMT genes.

Methods/Interventions: Tumors and matching non-involved tissues from six (EO) RC patients (< 50 years) and six (LO) RC patients (>65 years) were obtained from Pathology archives. Deparaffinized tissues were

macro-dissected from FFPE sections, RNA isolated and used for expression profiling of 770 cancer related genes representing 13 canonical pathways. A gene was considered to be above background if the average count for the target gene was greater than the average counts for the eight negative control genes and if the P value of the t-test was less than 0.05. We compared expression patterns between COL11A1 and EMT markers for 104 RC patients from the TCGA READ database using the UCSC Cancer Browser.

Results/Outcome(s): When we compared rectal tumors to non-involved rectal tissues, changes in expression levels of 171 genes were statistically significant in early-onset group and 151 genes in late-onset group. Further comparative gene expression analysis between early- and late-onset rectal tumors normalized to their non-involved tissues revealed that changes in expression of 65 genes were unique to early-onset rectal tumors with 16 genes being up- and 49 genes down-regulated using the cutoff criteria of expression levels difference >2 fold and p-value <0.01. COL11A1 was one gene uniquely overexpressed in EORC. Analysis of data from the cBioPortal showed coexpression of COL11A1 with EMT markers SNAI1, SNAI2, ZEB1, ZEB2, TWIST1, POSTN, and MMP9.

Conclusions/Discussion: Results of this study suggest that sporadic early-onset rectal cancer is characterized by distinct molecular events compared to late-onset disease. In addition, COL11A1 is overexpressed in EORC and associated with EMT markers and with poor overall survival. COL11A1 may potentially serve as a novel biomarker associated with EORC as its protein can be easily detected using immunohistochemistry.

SFRP4 GENE IS CO-EXPRESSED WITH EMT GENES IN EARLY ONSET CANCER PATIENTS AND ASSOCIATED WITH POOR SURVIVAL.

P74

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Purpose/Background: 1.2 million new cases of colon cancer (CC) and 0.6 million deaths are reported every year, establishing colon cancer as an important contributor to worldwide cancer morbidity and mortality. Although the overall incidence and mortality of colon cancer have declined over the past three decades, the number of early-onset colon cancer (EOCC: < 50 years) continues to rise alarmingly. The majority (70-80%) of cases are sporadic, and patients present with features that are more aggressive. In addition, patients are often diagnosed at a more advanced stage and tend to have poor survival. Our recently published data showed that sporadic EOCC expressed unique genes when compared to late-onset colon cancer. One of the candidate genes overexpressed

in EOCC patients is Secreted Frizzled Related Protein 4 (SFRP4), which are soluble modulators of Wnt signaling, and implicated in cell proliferation and differentiation and plays an important role in carcinogenesis. Given that epithelial-mesenchymal transition (EMT) is associated with two important cancer mechanisms, metastasis and cell invasion, we assessed the correlation between SFRP4 gene expression and EMT gene expression in EOCC, and SFRP4's relationship to patient survival.

Methods/Interventions: Using the UCSC Cancer Browser, SFRP4 expression pattern was compared to that of EMT markers in 329 CC patients extracted from the TCGA COAD database. Samples were sorted on an epithelial-mesenchymal spectrum with red attributed to mesenchymal and blue to epithelial cells. We then performed a survival analysis using the Xena Functional Genomics Explorer using 329 CC patients also extracted from the TCGA COAD database.

Results/Outcome(s): Our expression analysis revealed co-expression of SFRP4 with the EMT markers SNAI1, SNAI2, ZEB1, ZEB2, TWIST1, POSTN, and MMP9. Samples that were more mesenchymal had higher expression levels of SFRP4 and the EMT markers, thus suggesting a role for SFRP4 in EMT. Patients with the greatest SFRP4 expression (≥ 9.785 and 6.806 to 9.785) presented with poorer overall survival compared to patients with less SFRP4 expression (< 6.806) at p-value of 0.029. The survival curve for the groups with the greatest levels of SFRP4 were quite similar, suggesting that there is a threshold for SFRP4 expression that will result in poorer survival.

Conclusions/Discussion: These findings reveal SFRP4 as a potential biomarker for EOCC, with a likely role in EMT during tumor metastasis and invasion, and a contributing factor to patient survival. Further studies designed to determine how SFRP4 interacts with the EMT genes will elucidate SFRP4's mechanism of action and provide further insight into its role in EOCC.

DELAYED PRESENTATION OF PYOGENIC LIVER ABSCESSSES AFTER HEMORRHOIDECTOMY.

P75

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Purpose/Background: Pyogenic liver abscess (PLA) is a rare complication of hemorrhoid surgery, typically attributed to mucosal necrosis, bacterial translocation into the portal venous system and seeding of the liver. It is associated with significant morbidity from sepsis and hepatic failure. A 44 year-old Caucasian male presented with history of hemorrhoid banding and stapled hemorrhoidectomy. Due to refractory symptoms, he underwent three-column Ferguson hemorrhoidectomy without complication. Postoperatively, he completed a 10-day course of

metronidazole. Three weeks post-op, he developed rigors, generalized body aches, nausea, anorexia, and right upper quadrant abdominal pain, but did not seek medical attention. Six weeks post-op, he presented with a leukocytosis of 23,000 but was afebrile. Liver function tests were all within normal range, blood cultures remained negative, and he had no abdominal tenderness. His hemorrhoidectomy incisions were healed without evidence of necrosis or cellulitis. Contrast-enhanced abdominopelvic CT revealed approximately 30 sub-centimeter lesions concerning for abscesses. All were in the right hepatic lobe, and the largest lesion was 2.7cm in diameter.

Methods/Interventions: The patient was admitted to a medical floor and started on IV ampicillin/sulbactam. A transthoracic echocardiogram was negative for signs of endocarditis. He remained without evidence of immunosuppression. Recent colonoscopy had ruled out malignancy. The patient remained hemodynamically stable, and his symptoms resolved. He was discharged home on hospital day 3, with 3 weeks of IV ampicillin/sulbactam followed by 3 weeks of oral amoxicillin-clavulanate.

Results/Outcome(s): A repeat CT abdomen 1 week after discharge showed larger, but fewer, hepatic abscesses. He was seen in the office 2 weeks after discharge with intermittent right upper quadrant pain; fevers and rigors had resolved. Two months after discharge, repeat CT abdomen was performed showing further regression of the abscesses and all symptoms resolved.

Conclusions/Discussion: Infectious complications after hemorrhoidectomy are rare. This is a rare presentation of PLA after hemorrhoidectomy in a non-immunocompromised patient. In the few previously reported cases, patients presented in the early postoperative period with bacteremia and often hemodynamic instability. To our knowledge, this is the first case described with a delayed, transient bacteremia and without significant associated morbidity. In addition, the patient developed PLA despite post-operative antibiotics, suggesting further investigation into perioperative antibiotics is warranted.

EFFECTIVENESS AND SAFETY OF PERIANAL BLOCK WITH TOTAL INTRAVENOUS ANESTHESIA (TIVA) IN COMMON ANAL SURGERIES: A COMPARISON BETWEEN OUTPATIENTS AND INPATIENTS.

P76

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Purpose/Background: To assess the effectiveness and safety of perianal block with total intravenous anesthesia (TIVA) in common anal surgeries and to compare the results of this technique between outpatients and inpatients.

Methods/Interventions: This prospective study included 83 elective anal surgical patients (41 outpatients and 42 inpatients) under perianal block between September 2016 and August 2017. The selection of outpatient or inpatient treatment depended on patient preference. Perianal block was done with 1:1 0.5% Marcaine and 1% Xylocaine with adrenaline with Propofol-based TIVA. Post-operative pain and complications was recorded.

Results/Outcome(s): The patients were 48 males and 35 females with mean age 43 years. The procedures were 39 fistulotomies, 33 hemorrhoidectomies, 4 ligation of intersphincteric fistula tract (LIFT), 5 lateral internal sphincterotomies, and 2 incision drainage. Patients' demographic data and details of procedures were comparable between outpatients and inpatients. None of the patients needed further rescue anesthesia during operation. Average post-operative pain score was 2.3 ± 1.3 on day 1 and 0.1 ± 0.3 on day 7. The postoperative pain score at rest was slightly difference between outpatients and inpatients at day 1 (2.6 ± 1.5 vs 1.9 ± 1.0 ; $p=0.013$) and on day7 (0.2 ± 0.4 vs 0 ; $p=0.008$). The postoperative pain score at defecation was slightly difference between outpatients and inpatients at day 1 (2.9 ± 1.5 vs 2.2 ± 1.1 ; $p=0.019$) and on day7 (0.1 ± 0.4 vs 0 ; $p=0.032$). Urinary retention was found in 2 patients (2.4%). None of the patients required re-operation or re-admission at 30-day follow-up.

Conclusions/Discussion: Perianal block with TIVA was associated with low level of postoperative pain and low incidence of urinary retention. Inpatients had a non-clinically significant lower pain score than outpatients. This study suggested that many common anal procedures can be performed safely and effectively for both inpatients and outpatients setting.

10-YEAR REVIEW OF A ROBOTIC COLORECTAL SURGERY PROGRAM AT AN ACADEMIC MEDICAL CENTER.

P77

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Purpose/Background: Since the da Vinci® surgical robot was introduced in 2000, its use has rapidly increased across surgical specialties. Our institution quickly adopted this technology for colorectal operations and has performed a variety of procedures of increasing complexity with improved outcomes. Robotic surgery offers an advantage when operating in the pelvis, but is associated with increased costs and long operative times. This study examines the 10-year experience of a robotic colorectal surgery program at a single academic institution.

Methods/Interventions: All robotic colorectal operations performed at our medical center from January

2006-December 2016 were reviewed. Data was collected from hospital databases and the robotic system.

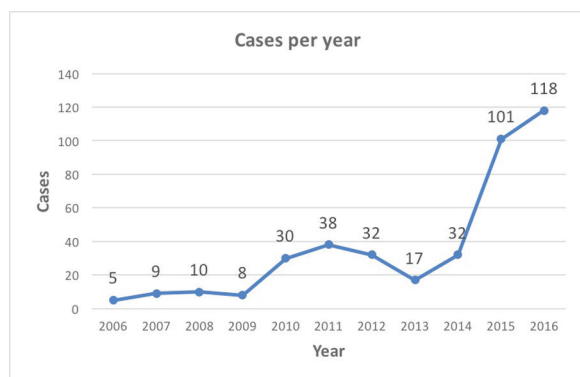
Results/Outcome(s): A total of 400 colorectal robotic operations were performed from 2006 to 2016. Use significantly increased in 2015 and 2016 (Figure 1). The number of colorectal surgeons increased from 1 in 2006 to 3 in 2013. Twelve different types of operations were performed. The most common operations were rectal resections, including low anterior resection (LAR, n=153, 38% of total) and abdominoperineal resection (APR, n=52, 13%). There were also large numbers of right hemicolectomy/ileocolic resection (n=42, 11%), sigmoid resection (n=37, 9%), proctocolectomy with ileoanal anastomosis (n=35, 9%), rectopexy (n=33, 8%), subtotal colectomy (n=32, 8%), and transanal resection (n=10, 3%). Average case time increased from 321 minutes in 2006 to a high of 377 minutes in 2010, then decreased to 224 minutes in

2016. Robotic console time accounts for 53% of case time. Conversion rate to open was 6% overall, with highest rate for total abdominal colectomy (15.6%). Highest conversion rate was 30% in 2008, and decreased to 4% in 2015 and 2016. Average operative supply cost was \$4552/case, ranging from \$1955 for rectopexy to \$5313 for proctocolectomy. Robotic supplies accounted for an average of 41% of the costs per case, and range from \$1434 (APR) to \$2067 (LAR). When compared to equivalent open operations from 2009-2015, robotic surgery length of stay (LOS) was 5.1 days compared to 8.6 days (NS, p=0.056). Cost per day for admission was higher for robotic cases, approximately \$1400 per day (p<0.001). When factoring in shorter length of stay, total cost for admission after an open case was an average of \$6800 greater than for robotic cases. There was no statistical significance in total costs when comparing admissions for robotic vs open (NS, p=0.063)

P76 Outcomes

	Total (n=83)	outpatients (n=41)	inpatients (n=42)	p-value
Pain at immediate	0.9 ± 1.4	1.3 ± 1.6	0.6 ± 0.9	0.017
Pain at rest				
day 0	2.3 ± 1.5	2.3 ± 1.8	2.3 ± 1.2	0.868
day 1	2.3 ± 1.3	2.6 ± 1.5	1.9 ± 1.0	0.013
day 2	1.6 ± 1.2	2.0 ± 1.4	1.2 ± 0.8	0.004
day 3	1.0 ± 1.0	1.2 ± 1.3	0.8 ± 0.7	0.093
day 4	0.5 ± 0.9	0.6 ± 1.1	0.4 ± 0.5	0.154
day 5	0.3 ± 0.7	0.4 ± 0.9	0.2 ± 0.4	0.078
day 6	0.1 ± 0.5	0.3 ± 0.7	0	0.014
day 7	0.1 ± 0.3	0.2 ± 0.4	0	0.018
at 1 month	0	0	0	
Pain at defecation				
day 0	2.6 ± 1.6	2.5 ± 1.8	2.6 ± 1.4	0.867
day 1	2.6 ± 1.3	2.9 ± 1.5	2.2 ± 1.1	0.019
day 2	1.7 ± 0.9	2.1 ± 1.5	1.4 ± 0.9	0.016
day 3	1.1 ± 1.1	1.3 ± 1.3	0.9 ± 0.8	0.101
day 4	0.6 ± 0.9	0.7 ± 1.2	0.5 ± 0.7	0.281
day 5	0.3 ± 0.7	0.4 ± 0.9	0.2 ± 0.4	0.107
day 6	0.2 ± 0.5	0.2 ± 0.7	0	0.023
day 7	0.1 ± 0.3	0.1 ± 0.4	0	0.032
at 1 month	0	0	0	
Satisfactory				
at surgery	4.5 ± 0.5	4.4 ± 0.6	4.6 ± 0.5	0.035
day 1	4.6 ± 0.6	4.4 ± 0.7	4.8 ± 0.5	0.015
day 7	4.8 ± 0.4	4.7 ± 0.5	4.9 ± 0.2	0.006
at 1 month	4.9 ± 0.3	4.9 ± 0.4	5	0.103
Time to first void (hr)	3.1 ± 1.3	3.1 ± 1.2	3.1 ± 1.3	0.941
Voiding problem				1.000
Dysuria	3 (3.6%)	1 (2.4%)	2 (4.7%)	
Urine catheterization	2 (2.4%)	1 (2.4%)	1 (2.4%)	
Re-operation	0	0	0	
Re-admission	0	0	0	

Conclusions/Discussion: Over the past 10 years, our institution has performed a large number and variety of robotic colorectal operations. Operations have been predominantly in the pelvis, but use throughout the abdomen has increased. Case times and conversion rate to open have decreased. Supply costs are high, leading to a high cost per day for admission. However, LOS is shorter than open operations, leading to lower overall admissions costs.



COMPUTED TOMOGRAPHY AFTER PERCUTANEOUS DRAINAGE FOR ACUTE APPENDICITIS WITH ABSCESS MAY AID IN PREDICTING RECURRENCE AND NECESSITY FOR SUBSEQUENT APPENDECTOMY.

P78

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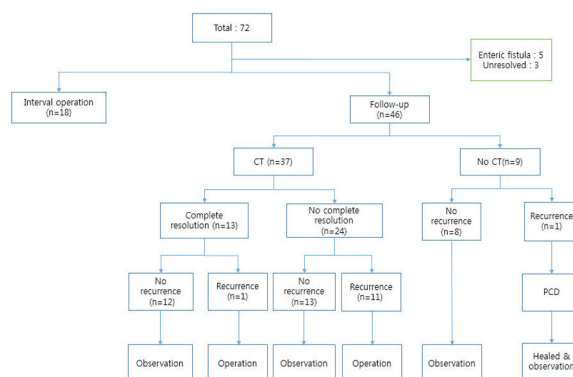
Purpose/Background: To determine whether computed tomography (CT) follow-up after percutaneous drainage (PCD) for acute appendicitis with abscess can be used to select patients in whom definite surgery is necessary.

Methods/Interventions: Seventy two consecutive patients who had underwent percutaneous drainage for acute appendicitis with abscess were prospectively enrolled. Clinical variables, including duration of PCD insertion were reviewed. After resolution or removal of PCD catheters, patients were re-evaluated with follow-up CT to determine whether additional procedures were necessary.

Results/Outcome(s): Forty three patients (59.7%) were male and the mean age was 54.3 (range 19 - 84). All patients were diagnosed with periappendiceal abscess on initial CT and were admitted after PCD insertion. The median duration of PCD insertion was 19.2 days (range: 3-68). Eight (8/72, 11.1%) of these patients need operation at the time of initial hospitalization because of enteric fistula formed by PCD in 5 and failure to drain the abscess with PCD in 3. In all other patients PCD was removed after documentation of clinical improvement (including WBC and CRP values) and when the abscess cavity was not visible after dye injection through the PCD tube.

After PCD removal, interval operation was performed in 18 patients (18/72, 25%) and remaining 46 patients (46/72, 63.9%) were allocated to regular follow-up group. Of these 46 patients, 37 (37/46, 80.4%) had follow-up CT taken at average of 53.3 ± 11.9 days after PCD removal. Thirteen of 37 (35.1%) patients had complete resolution (CR) and among them, only one patient (1/13, 7.7%) had recurrence. In contrast, of 24 patients (24/37, 64.9%) who did not show CR, the recurrence rate was 45.8% (11/24). The difference of recurrence rate between two groups was statistically significant ($p = 0.002$). In all 12 patients who had recurrence on CT scan, surgery was performed.

Conclusions/Discussion: There is still controversy as to whether interval appendectomy is necessary after PCD of periappendiceal abscess. Our results indicate that follow-up CT scans after resolution of periappendiceal abscess with PCD can be helpful to predict the recurrence and decide whether appendectomy is necessary.



CHARACTERIZING DEMOGRAPHICS AND CLINICAL ASSOCIATIONS OF PATIENTS REQUIRING ADMISSION WITH ENTERIC FISTULAS: A NATIONAL POPULATION STUDY.

P79

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Purpose/Background: There is a paucity of descriptive data on enteric fistulas. When available, they describe small series of patients, with little information about the overall incidence or prevalence. We sought to better characterize the incidence, demographics and clinical associations of patients requiring admission to the hospital diagnosed with enteric fistulas on a national level.

Methods/Interventions: We queried the 2004-2014 National Inpatient Sample (NIS) cohort for all patients admitted with a diagnosis of an enteric fistula, ICD 569.81. This code includes data on enteric fistulas, as well as enterocutaneous fistulas, and excludes patients with colovaginal, colovesical and perianal fistulas. From this cohort, we extracted basic demographics as well as associated comorbidities and common inpatient procedures performed.

Results/Outcome(s): Over 11 years, 317,292 were admitted with a diagnosis of an enteric fistula. Patients were predominantly white (75%), 12% were black and 8% were Hispanic. Median age of patients admitted was 58 years. Over half of the patients were female (55%). Most patients were admitted to a teaching hospital (60.5%). The median length of hospital stay was 8 days. Overall inpatient mortality rate was 4.1%. Associated co-diagnoses and comorbidities of the cohort included infection (57.1%), fluid/electrolyte imbalance (36.9%), anemia (34.6%), sepsis (25.0%), malnutrition (22.5%), and Crohn's disease (19.3%). Enteric fistula patients required a mean of three procedures during the admission. These included nonsurgical interventions such as venous access (central venous catheterization or peripherally inserted central catheters) in 33.5%, total parental nutrition administration in 25.1% and transfusion of a blood product in 20.9%. The most common surgical interventions noted were small bowel resection in 37.0%, colon resection in 19.1%, adhesiolysis in 18.8%, fistula takedown in 15.0% and ostomy construction/diversion in 10.7%. Only 10.6% underwent a drainage procedure by radiology.

Conclusions/Discussion: The data demonstrate that over 28,000 cases of enteric fistula are admitted annually. Patients admitted to the hospital for management have major risks for inpatient mortality and require complex care for multiple comorbidities, including infection, fluid imbalances, anemia, sepsis and malnutrition. A large number of patients will require multiple procedures while admitted, including nonsurgical interventions such as central venous access or surgical procedures such as small bowel resection. Understanding the incidence and associations for enteric fistulas may help us better treat these patients.

OUTCOMES IN CECAL VOLVULUS: DOES AGE AFFECT OUTCOMES IN PATIENTS UNDERGOING SURGERY?

P80

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Purpose/Background: Colonic volvulus is a rare cause of bowel obstruction with an incidence of 2-10%.^{1,2} Cecal volvulus accounts for 10-40% of cases.³ Cecal volvulus presents at a mean age of 53.^{3,4} There is a paucity of literature reporting how older patients with cecal volvulus fair relative to their younger counterparts. The goal of our study is to evaluate outcomes after surgical resection in patients ≥ 50 years old with cecal volvulus compared to younger patients.

Methods/Interventions: We utilized the National Surgical Quality Improvement Program (NSQIP) database. We identified volvulus by ICD-9 code 560.2. We selected for those with cecal volvulus who underwent

surgical resection by specifying the CPT codes 44160 and 44205 for open and laparoscopic right hemicolectomy. Primary outcomes were mortality, major and minor postoperative complications. The Student's *t*-test was utilized to compare continuous variables. A chi-squared and Fisher's exact tests were used to compare categorical variables.

Results/Outcome(s): Analyzing the NSQIP database from 2010-2015, 1,220 patients were identified who underwent surgical intervention for cecal volvulus. Of these, 266 (21.8%) patients were < 50 years old and 954 (78.2%) were ≥ 50 years old. Patients 50 years and older had higher rates of co-morbid conditions including diabetes (3.8% vs 9.1%; $p = 0.004$), COPD (0.8% vs 11.6%; $p < 0.00010$) and hypertension (8.3% vs 50.6%; $p < 0.0001$). The older cohort also had a lower mean albumin (4.1 vs 3.9 g/dL; $p = 0.001$). There was a higher proportion of patients with lower ASA scores in the young patient cohort. Patients younger than 50 years old had a higher rate of laparoscopic surgery (22.1% vs 10.9%; < 0.001). The rate of non-elective operations was equivalent in both groups (87.3 vs 90.4; $p = 0.157$). Operative time was longer in the younger group with mean operative time of 97.5 vs 89.1 minutes ($p = 0.004$). There was no significant difference in mortality between the two groups (1.1% vs 3.4%; $p = 0.061$). There was no significant difference in major or minor complications between the two groups. Specifically, there was no difference in superficial site infections (8.3% vs 7.8%; $p = 0.783$), deep incisional site infections (0.4% vs 0.9%; $p = 0.364$), organ space infections (3.8% vs 4.5%; $p = 0.597$), or return to the operating room (5.3% vs 7.3%; $p = 0.23$). Patients 50 years or older had a longer length of stay (9.06 days vs 7.4 days; $p = 0.005$) as well as days from operation to discharge (8.36 vs 6.9 days; $p = 0.008$).

Conclusions/Discussion: Cecal volvulus is an uncommon reason for bowel obstruction. Our study demonstrates high rate of co-morbidities in patients 50 years old or older. The younger group had a higher rate of laparoscopic surgery. There was a longer hospital stay for patients over 50, but no differences in major or minor morbidity or mortality. It is safe to take both groups for surgical intervention in cecal volvulus.

CAN WE PREDICT HIGH-GRADE INTRAEPITHELIAL ANAL NEOPLASIA IN PATIENTS CONSULTING FOR ANAL WARTS?

P81

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Purpose/Background: The increasing incidence of human papillomavirus (HPV) infection has raised the number of medical consultation of patients with anal warts. On the other hand, this infection can produce anal intraepithelial neoplasia (AIN), that is classified as: Low

grade (AIN I); and high grade (AIN II and III) which in turn is a precursor lesion of squamous anal cancer. The objective of this study is to assess the incidence and risk factors of high grade AIN in patients with anal warts due to HPV.

Methods/Interventions: A retrospective study based on a prospective collected database was performed. Patients with anal warts evaluated between April 2011 and March 2017 with histopathological confirmation of anal HPV were included. The sample was divided into two groups: G1 (patients with diagnosis of condyloma or AIN I) and G2 (patients with diagnosis of AIN II and III). Demographic, clinical and pathological variables were compared between the groups. Predictive factors for having high-grade intraepithelial anal neoplasia were evaluated using a logistic regression analysis.

Results/Outcome(s): From the analyzed period of time a total of 199 patients were treated for anal condylomatosis. 181 (90%) belonged to G1 and 18 (10%) to G2. One hundred forty-nine (74%) were men. 102 (68%) of those were men who have sex with men (MSM). The average age was 35 +/- 12 years. 37 (19%) patients were HIV + and 5 (2.5%) had pharmacological immunosuppression. 70 (35%) were smokers and 129 (65%) practiced receptive anal sex. The average age of sexual initiation was 18.5 +/- 3.5 years and the mean number of sexual partners was 21 +/- 26.9. 68 (34%) practiced polygamy in the last year.

The distribution by location was: 14 (7%) perianal; 38 (19%) endoanal; 147 (74%) peri-endoanal. According to the Silvera' index, the severity of condylomatosis was: 70 (35%) minimal; 107 (54%) moderate; 22 (11%) extensive. The pathology report informed: 177 viral condylomas; 4 AIN I; 7 AIN II; 11 AIN III. The incidence of high-grade AIN was 10%. In 40 patients, genotyping was performed: 16 (40%) HPV 6; 21 (53%) HPV 11; 3 (7%) HPV 16. Both groups were matched by age and sex. There were no differences in the average number of couples, age of sexual initiation neither HIV infection between the groups. On univariate analysis G2 was associated with a history of 2 or more couples in the last year (G1: 32% vs. G2: 55%, p: 0.04), smoking (G1: 7% vs. G2: 56%, p: 0.05) and MSM (G1: 50% vs. G2: 89%, p: 0.02). In the multivariate analysis, no risk factors of high grade AIN were identified.

Conclusions/Discussion: In our series, the incidence of high grade AIN in patients treated by HPV anal warts was 10%. Polygamy, smoking and MSM were associated with high grade AIN. In these patients, a systematic biopsy with histopathological evaluation should be considered.

P80 Intraoperative and Postoperative Outcomes

	<50 yo (n= 266)	≥50 yo (n=954)	p-value
Type of Surgery (%)			
Laparoscopic Surgery	22.2	10.9	<0.001
Non-Elective	87.3	90.4	0.157
Total time in the OR (min)	97.45	89.11	0.004
Length of total hospital stay (days)	7.4	9.1	0.005
Hospital admission to OR (days)	0.5	0.7	0.11
OR to discharge (days)	6.9	8.4	0.008
Minor Complications (%)			
Superficial Surgical Site Infection	8.3	7.8	0.78
Deep Surgical Site Infection	0.4	0.9	0.7
Organ Space Surgical Site Infection	3.8	4.5	0.6
Wound Disruption	0.8	1.7	0.39
Pneumonia	5.2	5.2	0.96
Acute Renal Failure	0.4	0.5	1
UTI	2.3	2.9	0.55
Minor Complications (%)			
Unplanned intubation	1.9	3.2	0.24
Pulmonary Embolism	0	0.3	1
Prolonged Ventilator Requirement (>48 hrs)	4.9	4.6	0.85
Progressive Renal Insufficiency	0	0.8	0.21
CVA	0	0.2	1
Mortality (%)	1.1	3.4	0.061

A META-ANALYSIS OF THE PREVALENCE OF LOW ANTERIOR RESECTION SYNDROME AND SYSTEMATIC REVIEW OF RISK FACTORS.

P82

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Purpose/Background: With increasing use of the low anterior resection (LAR) to treat rectal cancer and avoid permanent stoma, there has been an increase in recognition of impaired bowel function known as Low Anterior Resection Syndrome (LARS). Previously due to the use of various data collection tools, determining the true prevalence of the syndrome by meta-analysis has been impossible. The creation of the Low anterior resection syndrome score has allowed for collection of comparable data in order to allow for such a meta-analysis. The aim of this review is to summarize the various reported prevalence of LARS using the LARS score, after 1 year follow up when colonic adaptation would have occurred. Factors implicated in the causation of the syndrome were also reviewed.

Methods/Interventions: A systematic literature search was conducted using Pubmed, Ovid Medline and the Cochrane database. Searches were performed using a combination of appropriate MeSH (medical subject headings) terms and key terms, for studies using the LARS score. Meta-analysis performed where studies reported prevalence at least 1 year after surgery. Reported factors implicated in the causation of the low anterior resection syndrome were identified and summarised.

Results/Outcome(s): Eleven eligible studies were identified from the literature which met inclusion criteria. The estimated prevalence of major LARS was 41% (95% CI 34 -48). Where possible outlier studies were excluded, the prevalence was 42% (95%CI 35-48). The [A1] patient population who had undergone LAR was necessarily heterogenous due to tumour, patient and treatment characteristics. Radiotherapy and tumour height were the most consistently assessed variables, both showing a consistent negative effect on bowel function. Defunctioning ileostomy was found to have a statically significant negative impact on bowel function in 4 of 11 studies.

Conclusions/Discussion: There is a likely significant prevalence of mid to long term LARS following LAR for rectal cancer, despite expected bowel adaptation. Patients with a low anastomosis and or who have received radiotherapy are at higher risk of developing LARS. Increasing understanding of the potential causative factors indicates the need for further investigation into tailoring patient treatments. Although oncological outcome should be the highest priority, potential improvement in functional outcome should also be considered.

LIPOSOMAL BUPIVACAINE OFFERS BETTER OUTCOMES THAN EPIDURAL ANALGESIA WHEN USED IN AN ENHANCED RECOVERY PROTOCOL.

P83

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Purpose/Background: Multimodal analgesia is an important component of enhanced recovery pathway (ERP) protocols. This study compared postoperative outcomes between patients who received liposomal bupivacaine (LB) and patient-controlled epidural analgesia (PCEA) after laparoscopic colorectal surgery.

Methods/Interventions: This is a retrospective study of patients who underwent laparoscopic colorectal surgery between February 2016 and January 2017 at a single, tertiary care center. All patients underwent the same ERP protocol, however after September 2017, postoperative analgesia transitioned from a PCEA to local incision infiltration with LB (preperitoneal, subfascial and subcutaneous injection of a mixture of 20mL of LB, 50mL of 0.25% marcaine, and 10mL of normal saline). Adjunctive multimodal analgesia was given as part of a standard postoperative order: scheduled acetaminophen, pregabalin and oxycodone. LB patients also received 4 doses of scheduled intravenous (IV) ketorolac postoperatively following by scheduled celecoxib. IV narcotics were given as needed for breakthrough pain. Demographics, comorbidities, IV narcotic use, operative time, time to return of bowel function (ROBF), hospital-associated costs, and length of stay (LOS) were compared between those who received LB versus PCEA. The highest pain level (i.e. peak pain level), measured by the visual analog scale (VAS), was recorded during five time intervals over the first 72 hours post-operatively.

Results/Outcome(s): 137 patients met inclusion criteria. 81 patients (59%) received LB and 56 (41%) received a PCEA. The LB and PCEA groups were comparable in

P83 Change in Postoperative VAS Pain Scores between Liposomal Bupivacaine and Epidural Groups

Time Interval	Change in VAS pain score in LB vs PCEA Groups	
	P	
0-12 hours	0.28	0.58
12-24 hours	-0.23	0.57
24-36 hours	-0.74	0.07
36-48 hours	-1.26	0.02
48-72 hours	-1.77	0.01

VAS: visual analogue scale

LB: liposomal bupivacaine

PCEA: patient-controlled epidural analgesia

age (64.4 vs 60.7 years, $P=0.19$), male gender (46% vs 41%, $P=0.39$) and ASA class ($P=0.24$), but differed in BMI (28.4 vs 26.2, $P=0.015$). Overall, the LB and PCEA groups used a similar amount of IV narcotics (5.1 vs 4.6 mg morphine; $P=0.72$). In the LB group, there was a significant decrease in peak pain levels between 36 and 48 hours ($\Delta -1.3$, $P=0.02$), as well as between 48 and 72 hours ($\Delta -1.8$, $P=0.01$). LOS was shorter for the LB group (2.8 vs 3.5 days; $P=0.020$), achieving an average cost saving of \$999/patient (\$6,511 vs \$7,510). There was no significant difference in operative time between the LB and PCEA groups (195 vs 210 minutes, $P=0.413$), time to ROBF (1.5 vs 1.7 days, respectively; $P=0.25$), 30-day ER visit incidence (9 vs 13 patients, $P=1.00$) or 30-day readmission incidence (10 vs 5 patients, $P=0.59$).

Conclusions/Discussion: In our series, an ERP protocol that includes liposomal bupivacaine as part of a multimodal analgesia regimen is associated with lower peak pain levels, shorter LOS, and lower hospital-associated costs when compared to a regimen that includes a patient-controlled epidural. Our findings do not support the routine use of epidurals in ERP pathways.

RECTAL FOREIGN BODIES; PATIENT CHARACTERISTICS AND CLINICAL OUTCOMES.

P84

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Purpose/Background: The incidence of a retained rectal foreign body (RRFB) has increased over the past five years. RRFB often poses a challenging management dilemma for the practicing physician. Serious complications, such as bleeding or perforation, can ensue either from direct trauma from the RRFB, or as the result of extraction maneuvers. The objective of this four-year study is to identify those factors that are associated with the need for an abdominal operation in those patients admitted with a RRFB.

Methods/Interventions: Analysis of the Nationwide Inpatient Sample (NIS) for the years 2012-2015 was performed to identify the cohort of patients. Patients with

a RRFB who underwent a major therapeutic procedure in the operating room (OR) were selected. Patients who underwent an abdominal operation were included in the operative group, and those undergoing endoscopic procedures or an exam under anesthesia in the OR were included in the non-operative group. Patient's demographics, length of hospital stay, insurance status, rural vs. urban hospital admission, type of endoscopic procedure, need for an abdominal operation, type of operation performed, history of mental illness and in-hospital mortality were analyzed. Univariate analysis was performed and variables that reached statistical significance were then included in a multinomial logistic regression model. The performance of the multivariable logistic regression analysis model was assessed by calculation of the pseudo R-squared using Nagelkerke method.

Results/Outcome(s): We identified 2,720 hospital discharges in patients with the principal diagnosis of RRFB during the four-year study period. Non-operative management was possible in 61.4% of the patients. 27.8% of the patients underwent a major therapeutic procedure in the OR and 10.8% of the patients had no documented intervention to remove the RRFB. Among the entire cohort of patients studied, 550 (20.2%) patients required an abdominal operation. The type of operations performed were colotomy (49.1%), exploratory laparotomy (30.0%), left colon resection (16.4%), and proctotomy (4.5%). A colostomy was performed as an additional procedure in 21.8% of the patients. A multivariable logistic regression analysis was performed and factors associated with the need for an abdominal operation included age less than 45 years, diagnosis of a mental illness, non-private insurance and admission to a rural hospital, Pseudo R-square value for the model was 0.70.

Conclusions/Discussion: Retained rectal foreign bodies are an infrequent but potentially challenging problem encountered by the practicing physician. Most patients can be managed by endoscopic intervention but at least a third of them will need an abdominal operation, possibly a colon resection and/or creation of a stoma. This entity requires expeditious treatment following established pathways to both avoid treatment delays and to minimize associated morbidity.

P84 Multivariable Logistic Regression Analysis of the Factors Associated with the Need for an Abdominal Operation among Patients with the Diagnosis of Retained Rectal Foreign Body.

N=2,720	Odds Ratio	95% Confidence Interval	P value
Age < 45 years	1.4	1.2-1.7	<.001
Psychiatric diagnosis	2.6	1.5-4.7	<.001
Admission to rural hospital	3.5	1.7-7.5	<.001
Caucasian race	1.2	0.9-1.4	.54
Female	1.0	0.8-1.4	.31
Non-private insurance	1.5	1.3-1.9	<.001

INNOVATIVE INTRAOPERATIVE URETERAL IMAGING IN ROBOTIC COLON AND RECTAL SURGERY.

P85

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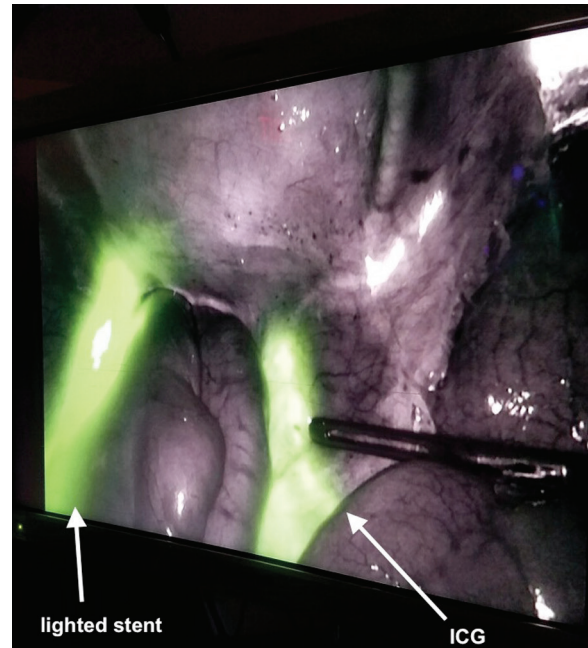
Purpose/Background: The purpose of our report is to highlight the use of intraureteral indocyanine green (ICG) and subsequent visualization using near-infrared fluorescence (NIRF) to prevent iatrogenic ureteral injuries. Robotic surgery has gained popularity over the years specifically in colorectal surgery. Ureteric Injury remains a feared complication for the Colorectal Surgeon ranging in the literature from <1 to 8 percent and leads to significant morbidity to the patient. Prevention of injury has been a primary focus and several methods have been described, such as intraoperative identification with the use cystoscopy, placement of ureteric stents, lighted ureteral stents, and the use of methylene blue have been described. The use of Indocyanine Green in colorectal surgery for ureteric identification has yet to be studied in the literature.

Methods/Interventions: This is a retrospective analysis of 14 patients who underwent elective colorectal resection for both benign and malignant disease at Florida Hospital Tampa, Florida, USA during the dates of 01/01/2017-11/09/2017. Our database included all patients undergoing placement of ureteric stents patients were excluded if they did not undergo ICG placement. Patients underwent cystoscopy then had a lighted 6F ureteral stent (Stryker) placed on one side. A 5F pollack (Cook) stent was then temporarily placed in the opposite ureter followed by injection of 5cc of ICG. Alternatively in some patients, both ureters were injected with 5cc ICG via a 5F pollack stent. The pollack stents were then removed. Cases included colectomies and low anterior resections. The da Vinci Xi Surgical System was used to complete our case in the usual fashion. Data analysis was then presented as mean.

Results/Outcome(s): Our study included 14 patients 7 male, 7 female. Our averages included age 55, BMI 29.1 operative time 331 minutes, EBL 103 ml. There were no iatrogenic injuries to the ureter or intraoperative complications on these 14 procedures, no anesthetic complications were noted. Two patients had urinary retention, one patient required a blood transfusion postoperatively.

Conclusions/Discussion: Due to its simplicity and effectiveness in early ureteral identification, we suggested that this technique may be potentially valuable during colorectal procedures for ureteral avoidance when there is a risk for unintended ureteral injury.

Of note, during our first use of this technique during routine placement of lighted stents the urologist was unable to place the right ureteric stent, in this case ICG was instilled without complication and the ureter immediately visualized. This novel technique will be beneficial to others in a similar situation. Likely this will also lead to a substantial time and cost savings and thus less burden on the healthcare system.



DOPPLER-GUIDED HEMORRHOID ARTERIAL LIGATION: TO DO OR NOT TO DO?

P86

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Purpose/Background: Doppler-Guided Hemorrhoid Arterial Ligation (DG-HAL) can be offered to patients with grade 3 and 4 hemorrhoids and as an alternative to excisional hemorrhoidectomy. DG-HAL has been reported to be safe and to have a comparatively painless recovery compared to conventional hemorrhoidectomy (CH). Aim: To analyze the outcomes of DG-HAL in terms of recurrence, complications and analyze recurrence.

Methods/Interventions: Patients were selected from an IRB approved database using CPT codes 76998 (other diagnostic ultrasound procedures), 45505 (repair procedures on the rectum) and 0249T (ligation, hemorrhoidal vascular bundles, including ultrasound guidance) and with ICD-9 455 code for hemorrhoids. A review of the electronic medical record (EMR) of patients, treated for hemorrhoids by DG-HAL, between January 2013 and December 2016 was carried out. Data included demographics, preoperative

symptoms, hemorrhoid grade, intra-operative data, 30 day complication rates and recurrences defined as the need for additional procedures or reported in the EMR. Descriptive statistics were computed for all variables of interest. They are presented as means and standard deviations.

Results/Outcome(s): 165 patients (116 female) with mean age at surgery of 54.5 years were evaluated. The mean number of ligations was 8 (minimum 5; maximum 12). The mean number of mucopexies performed was 4 (minimum 2 and maximum 7). The 30-day complication rate was 6.6% (11/165). These were: urinary retention (6, 3.6%), bleeding (2, 1.2%), thrombosis (2, 1.2%) and fissure with levator ani spasm (1, 0.6%). 121/165 (73.3%) with a documented follow up in the EMR reported improvement in symptoms. The overall recurrence rate was 9.1% (15/165) (Table). In the group of patient with no previous surgical treatment (n=154) the recurrence rate was 8.4%. In the group of patients that had previous treatment (n=11) the recurrence was 18.2%. Recurrences after DG-HAL were treated with: conventional hemorrhoidectomy (n=6), DG-HAL (n=4), Rubber Band Ligation (n=4), RBL followed by DG-HAL (n=1). Of the 26 (15.7%) patients with circumferential hemorrhoids, 4/26 (26.6%) needed additional treatments. Median time to additional treatment after DG-HAL was 5 months. The overall rate of concomitant procedures performed (excision of redundant/keratinized mucosa or skin tags) was 14.5% and none of these patients needed additional treatments.

Conclusions/Discussion: DG-HAL is a safe procedure with an acceptable recurrence rate. Patients with a previous history of hemorrhoid surgery and circumferential hemorrhoids should be cautioned about a higher recurrence rate. Circumferential hemorrhoids may need more intraoperative ligations and additional procedures in the future. Concurrent procedures do not increase the complications or recurrence rates

RESULTS OF SURGICAL MANAGEMENT OF INTESTINAL ENDOMETRIOSIS.

P87

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Purpose/Background: Bowel involvement occurs in 12-37% of cases of pelvic endometriosis. Surgical treatment of advanced intestinal endometriosis is effective in controlling symptoms of pelvic pain and obstruction and ideally should be performed using a minimally invasive approach.

Methods/Interventions: Patients were selected from an IRB approved database using ICD-9 code 617 (endometriosis). Further to this selection, cases were additionally filtered for colorectal surgeons' participation in surgical treatment. Electronic medical records were reviewed for patients treated between January 2010 and October 2017. The variables of interest are presented as means for continuous factors and frequencies for categorical factors.

Results/Outcome(s): The total of 48 cases were retrieved from the database. Mean age of 38.1 years. 25 cases were managed using laparoscopic surgery by a multidisciplinary team with colorectal surgeons' participation. Urologists participated on 2 procedures collaborating with colorectal surgeons. One patient had an emergency surgery performed by a colorectal surgeon only. One patient had pre-operative diagnosis of rectosigmoid adenocarcinoma, whose surgical pathology report revealed low-grade endometrioid adenocarcinoma, arising in the background of colonic endometriosis. One patient had a total proctocolectomy for ulcerative colitis, whose diagnosis was ulcerative colitis and endometriosis. One patient had a dysfunctional ileal pouch-rectal anastomosis resected, which displayed focal endometriosis per surgical pathology report. One patient had diagnosis of endometriosis on

P86 Results

	All patients (%)	Recurrence (%)
Female	116 (70.3)	11 (73.3)
Mean age (years/range)	54.5 (27-73)	51.7 (30-79)
Hemorrhoid grade		
II	35 (20.5)	1 (6.6)
III	126 (73.3)	12 (80)
IV	10 (5.8)	2 (18.2)
Circumferential	26 (15.7)	4 (26.6)
Previous Surgical Treatment	11 (6.6)	2 (18.2)
Stapled Hemorrhoidectomy	3	0
Conventional Hemorrhoidectomy	5	1
DG-HAL	2	1
Infra-Red Therapy	1	0
Rubber Band Ligation	42 (25.4)	7 (46.6)

debridement of pre-sacral abscess cavity, on a revision J-pouch surgery. One patient had left colon and rectum resection for Crohn's disease that harbored also endometriosis. The mean length of hospitalization was 3.8 days. The major postoperative complications included one colovaginal fistula following laparoscopic proctectomy, treated with laparoscopic loop ileostomy. One late left ureteral leak following laparoscopic excision of endometriomas, treated with stent and antibiotics. One patient has ischemic colitis following colorrhaphy after resection of endometrial implants on the sigmoid, treated with sigmoid resection and colostomy. One patient received 2 PRBC for chronic anemia. As per follow up, 40 patients reported improvements in symptoms, 7 no improvements and 1 worsening.

Conclusions/Discussion: Surgical treatment of endometriosis is effective to treat preoperative symptoms of pelvic endometriosis.

LOOP ILEOSTOMY TAKEDOWN: COMPARISON OF ANASTOMOSIS WITH AND WITHOUT SMALL BOWEL RESECTION.

P88

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Purpose/Background: The aim of this study was to compare the safety and efficacy of loop ileostomy closure with and without small bowel resection.

Methods/Interventions: The records of consecutive patients who underwent loop ileostomy closure at Hiroshima University Hospital from January 2013 to December 2016 were retrospectively reviewed. The procedure was performed by making an elliptical skin incision around the ileostomy and dissecting the bowel from its fascial attachments and intraperitoneal adhesion. The everted limbs of the stoma were turned back, and the stomal edge was trimmed off. The decision was then made to perform simple closure or bowel resection with anastomosis according to the degree of enterotomies and serosal tears. All closures or anastomoses were performed with handsewn layer-to-layer sutures. Finally, the fascia was closed and the skin was approximated via a purse-string suture. The patients' characteristics, intraoperative factors, and postoperative complications were compared between the simple closure and resection with anastomosis groups.

P87 Sites of Intestinal Endometriosis and Colorectal procedures performed

Site of interstitial endometriosis (n = 48 patients)	No. (%) of patients
Terminal ileum	3 (6.2)
Appendix / Appendix + Cecum	4 (8.3)
Sigmoid	13 (27)
Rectum/cul de sac	37 (77)
Ileal pouch	2 (4.2)
Right colon	1 (2.1)
Left colon	1 (2.1)
Colorectal procedures performed (n = 48 patients)	No. (%) of patients
Superficial/ partial thickness excision of multiple sites	27 (56.2)
Appendectomy	1 (2.1)
Resection of cecum	1 (2.1)
Full-thickness disc excision	1 (2.1)
Proctectomy/ proctosigmoidectomy	10 (21)
Sigmoid colectomy	6 (12.5)
Ileocolic segmental resection	1 (2.1)
Right colectomy	2 (4.2)
Left colectomy	1 (2.1)
Total proctocolectomy	1 (2.1)
Ileal pouch resection	1 (2.1)

Total > 100% because 13 patients had more than one site involved and 7 patients had more than one procedure

Results/Outcome(s): Eighty-two patients were included in the study. The diagnoses were ulcerative colitis (54.0%), rectal cancer (23.4%), Crohn's disease (13.5%), and others (8.6%). Fifty-five ileostomies (67.0%) were closed without bowel resection (simple closure group), and 27 were resected (resection group). Patient characteristics and preoperative factors were similar between the two groups. Regarding surgical outcomes, the median operative time and blood loss were not significantly different between the simple closure group (83 min and 32 ml, respectively) and resection group (96 min and 50 ml, respectively). Postoperative complications were observed in 19 patients. The most frequent complication was ileus, occurring in 11 patients (19.3%) in the simple closure group and 8 patients (29%) in the resection group ($p > 0.05$). The treatments for ileus were fasting or nasogastric tube placement, ileus tube placement, and reoperation (5, 1, 2, and 3 patients, respectively, in the simple closure group vs. 4, 1, 2, and 1 patient, respectively, in the resection group; $p > 0.05$). Other complications were one wound infection and one abdominal abscess in the simple closure group. No anastomotic leakage occurred in either group.

Conclusions/Discussion: No significant differences were found between simple closure of the loop ileostomy versus resection and anastomosis. However, simple closure allowed for preservation of an approximately 10-cm length of ileum compared with resection and anastomosis; it may therefore be preferred for patients with inflammatory bowel disease.

RISK FACTORS ASSOCIATED WITH FAILURE OF NON-OPERATIVE MANAGEMENT OF ACUTE DIVERTICULITIS.

p89

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Purpose/Background: With the gradual paradigm shift away from surgical management, the volume of patients undergoing medical management of diverticulitis has risen. Operative versus non-operative management is primarily based on patient parameters and CT scan findings. 10-15% of patients who undergo non-operative management are unresponsive and require urgent/emergent surgery. This study aimed to define risk factors associated with failure of non-operative management of acute diverticulitis and impact of delay in surgical management on final outcomes.

Methods/Interventions: Patients hospitalized for acute diverticulitis from 2010-2017 were assigned to one of two groups: failed or successful conservative management. See Table for data parameters. Risk factors associated with failure of non-operative management were analyzed. Failure of non-operative management was defined as need for surgical intervention prior to 6 weeks. 30-day morbidity was defined as any complications during hospitalization or within 30 days of surgery. Patients who required surgery on admission were excluded.

Results/Outcome(s): 142 patients were included in the study, of whom 43 failed non-operative management. Both groups were similar in terms of patient demographics and co-morbidities ($p=0.33$ and $p=0.99$, respectively). No statistically significant difference was noted in either vital signs or laboratory parameters on admission. All patients in both groups were Hinchey Class 1 and II ($p=NS$). Further evaluation of CT findings suggested that abscesses, fistulae, free-air, simple free fluid in abdomen or pelvis did not significantly differ between groups ($p=0.58$). However, specks of air in the paracolic area (Odds Ratio [OR], 0.27; 95% confidence interval [CI], 0.12–0.62; $P = 0.002$) and in the distant abdominal quadrants (OR 0.26; 95% CI, 0.19–0.347; $P = 0.000$) as well as larger air pockets (OR 6.00; 95% CI, 1.07–33.37; $P = 0.048$) were significantly associated with failure of non-operative management. As expected, more open surgeries were performed in the failure group with significantly higher conversion rates in patients who had laparoscopic surgery ($p=0.002$). Length of stay ($p=0.940$) and 30-day morbidity ($p=0.018$) were higher in the failure group (See Table).

Conclusions/Discussion: With the limitations of the retrospective nature of this study, patients in both groups were comparable in terms of demographics, clinical parameters and laboratory values. CT scan findings differed between the groups. The most significant findings associated with failure of conservative management were specks of air in paracolic and remote abdominal areas as well as pockets of air. Hospital stay and post-operative complications were similar between groups. CT scan findings are most helpful in predicting the likelihood of failure of conservative management in acute diverticulitis. Interestingly, neither intra-abdominal abscesses nor fistulae were associated with higher failure rates.

Parameters	Failed non-operative management	Successful non-operative management	P value
Total number	43	99	
Demographics			
Age	57.81	56.04	0.333
Number of prior attacks of diverticulitis	2.03	2.33	0.112
Duration of antibiotics	6.7	22.21	0.009
Length of stay (days)	10.21	6.48	0.044
Gender ratio M:F	0.79	1.2	0.278
CT scan findings			
Uncomplicated	16	55	0.087
Specks of air (paracolic)	17	15	0.002
Specks of air (distant)	8	0	0.000
Air cavity	5	6	0.048
Intervention			
IR drainage	6	12	0.738
Access to surgery			
Open	30	10	0.000
Laparoscopic	10	55	
Conversion to open	4	2	0.002
Operative Procedure			
Hartmann	28	4	0.000
Primary anastomosis	11	99	
Primary anastomosis with DJL	1	0	
Post-operative Morbidity			
Thirty day morbidity	20	25	0.018
Wound dehiscence	1	3	0.988
Wound infection	6	14	0.990
Anastomotic leak	1	2	0.909
Pelvic abscess	3	1	0.083
Abdominal abscess	6	3	0.023
Re-operation	1	4	0.380
Mortality	0	1	0.956

Table 1
Categorical variables were compared using the chi-square test and Fisher exact test when appropriate. Independent sample t test was used for continuous Variables. Independent significant predictors from the univariate analysis were further evaluated in SPSS ver. 25.0 (SPSS Inc., Chicago, IL, USA). Power of the study was calculated by univariate general linear model. Statistical significance was defined as $P \leq 0.05$.

PERCUTANEOUS DRAINAGE OF DIVERTICULAR ABSCESS - A SINGLE INSTITUTION EXPERIENCE.

P90

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Purpose/Background: Abscess formation complicates approximately 15-20% of acute diverticulitis episodes. Initial nonoperative management with percutaneous drainage (PD) is commonly preformed. Benefits of PD include temporizing the acute illness, avoiding an emergent operation on presentation and possibly obviating colectomy. The natural history of patients presenting with diverticular abscesses is incompletely understood, and we aim to better describe outcomes associated with PD.

Methods/Interventions: A retrospective review of patients admitted with radiographic confirmed diverticular abscess initially managed nonoperatively with antibiotics and PD was performed at our institution. Subjects were divided into two cohorts—successful temporizing percutaneous drainage (STPD) and failed temporizing percutaneous drainage (FTPD). STPD was defined as effective management of complicated diverticulitis without need for operative intervention during index admission or within 60 days post-drainage. FTPD was defined as necessitating operation or death during the same time period. Groups were compared using Fischer's exact test for categorical variables; t-test and Mann-Whitney-Wilcoxon test were used for continuous variables. A p-value ≤ 0.05 was

considered significant. This study was approved by our Institutional Review Board.

Results/Outcome(s): A total of 35 patients were identified. Mean (\pm Standard Deviation) follow-up was 25.9 (\pm 25.6) months. There were no significant differences in baseline patient characteristics with the exception that FTPD patients were more likely to be smokers (Table 1). There were no deaths within 30 days of PD. STPD occurred in 71.4% of patients (25/35), while FTPD occurred in 28.6% of patients (10/35). The STPD group had significantly higher white blood cell count on presentation when compared to FTPD subjects. In the STPD group, 52% (13/25) did not undergo elective resection over a mean 34.6-month follow-up. A greater proportion of FTPD patients received end colostomy creation as compared to STPD (40% vs. 8.0%, $p = 0.043$). Of the 12 STPD patients who did require surgery, 16.7% (2/12) underwent end colostomy creation. In the STPD cohort, 32% (8/25) of patients experienced abscess recurrence after drain removal: 4 required drain replacement and 4 were managed with antibiotics alone. Five of these recurrences underwent elective resection.

Conclusions/Discussion: Our findings demonstrate that most patients undergoing successful PD for diverticular abscess may potentially avoid surgery on index admission. STPD patients may have a lower risk of requiring an end colostomy. Further studies, with larger patient populations, are required to confirm our findings.

ACUTE DIVERTICULITIS WITH MICROPERFORATION IS A SUBSET OF UNCOMPLICATED DIVERTICULITIS.

P91

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Purpose/Background: Acute uncomplicated diverticulitis (UD) is defined as an inflammation of the colon thought to arise from the microperforation of a colonic diverticulum. While microperforation is rarely seen on routine imaging, its presence indicates microperforated diverticulitis (MD). Since literature affirming that MD is a subset of acute UD is currently limited, the aim of this study was to assess whether microperforated diverticulitis (MD) represents a subset of uncomplicated diverticulitis (UD) in terms of readmission and recurrence rates.

Methods/Interventions: After institutional review board approval, all patients with acute left-sided diverticulitis from 2007-2017 at a tertiary care center were identified. A blinded expert gastrointestinal radiologist reviewed all CT scans to determine CT characteristics of the diverticulitis episode. Chart review was conducted to collect patient demographics, disease characteristics and

P90 Table 1: Patient Characteristics

		Total patients N(%)	STPD N (%)	FTPD N(%)	p-value
Number of Patients		35 (100)	25 (71.4)	10 (28.6)	
Gender	Male	20	8	7	0.282
	Female	15	15	5	
Age	Mean ± S.D.	64.3 ± 15.1	65.5 ± 14.9	61.8 ± 4.6	0.500
	IQR	53 - 76	51 - 74	58 - 76	
Body Mass Index (kg/m ²)	Mean ± S.D.	30.83 ± 8.5	31.5 ± 9.5	29.6 ± 6.4	0.537
	IQR	26 - 35	25 - 36	27.1 - 33.1	
Number of Prior Diverticular Attacks	Mean ± S.D.	0.91 ± 1.44	0.88 ± 1.60	1.0 ± 1.05	0.822
History of Prior Diverticular Drain	Yes	4 (11.8)	23 (92.0)	7 (77.8)	0.281
	No	30 (88.2)	2 (8.0)	2 (22.2)	
Hypertension	Yes	19 (54.3)	14 (56.0)	5 (50.0)	1.000
	No	16 (45.7)	11 (44.0)	5 (50.0)	
Diabetes	Yes	9 (25.7)	6 (24.0)	3 (30.0)	0.694
	No	26 (74.3)	19 (76.0)	7 (70.0)	
Chronic Kidney Disease	Yes	6 (17.1)	4 (16.0)	2 (20.0)	1.000
	No	29 (82.9)	21 (84.0)	8 (80.0)	
Charlson Comorbidity Index	Mean ± S.D.	3.66 ± 2.60	3.24 ± 2.44	4.7 ± 2.83	0.136
Current Smoker	Yes	7 (20.0)	3 (12.0)	4 (33.3)	0.155
	No	28 (80.0)	22 (88.0)	8 (66.7)	
Smoking History	Yes	15 (42.9)	7 (28.0)	8 (66.7)	0.008
	No	20 (57.1)	18 (72.0)	4 (33.3)	
Prior Abdominal Surgery	Yes	19 (54.3)	13 (52.0)	6 (60.0)	1.000
	No	16 (45.7)	12 (48.0)	4 (40.0)	
Systemic Steroid Use	Yes	5 (14.3)	3 (12.0)	2 (20.0)	0.610
	No	30 (85.7)	22 (88.0)	8 (80.0)	
WBC on presentation	Mean ± S.D.	15.3 ± 5.27	16.49 ± 5.29	12.2 ± 3.98	0.027
Febrile on Admission (T>38.3°C)	Yes	8 (22.9)	8 (32.0)	0 (0)	0.073
	No	27 (77.1)	17 (68.0)	12 (100.0)	
Collection Size (Greatest Diameter (cm))	Mean ± S.D.	6.74 ± 1.60	6.93 ± 1.60	6.27 ± 1.60	0.278
Drain Size (French)	Mean ± S.D.	8.28 ± 1.00	8.28 ± 1.13	8.28 ± 0.51	0.988
Total Drain Days	Mean ± S.D.	15.97 ± 13.5	17.70 ± 14.9	11.6 ± 8.17	0.230
Hospital Length of Stay	Mean ± S.D.	13.26 ± 10.72	9.28 ± 7.39	20.42 ± 12.52	<0.001
Required Surgery	Yes	22 (62.9)	12 (48.0)	10 (100)	0.005
	No	13 (37.1)	13 (52.0)	0 (0)	
Days to Surgery	Mean ± S.D.	150.05 ± 394.5	263 ± 515.29	14.5 ± 19.42	<0.001
	Median	65	98.5	8.5	
	IQR	7 - 103	75 - 153	6 - 12.0	
Required End Colostomy	Yes	6 (17.1)	2 (8.0)	4 (40.0)	0.043
	No	29 (82.9)	23 (92.0)	6 (60.0)	
Required Diversion (colostomy, DLI)	Yes	15 (42.9)	9 (36.0)	6 (60.0)	0.266
	No	20 (57.1)	16 (64.0)	4 (40.0)	
Operative Time (minutes)	Mean ± S.D.	261.5 ± 86.15	271.2 ± 76.23	250.0 ± 99.72	0.579
Discharged on Antibiotics	Yes	20 (57.1)	19 (76.0)	1 (10.0)	0.001
	No	15 (42.9)	6 (24.0)	9 (90.0)	
Follow-up Time (months)	Mean ± S.D.	25.9 ± 25.55	31.86 ± 27.74	11.0 ± 9.56	0.027
	Median	15	22	10.5	
	IQR	6 - 38	7.5 - 56	2 - 15	

STPD: Successful Temporizing Percutaneous Drainage;

FTPD: Failed Temporizing Percutaneous Drainage;

S.D.: Standard Deviation

IQR: Interquartile range;

WBC: White Blood Cell Count;

DLI: Diverting Loop Ileostomy

follow-up data. Patients were categorized as UD if CT findings were limited to wall thickening and/or inflammatory signs and as MD if CT findings also included air bubbles (≤ 5 mm) within 5cm of the colon wall. All patients with complicated disease were excluded. The primary outcome was recurrence defined as another episode of diverticulitis at least 60 days after the index episode. The secondary outcome was readmission.

Results/Outcome(s): Of the 360 patients who met the inclusion criteria, 48 were found to have MD and 312 had UD. Patients with MD and UD were similar in age (58.52 (± 15.05) vs. 61.38 (± 14.48) years, $p=0.206$), male gender (52.1% vs. 41%, $p=0.198$), immunosuppression (0% vs. 2.9%, $p=0.22$) and Charlson co-morbidity indices (2.12 (± 2.41) vs. 2.40 (± 2.20), $p=0.425$). Patients with MD had higher mean white blood cell counts on presentation 13.94 (± 4.61) vs. 11.15 (± 3.96) $\times 10^9/L$ ($p<0.01$). Patients in both groups had a similar distribution of descending and/or sigmoid colon disease (table 1); however patients with MD had greater length (6.50 (± 2.93) vs. 5.17 (± 2.15) cm, ($p<0.01$)) and thickness (10.15 (± 3.35) mm, $p=0.002$) of the involved segment compared to patients with UD. All patients underwent medical treatment, however 64.6% vs. 33.7%, ($p<0.01$) of patients with MD compared to UD underwent in-patient treatment. Patients with MD and UD had similar recurrence rates (29.2% vs. 23.1%, $p=0.460$); and only a minority of patients required readmission (2.1% MD vs. 4.5% UD, $p=0.698$). On multivariable regression, controlling for age, sex, Charlson comorbidity indices, white blood cell count, length and thickness of the involved colon and in-patient status, the odds of recurrence for MD vs. UD was similar [0.72 (95%CI 0.37 to 1.47)].

Conclusions/Discussion: Acute diverticulitis with microperforation should be considered a subset of acute uncomplicated diverticulitis and treatment should be dictated by the patients' symptoms, rather than by the presence of microperforation.

DIVERTICULAR RELATED COLOVAGINAL FISTULAS – WHAT FACTORS CONTRIBUTE TO SUCCESSFUL SURGICAL MANAGEMENT?

P92

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Purpose/Background: Though uncommon, diverticular disease is the leading cause of colovaginal fistulas (DCVF). Treatment is surgical, but can be challenging given the inflammatory process that distorts planes, making dissection notoriously difficult. To date, most studies are small and include colovaginal fistulas secondary to multiple etiologies. The aim of this study was to examine our results of DCVF looking for factors that may predict surgical success.

Methods/Interventions: After institutional review board approval, a single tertiary-referral center retrospective chart review of a prospectively maintained clinical database was performed to identify all women with DCVF from 2011 - 2016 who underwent elective surgical repair with the intent to close the fistula. Patients were excluded if they underwent emergent surgery, received diversion only as their definitive repair, or had a fistula due to other etiology (example cancer, mesh erosion). Patient characteristics, surgical strategies, perioperative outcomes, conversion rates, postoperative complications, recurrences, readmissions and reoperations were recorded. We defined our composite endpoint of "success" as fistula closure with no symptoms, and no stoma, at 3 years post-operatively.

Results/Outcome(s): A total of 52 patients underwent definitive surgical treatment of DCVF. The operation was successful in 47 (90%) patients. Patients in the success and failure groups, respectively, did not differ with respect to age, BMI, proportion with diabetes, ASA grade, chronic steroid use, prior abdominal surgery, and those with prior hysterectomy 42 (89.4%) vs. 3 (60%), $p=0.07$. However, patients who failed were more likely to be smokers 3 (60%) vs. 6 (12.8%), $p=0.008$. Operative characteristics and outcomes are summarized in **Table 1**. Overall, 21 (40%) surgeries were performed minimally invasively,

P91 Table-1: Characteristics of the index episode of diverticulitis

Factors		Micro-perforation (n=48)	Uncomplicated (n=312)	p-value
Location n, (%)	Sigmoid	31 (64.6)	162 (51.9)	0.287
	Descending	11 (22.9)	75 (24.0)	
	Both	6 (12.5)	74 (23.7)	
Length, cm (mean (SD))		6.50 (2.93)	5.17 (2.15)	<0.001
Thickness, mm (mean (SD))		10.15 (3.35)	8.76 (2.79)	0.002
In-patient n, (%)		31 (64.6)	105 (33.7)	<0.001
White blood cell count, $\times 10^9/L$ (mean (SD))		13.94 (4.61)	11.15 (3.96)	<0.001

with a conversion rate of 19%, 28 (54%) patients had an ostomy constructed of which 25 (100%) and 1 (33%), $p=0.11$ were reversed in the success and failure groups, respectively.

Conclusions/Discussion: Surgery is highly effective in achieving successful closure of DCVF through either minimally invasive or open techniques. Patients who smoke should be strongly encouraged to stop before embarking on an elective repair. While the use of fecal diversion and omental pedicle flaps did not correlate with success, they should be utilized when deemed clinically appropriate.

TOPIC POSTOPERATIVE ANALGESIA IN BENIGN ANORECTAL SURGERY: A COMPARATIVE RANDOMIZED DOUBLE- BLINDED MULTICENTRIC CLINICAL TRIAL.

P93

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Purpose/Background: Despite in last years less painful surgery techniques have been developed, benign anorectal surgery, specially hemorrhoidectomy, often presents moderate/severe postoperative pain, with difficult control during several weeks. The aim of this clinical trial is to

demonstrate the larger postoperative analgesic efficacy of a topic anorectal treatment with lidocaine and diclofenac (CLIFE1) compared with another one including only lidocaine (CLIFE2) in benign anorectal pathology.

Methods/Interventions: A comparative randomized double-blinded multicentric clinical trial, authorized by AEMPS and CEIC of Bellvitge Hospital (HUB) (EudraCT-N-2010-024535-42) to evaluate the analgesic efficacy of two topic pharmaceutical forms (gel): CLIFE1, combination of local anesthesia (lidocaine 2 %) and a non-steroidal anti-inflammatory (sodic diclofenac 0.5%), and CLIFE2, local anesthesia (lidocaine 2 %), in patients with benign anorectal surgery performed in Viladecans Hospital and Bellvitge Hospital during a 3 years period (2011-2013). The pain was registered by patients in a Visual Analogue Scale (VAS), before and after topic treatment, until 6th postoperative day. Main endpoint of the study: differential level of pain by VAS (pre and post-gel until 3rd postoperative day). Another endpoints: differential level of pain by VAS (pre and post-gel until 6th postoperative day) and accumulated VAS differential mean. We recruited 120 patients (power 80.0%/ $\alpha=0.01$). We used Mann-Whitney Test, Chi-Square Test, AUC (CI-95%, $\alpha=0.05$) and Farrar Methodology Analysis.

Results/Outcome(s): The mean of the decrease in postoperative VAS was larger in CLIFE1 group versus CLIFE2

P92 Operative Variables and Outcomes for 52 Patients Who Underwent Surgery for DCVF

OPERATIVE VARIABLES	Success	Failure	p
Diverting ostomy	25 (52.3%)	3 (60%)	0.77
Minimally-invasive surgery	21 (44.6%)	2 (40%)	0.51
Conversion to open	5 (10.6%)	0 (0%)	n/a
Omental pedicle flap	34 (72.3%)	4 (80%)	0.71
Transabdominal vaginal repair	10 (21.2%)	2 (40%)	0.34
Transvaginal repair	1 (2.1%)	0 (0%)	0.74
Splenic flexure	45 (95.7%)	5 (100%)	0.81
Drain	25 (53.1%)	3 (60%)	0.77
Ureteral stents	23 (48.9%)	2 (40%)	0.70
Estimated blood loss (ml)	346 ± 329	300 ± 264	0.42
OR time (min)	242 ± 69	217 ± 17	0.85
Smoking	6 (12.7%)	3 (60%)	0.008
OUTCOMES			
Length of stay (days)	7.7 ± 4.6	6.5 ± 3	0.22
Ostomy reversed	25 (92.6%)	1 (20%)	0.11
Clavien-Dindo complications			
I/II	21 (44.6%)	0 (0%)	0.56
III/IV	5 (10.6%)	2 (40%)	0.44
Readmission 30 days	3 (6.3%)	2 (40%)	0.44
Readmission after 30 days	2 (4.2%)	4 (80%)	0.27
ICU admission	6 (12.7%)	1 (20%)	0.28

Number represents (mean±SD) or frequency (proportion)

group at 3rd and 6th day (7.47 ± 13.09 vs 4.38 ± 6.75 , $p=0.008$ and 8.08 ± 14.5 vs 4.26 ± 6.55 , $p=0.004$). The AUC of differential VAS pre and post-treatment also showed a larger decrease in CLIFE1 (45.69 ± 45.15) compared with CLIFE 2 (28.16 ± 41.51) ($p=0.02$). The percentage of patients with a larger decrease of VAS after topic treatment in the first 6 postoperative days was larger in CLIFE1.

Conclusions/Discussion: In benign anorectal surgery the use of topic postoperative analgesia with lidocaine and diclofenac has larger efficacy than the use of the same analgesic gel without diclofenac.

IS THE LARS SCORE HELPFUL TO EVALUATE FUNCTIONAL RESULT AFTER PROCTECTOMY FOR DEEP PELVIC ENDOMETRIOSIS (DPE)?

P94

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Purpose/Background: Deep pelvic endometriosis with bowel involvement highly affects women quality of life as responsible for chronic pain, dysmenorrhea, dyspareunia. In a multidisciplinary approach, rectal resection is sometimes necessary to improve both pain and fertility. The Low Anterior Resection Syndrome Score (LARSS) had been validated in some languages and dispensed only for the rectal cancer surgery, we wanted to test its efficiency in the setting of endometriosis radical treatment, and in a French version, to evaluate the intestinal symptoms impact on the quality of life (QoL).

Methods/Interventions: Peri-Operative data from Eighty-nine women who underwent laparoscopic colorectal resection for endometriosis were extracted from our maintained database. French version of standardized questionnaire: Visual Analogue Scale -10 (EVA) pre-operative symptoms for endometriosis, Faecal Incontinence Quality of Life Score (FIQL), short form 36 (SF-36), and Low Anterior Resection Syndrome Score (LARSS) questionnaires were e-mailed or mailed to the patients. Statistical analysis was made by the software R. The tests of Student t -test Anova, Chi 2 or Exact Fisher, were used according to the situations, when appropriate.

Results/Outcome(s): Completed questionnaires were received from 62 women, a response rate of 69,6%. All procedures were performed laparoscopically. Conversion rate was: (1 patient) 1,1%. The complication rate was: 22,5 % (14 patients). Two patients had a colorectal anastomotic leak (3,2%). We did not have any case of recto-vaginal fistula. The majority of the patients had a medium colorectal anastomosis (36 women, 58,1%), 17 patients (27,4%) had a low, 9 patients (14,5%) had a high. Thirty-nine patients (62,9 %) underwent temporary ileostomy creation. 22 patients had MAJOR LARSS (35,5%), 13 patients MINOR LARSS (21%) and 27

patients NO LARSS (43,5 %). LARS was present in 56,5% of the patients. Considering any items of the FIQL 45% of the patients had a poor quality of life (BAD+NOT SO GOOD) after surgery, and more than 50% of the patients had a GOOD or Excellent QoL (respectively MDV53,20%, COM53,30%, DEP56,50%, GEN 64,50%). The statistical analysis did not find significant correlation between the results of the two questionnaires (correlation rate $p>0,05$), but the evaluations of quality of life obtained with the questionnaires (FIQL- LARSS) showed a correlated percentage with the cut-off level of colorectal anastomosis. Low colorectal anastomosis for deep intestinal endometriosis, altered the quality of life of patients and increase of the embarrassment was globally proportional to the lower level.

Conclusions/Discussion: After proctectomy for DPE, even non significant, there's a high correlation between the level of colorectal anastomoses and the LARSS. The lower, the Higher. Despite a minority of patients "Free of LARS" (43,5%) after procedure a majority of patients had a "good" quality of life (55%) according to the FIQL.

PERIANAL SEPSIS IN IMMUNOCOMPROMISED PATIENTS: DEVELOPING A NEW STANDARD OF CARE.

P95

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Purpose/Background: There are no guidelines for the treatment of perianal sepsis in immunocompromised patients. Especially, when faced with patients that have hematologic malignancy, the low neutrophil, platelet and/or hemoglobin count the diagnosis and treatment of these patients is challenging and difficult. In order to create guidelines, we must first distinguish the differences between immunocompromised patients and not immunocompromised patients. There is lack of published work in México regarding this topic and in general about perianal abscess and fistula, the epidemiology, its clinical behavior (including healing time and incontinence) and the treatment used for each case.

Methods/Interventions: This is a retrospective study, from 2007-2017, we detected every patient with a diagnosis of perianal abscess and/or perianal fistula in a reference hospital in México City, México. There were 166 patients. We divided patients, immunocompromised patients had a diagnosis of: Inflammatory Bowel disease, rheumatologic disease with steroid intake, hematologic malignancy, infectious diseases (HIV with less than 500 CD4 cell count, tuberculosis), solid organ active neoplasia (prostate cancer, colon and rectal cancer, GIST), Hepatic cirrhosis Child-Pugh Score ≥ 7 , Diabetes Mellitus with a HbA1c ≥ 7.5 or renal/liver transplant. Non-immunocompromised patients

included healthy patients, diagnosis of hypertension, HIV with more than 500 CD4 cell count, history of malignancy among other diagnoses that were not considered a cause of immunocompromise. We compared these two groups.

Results/Outcome(s): There were 87 immunocompromised (IC) patients and 79 no immunocompromised patients (NIC). We found a higher heart rate in the IC group with a p-value of 0.0001, making it the only clinical measurement with a statistical significance (there was no difference in fever, erythema or fluctuation) between the two groups. IC patients had a lower platelet count $p=0.04$. There was a statistical significance having more patients in the NIC group that had no imaging study for the diagnosis of perianal sepsis $p=0.007$. The ASA score was higher in the immunocompromised group $p=0.0001$. There were no differences in the type of abscess diagnosed, but there was a statistically significant difference, finding more complex anal fistulas in the non-immunocompromised patients group $p=0.01$. There was a higher abscess recurrence in the immunocompromised group: 7.5% in the NIC group versus 16.3% in the IC group. Mean healing time was 85 ± 10 days with no difference between the two groups. After the first surgery, 108 patients were cured, 59 patients required a second surgery and only 16 patients required a third surgery.

Conclusions/Discussion: Perianal sepsis is a different entity in immunocompromised patients, there is still lack of data that best tell us how to treat these patients.

INITIAL EXPERIENCE WITH STAGED ABDOMINAL WALL RECONSTRUCTION IN THE SETTING OF COMPLEX COLORECTAL DISEASE: DO TWO STEPS FORWARD PREVENT STEPS BACK?

P96

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Purpose/Background: Patients requiring complex gastrointestinal reconstruction (GIR) often present with concomitant incisional hernias. Although recent evidence demonstrates the safety of abdominal wall reconstruction (AWR) in clean contaminated circumstances, for some patients the combined risks of simultaneous GIR and AWR is prohibitively high. In this small case series, we describe our experience with two-staged GIR/AWR procedures to reduce the risk of complications related to herniorrhaphy with permanent synthetic mesh.

Methods/Interventions: Patients were preoperatively screened by a colorectal and hernia surgeon at a single tertiary care hospital and deemed high-risk for a one stage GIR and AWR operation. During Stage 1 (S1), a colorectal surgeon performed the GIR, and the hernia was treated with a planned non-definitive herniorrhaphy.

The subsequent Stage 2 (S2) procedure, led by the hernia surgeon, included definitive sublay mesh herniorrhaphy. Patient demographics, hernia characteristics including hernia size, fascia closure method, mesh characteristics, and wound classification were retrieved from prospectively collected databases. Outcome measures included length of stay (LOS), surgical site infection (SSI), and hernia recurrence.

Results/Outcome(s): A total of 8 patients completing both stages are included in this study. In S1, 1 patient (12.5%) had a BMI >40 , and 2 patients (25%) were active smokers, while no patient in S2 retained these risk factors. Table 1 outlines the GIR-related procedures performed and operative times. Three patients were readmitted follow S1 for GIR-related complications. The average time interval between stages was 259 ± 163 days. Wound class in S1 was primarily clean-contaminated in 7 (87.5%) cases, while in S2, 2 (25%) were clean, 4 (50%) clean-contaminated, and 2 (25%) infected. The average hernia size increased during S2 from 241 ± 134 cm² to 494 ± 157 cm². In S1, the hernia was closed primarily (50%) or with inlay bridged biologic mesh (50%). All S2 repairs consisted of retromuscular sublay repair with posterior component separation and either intermediate weight polypropylene (87.5%) or bioabsorbable (12.5%) mesh. Mean follow-up period was 8.6 months (range 2 to 47 mo) following S2. In S1 there was 1 superficial SSI requiring antibiotics, and 1 superficial SSI in S2 requiring antibiotics and drainage. Mean LOS was 8 ± 4.2 days after S1, and 8.5 ± 8 days after S2. Hernias recurred in 3 patients following S1, and zero patients after the S2 definitive repair.

Conclusions/Discussion: Planned two-stage operations for patients who require both GIR and AWR separates the complexity the individual surgical interventions. Dividing the procedure into stages may minimize the combined risk of simultaneously reconstructions and ultimately permits a definitive sublay mesh herniorrhaphy with a low recurrence rate.

UTILITY OF NONINVASIVE TESTING FOR COLON POLYPS WHILE AWAITING COLONOSCOPY AT URBAN MEDICAL CENTER.

P97

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Purpose/Background: When discovered early, colorectal cancer has a good prognosis. Unfortunately, among underinsured and underserved populations, many patients are diagnosed with advanced cancers. As more people obtain access to health insurance though the Affordable Care Act, our institution has taken on a large patient population over age 50 who have never had screening for colorectal cancer- neither through stool

testing nor endoscopy. Given capacity constraints, the gold standard of screening colonoscopy is not realistic. Recent implementation of a screening program using Fecal Immunochemical Test (FIT) at our institution has highlighted the utility of budgeting for a more expensive test when compared to using Fecal Occult Blood Testing (FOBT). Fecal occult testing is limited by diet and medication restrictions, and requires three samples. Although hsFOBT (cost \$4) is less expensive than FIT (\$22.22 Medicare price), we must use the best test that will identify the population most at risk of developing colon cancer. In a system with limited resources and a largely low socioeconomic population, these test implementations must be scrutinized. For this reason, we sought to compare the findings of colonoscopies from these two groups.

Methods/Interventions: A retrospective review of colonoscopies done in a large tertiary center by the colorectal service between November 2015 and November 2017 was performed focusing on colonoscopies performed for positive FIT and positive hsFOBT. Data was extracted including patient demographics, completeness of colonoscopy, preparation quality, colonoscopy findings including polyp size, number of polyps, and pathology, as well as history of previous colonoscopy. The groups were compared using chi-square statistics.

Results/Outcome(s): The sample yielded 255 colonoscopies done for positive FIT (n=153) and for positive hsFOBT (n=102). There was no difference in median age between groups [61 vs 62 (p=0.66)] or female to male ratio [FIT= 1:1.01; hsFOBT=1:1.12]. The quality of the prep was similar as well [75% vs 74.5% good quality prep]. Of the 153 colonoscopies for positive FIT, polyps were found in 90 of these procedures. When comparing the number of identified polyps between both groups, the colonoscopies done for +FITs detected more polyps than the colonoscopies done for +hsFOBTs [p=0.0037]. There was no statistical significance between groups in regard to polyp size or pathology.

Conclusions/Discussion: In an institution with budgetary constraints, inexpensive and simple screening modalities such as FIT have become very important, especially when compared to a much more expensive test such as a colonoscopy. It is imperative that screening is performed as efficiently as possible to maximize the return on investment. From our study, this test may be FIT as it generated colonoscopies with more polyps. In our system, given its limitations, FIT should be supported as the initial screening test.

P96 GIR-related procedures and operative time

Case #	Stage 1		Stage 2	
	Procedures	Operative time (mins)	Procedures	Operative time (mins)
1	Enterocutaneous fistula takedown, small bowel resection with primary anastomosis	305	LOA 5 hrs, Prior mesh excision	382
2	Low anterior resection with colorectal anastomosis, LOA 45 mins, Prior mesh excision	166	LOA 45 mins, Closure end-loop ileocolostomy	382
3	Closure of loop transverse colostomy, sigmoidectomy, small bowel resection, diverting loop ileostomy, partial cystectomy	435	None	345
4	Hartmann reversal, partial colectomy and proctectomy, small bowel resection with end loop ileostomy, LOA 2 hrs	469	LOA 1 hr	279
5	Subtotal colectomy, end ileostomy, partial proctectomy, extensive LOA	231	LOA >1 hr	321
6	Proctectomy, end ileostomy	176	LOA >3 hrs, Prior mesh excision	472
7	Low anterior resection with colorectal anastomosis, small bowel resection with primary anastomosis, LOA	425	LOA >2 hrs, closure diverting loop ileostomy	603
8	Takedown colovesical fistula, partial colectomy & proctectomy, colorectal anastomosis, closure transverse loop colostomy, small bowel resection with anastomosis, diverting loop ileostomy, LOA	541	LOA >3 hrs, excision of prior mesh, closure diverting loop ileostomy	530

LOA: Lysis of adhesions

GASTROINTESTINAL STROMAL TUMORS OF THE ANUS: THE MAYO CLINIC EXPERIENCE.

p98

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Purpose/Background: Gastrointestinal stromal tumors (GIST) of the anus are rare anal neoplasms about which little is known as few cases have been reported. Since 2000 only 14 cases of GIST of the anus, verified to have a c-kit mutation, have been published. The aim of this study was to examine our institution's experience with this rare disease, examine its clinicopathologic factors, and observe recurrence patterns.

Methods/Interventions: We identified patients diagnosed with GIST of the anus from 2000 to 2017 by querying our institution's tumor registry and searching the electronic medical record after obtaining institutional review board approval. The year 2000 was chosen to ensure c-kit testing was performed. Medical records were reviewed for clinicopathologic data including patient demographics, presenting symptoms, tumor size, local recurrence, distant metastasis, and treatment(s).

Results/Outcome(s): Three cases of GIST of the anus, positive for c-kit mutation, were discovered in one woman and two men. Patient 1 was 68 years at diagnosis and presented with complaints of fecal incontinence. Patient 2 was 69 years at diagnosis and the GIST was discovered at colonoscopy. Patient 3 was 72 years at diagnosis and the GIST was incidentally discovered on PET scan for tonsillar

mantle cell lymphoma but also reported fecal incontinence. All patients were noted to have tumors arising from the anal canal on imaging and physical exam. Patients 1 & 3 received neoadjuvant imatinib followed by APR and transanal resection, respectively. Both were subsequently treated with adjuvant imatinib and alive without evidence of recurrence 24 months and 27 months respectively. Patient 2 had an endoscopic resection followed by recurrence 51 months later which was treated with imatinib. A complete response was observed but local recurrence was noted at 38 months. At this time transanal resection was performed. No adjuvant therapy was given for 12 months at which time imatinib was resumed. Patient 2 developed local recurrence 29 months after transanal excision and was alive with local recurrence and suspected distant metastasis 128 months after initial diagnosis. For patient 1, 2, & 3 tumor size was 3.4 (T2), 1.4 (T1), and 3 (T2) cm respectively. Mitoses were 0/50, >5/50, and >5/50 HPF respectively. All were positive for c-kit and exon 11 mutations. All patients experienced periorbital edema and patient 2 developed pancytopenia secondary to imatinib.

Conclusions/Discussion: To our knowledge this is the largest single institution series of GIST of the anus, verified to have a c-kit mutation, reported to date. This is a rare malignancy with prognosis thought to be similar to GIST occurring in other parts of the digestive tract. An R0 resection and/or imatinib mesylate appear to be the mainstays of treatment. Case series, such as this, are important to share experiences with rare malignancies and improve care for patients.

P97 Table 1.1

Findings	+FIT n=153 (%)	+hsFOBT n=102 (%)
Complete Colonoscopy Preparation	149 (97.4)	94 (92.2)
Good	115 (75.2)	76 (74.5)
Fair	17 (11.1)	19 (18.6)
Poor	21 (13.7)	7 (6.9)
Colonoscopy Finding		
Normal	33 (21.5)	24 (23.5)
< 3 Polyps	47 (30.7)	42 (41.1)
>= 3 Polyps	43 (28.1)	13 (12.7)
Only Hemorrhoids	11 (7.2)	7 (6.8)
Only Diverticulosis	12 (7.8)	6 (5.9)
Mass	2 (1.3)	3 (2.9)
Polyp size		
<= 1cm	58 (37.9)	40 (39.2)
>1cm	32 (20.9)	18 (17.6)
Pathology Finding		
Hyperplastic	16 (10.5)	7 (6.8)
TA/TVA	68 (44.4)	38 (37.2)
HGD/intramucosal adenocarcinoma	3 (1.9)	6 (5.9)
Adenocarcinoma	3 (1.9)	3 (2.9)

INCIDENTAL HELICOBACTER PYLORI POSITIVE GASTRIC HETEROTOPIA IN THE RECTUM.

p99

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Purpose/Background: Less than 80 cases of gastric heterotopia in the rectum have been reported in the literature since the first report in 1939. Of these, less than ten cases have been shown to be helicobacter pylori (*H. pylori*) positive. Presentation varies from symptomatic rectal ulcer/polyp to asymptomatic incidental finding. We present a 55 year-old female with history of gastroesophageal reflux disease (GERD) who underwent esophagogastroduodenoscopy (EGD) and screening colonoscopy. She had no prior history of *H. pylori* infection; however, an incidental low rectal ulcer was seen showing gastric mucosa and *H. pylori* positivity on histology. This was subsequently confirmed as gastric heterotopia on excisional biopsy.

Methods/Interventions: Complaining of GERD symptoms and for colon cancer screening, a 55 year-old female was evaluated. Family history was negative for gastrointestinal cancers including colon cancer. The former smoker had no rectal pain, bleeding, or melena. Past history includes thyroid disorder, overactive bladder, and antero-posterior colporrhaphy. A complete colonoscopy was performed which showed external hemorrhoids, diverticulosis, and a 7-9 mm area just above the dentate line with possible polyp tissue that was sessile and inverted. Biopsies were taken for histology with cold forceps. No gastric lesions were seen on EGD but two tongues of suspected Barrett's esophagus were biopsied. Pathology results for the rectal polyp showed gastric fundic type mucosa with mild chronic inflammation, and a few *H. pylori* organisms. The esophageal biopsy showed gastric type mucosa with chronic inflammation and stratified squamous epithelium with mild hyperplasia. Upon in-office Colon and Rectal Surgery evaluation, the lesion was not clearly appreciated; therefore exam under anesthesia with possible transanal excision was planned.

Results/Outcome(s): In the operating room, the patient was found to have a right posterior anal ulcer at about 3 cm from the anal verge (figure 1). A full thickness transanal excision with margin was performed and the defect was closed in two layers. Final operative pathology showed gastric heterotopia with tan-red mucosa measuring 1.5 x 1.2 x 0.4 cm and a 0.6 x 0.5 cm ulcer. There was no evidence of malignancy.

Conclusions/Discussion: From literature review, heterotopic gastric mucosa can be found in many locations throughout the intestinal tract, including the rectum; although the rectum is a very uncommon location. Only a small percentage of these have been shown to be helicobacter pylori positive. This case highlights that heterotopic gastric mucosa in the rectum is still a rare entity and

even more rare is the presence of *H. pylori* in these lesion with unclear significance. Resection remains the most applied treatment option and recurrence rate is yet to be elucidated.

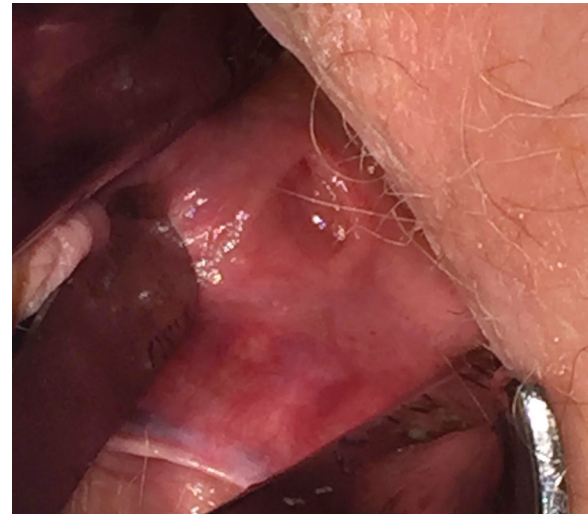


Figure 1. Intraoperative image of anal ulcer.

ILEAL MYCOBACTERIUM TUBERCULOSIS IN A PATIENT TREATED FOR LONG-STANDING CROHN'S DISEASE.

P100

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Purpose/Background: The purpose of this case study is to highlight the importance of screening for tuberculosis (TB) risk factors in patients with a diagnosis of inflammatory bowel disease taking immunomodulators and biologics.

Methods/Interventions: This patient is a 67 year old male diagnosed with ileocolonic crohn's disease in 2012 when he presented with crampy abdominal pain and diarrhea, and was found to have an ileocolonic phlegmon on imaging. He was initially treated with steroids, then pentasa. He stopped treatment for a few years as he was asymptomatic. When his symptoms recurred in June 2016 he was started on Humira monotherapy. Mantoux test at the time was negative. CXR revealed a pulmonary nodule. In August 2017 a CT enterography revealed complex fistulizing disease in the right lower quadrant. Additionally, there was a short segment of small bowel worrisome for a neoplastic process such as lymphoma.

Results/Outcome(s): The patient was subsequently referred to colorectal surgery, and the Humira was stopped. He underwent a laparoscopic-assisted ileocolic resection, ileal resection, and repair of sigmoid fistula. His post-operative course was uneventful. Pathology showed marked necrotizing granulomatous inflammation with acid fast bacilli consistent with a diagnosis of TB. The patient was

referred to TB clinic and started on quadruple therapy. In addition to his TB ileitis, his sputum smear and PCR were positive for TB. CXR performed revealed bilateral patchy infiltrates in the upper lung zones. On further retrospective history, the patient did endorse exposure to known active TB at the age of 10. He also travels to TB endemic areas.

Conclusions/Discussion: This case illustrates an example of a missed tuberculous ileitis in a patient with a presumed diagnosis of Crohn's. This highlights the fact that many disease processes can mimic inflammatory bowel disease and that it is important to consider a broad differential for ileitis. It is important to remember that the sensitivity of tuberculin skin testing varies widely, depending on many factors, including the timing of infection, the severity of disease, and the presence of factors that could decrease the patient's response, including corticosteroids. In our case, the missed diagnosis raises two important issues. First of all, it stresses the importance of keeping TB on the differential of a patient presenting with ileitis. Risk factors for TB should be screened for including birth in a TB endemic area, travel to a TB endemic area, contact with someone with active TB, exposure to high risk settings such as hospitals, correctional facilities, homeless shelters, and nursing homes. These risk factors should be assessed at every healthcare encounter as exposure to TB risk factors can occur in the interim between healthcare visits. The second issue this case highlights is the imperfect nature of tuberculin skin testing, and the need to consider repeat testing for patients with prior exposure to TB.

OPIOIDS AND INTUSSUSCEPTION: A CASE REPORT OF MEGA INTUSSUSCEPTION (160 CM) TWELVE YEARS AFTER A LAPAROSCOPIC ROUX-EN-Y GASTRIC BYPASS IN A METHADONE USER.

P101

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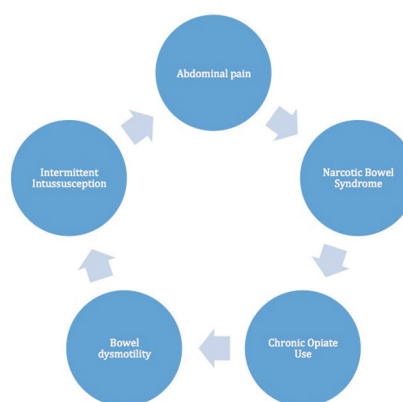
Purpose/Background: We present a unique case of a profoundly large (160 cm) intussusception occurring twelve years postoperatively in a patient with six months of severe, unexplained intermittent abdominal pain requiring ongoing chronic opiate use which was ultimately complicated by acute bowel obstruction and necrosis which required emergent surgery.

Methods/Interventions: Our patient is a 32 year-old female who presents with three days of worsening abdominal pain and nausea. Prior to this, she reports six months of intermittent, severe, unexplained abdominal pain. She has a past medical history of chronic opiate dependence, currently on methadone. Her surgical history is a laparoscopic Roux-en-Y gastric bypass weight loss operation twelve years ago and a laparoscopic reduction of an

intussusception two years ago at an outside hospital. On exam, she was tachycardic but normotensive and afebrile. On abdominal exam, she was distended with a palpable large mass in the right upper quadrant and moderate tenderness, worse on the right side. She was taken emergently to the operating room for an exploratory midline laparotomy. Operative findings revealed a small bowel intussusception which obstructed the jejunojejunostomy. The intussusceptum segment, which initiated distal to the jejunojejunostomy was 160 cm in length. Manual reduction revealed that the entire 160 cm intussusceptum segment was necrotic and required excision. The resected bowel pathology was negative for any neoplastic process.

Results/Outcome(s): Our patient represents a unique case of recurrent RNYGB-associated intussusception in a patient with a history of both prior reduction for intussusception and chronic ongoing methadone use. There is only one prior case report of RNYGB-associated intussusception in a methadone user. Bowel dysmotility is a known complication of chronic opiate use and may predispose to intussusception. Opioid-induced bowel dysfunction is thought to be caused by activation of the mu-opioid receptors in the gastrointestinal tract. Narcotic Bowel Syndrome, a subset of opioid induced bowel dysfunction, is when abdominal pain is the predominant symptom. These patients suffer from hyperalgesia of the abdomen, leading to escalating opiate dosages with subsequent paradoxical worsening of abdominal pain.

Conclusions/Discussion: In looking back, her ongoing opioid use and likely Narcotic Bowel Syndrome may have predisposed her to bowel dysmotility and therefore increased her risk for recurrent mild intussusception which ultimately incarcerated leading to acute bowel necrosis. Conversely her intermittent intussusception, a known sequelae of RNYGB, may have been the cause of her chronic abdominal pain and led to subsequent opiate use. When caring for chronic opiate patients with a history of RNYGB, it is important to note their unique multifactorial susceptibility for intussusception.



Proposed relationship between chronic opiate use and intussusception

ROSAL-DORFMAN DISEASE IN A PATIENT WITH HISTORY OF ANAL SQUAMOUS CELL CARCINOMA.

P102

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Purpose/Background: A patient with history of anal squamous cell cancer status post chemotherapy and radiation was found on follow up imaging to have a mass abutting the posterior aspect of the ascending colon with enlarged lymph nodes. Positron emission tomography (PET) showed moderate hypermetabolic uptake. Operative intervention was undertaken with concern for recurrence, however the pathology revealed a surprising diagnosis.

Methods/Interventions: The patient is a 61 year-old female with history of anal canal squamous cell cancer treated with chemotherapy and radiation in 2013. She underwent routine surveillance imaging. On computed tomography (CT) and/or PET on 12/14, 04/15, and 04/16 patient was noted to have stable imaging without pathologically enlarged lymph nodes. However, on CT 10/16 patient was found to have 1.8 x 1.8 cm soft tissue nodule abutting the posterior ascending colon decreased in size likely representing response to treatment. Confluent soft tissue attenuation within the right central mesentery unchanged likely representing metastatic involvement. Enlarged right mesenteric lymph node may have increased in size slightly in the interim. This would suggest mixed interval response to treatment per the radiology report. Of note, patient had not been on treatment for her cancer since 2013. PET/CT 11/16 showed that since 10/16 there had been no significant change in size of the mass abutting the colon which was moderately hypermetabolic. No significant change in the mesenteric masses/nodes, which were moderately hypermetabolic. Stable additional small ileocolic lymph nodes surrounding the mass abutting the ascending colon. Past medical history includes hyperlipidemia, hypertension, anal canal squamous cell cancer, and gastroesophageal reflux disease. The patient had been diagnosed with HLAB27 and was placed on Remicade in 2015 for her arthritis. Pertinent past surgical history includes uterine fibroid removal. Medications include lamictal and losartan.

Results/Outcome(s): Given imaging findings, the patient underwent hand assisted ileocolic resection in December 2016 after undergoing a colonoscopy, which showed no intraluminal abnormalities. Final surgical pathology showed Rosai-Dorfman disease (sinus histiocytosis with massive adenopathy), presenting as multiple mesenteric nodules and involving the lymph nodes. No significant mucosal alterations or carcinoma was identified. Further physical examination of the patient revealed skin lesions consistent with the disease (figure 1). Patient had an uneventful hospital course and was discharged home in stable condition on postoperative day eight.

Postoperative imaging four months later revealed no additional adenopathy.

Conclusions/Discussion: In a review of the literature, there are case reports of Rosai-Dorfman disease presenting in several parts of the body. It is a poorly understood disease, but highlights the importance of a full history and physical in patients with atypical imaging studies.



Figure 1. Skin lesion consistent with Rosai-Dorfman disease.

INTESTINAL PERFORATION SECONDARY TO HISTOPLASMOSIS.

P103

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Purpose/Background: Gastrointestinal (GI) involvement is common in disseminated histoplasmosis, but symptomatic GI histoplasmosis is unusual. Patients with HIV, cellular immunodeficiency, those on anti TNF α therapy, and patients on immunosuppression after solid organ transplants are at increased risk for dissemination and GI involvement. Symptoms of GI histoplasmosis are often vague, and frequently are subject to delayed diagnosis or misdiagnosis. Complications can be severe, including stricture and intestinal perforation requiring surgical management.

Methods/Interventions: We retrospectively reviewed the electronic medical record for patients who underwent surgical management of intestinal perforation secondary to GI histoplasmosis. Clinical and pathologic data were evaluated for each patient. Intestinal perforation was diagnosed at operation, and involvement of histoplasmosis was identified pathologically and confirmed by Gomori methenamine silver (GMS) staining.

Results/Outcome(s): Three patients were identified as having been operatively treated for intestinal perforation secondary to GI histoplasmosis. All were women, and were aged 37, 68, and 72 at the time of presentation. All three patients had the risk factor of recent use of anti

TNF agents: one for psoriatic arthritis, one for rheumatoid arthritis, and one for Crohn's disease. Two of the patients were already known to have disseminated histoplasmosis at the time of presentation with abdominal symptoms. Two patients presented with peritonitis and were found to have frank perforation of the small bowel at multiple sites, which were treated with resection and reanastomosis. The patient with a history of Crohn's disease presented with obstructive symptoms and a contained perforation of the terminal ileum, as well as several strictures which had gross characteristics that were not classic for Crohn's. She was treated with ileocecectomy and jejunal stricturoplasty. All three patients had fungal granulomas with *Histoplasma Capsulatum* identified on pathology. Patients were also medically treated with antifungal agents and withdrawal of the anti-TNF medications. No patient has developed recurrent symptomatic GI histoplasmosis.

Conclusions/Discussion: Intestinal perforation secondary to GI histoplasmosis is uncommon. GI histoplasmosis should be on the differential diagnosis when a patient with disseminated histoplasmosis presents with symptoms of intestinal obstruction or perforation. Treatment consists of surgical resection, antifungals, and optimization of risk factors.

CHILDHOOD ABDOMINAL RADIATION: AN INDICATION FOR EARLY COLON CANCER SCREENING?

P104

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Purpose/Background: Two patients with a history of childhood abdominal tumor status post radiation and resection were seen in a colon and rectal surgery practice for colon cancer. Both patients were in their fifth decade and were seen with colon cancer on the side where they previously had radiation and a nephrectomy.

Methods/Interventions: The first patient was a 42-year-old female who presented with tenesmus and rectal bleeding. She underwent colonoscopy where a left colon adenocarcinoma and a lobulated polyp 10 cm proximal to the tumor were found. As a child she had a left abdominal neuroblastoma treated with surgery and external beam radiation. On physical exam, the patient had obvious radiation changes to the left side of her abdomen. Past medical history includes asthma. A 49-year-old female was the second patient. As a child she had a nephroblastoma (Wilms tumor) of the right kidney. She underwent external beam radiation followed by nephrectomy. In 2017 she underwent a total abdominal hysterectomy, bilateral salpingo-oophorectomy for presumed ovarian cancer. Pathology revealed adenocarcinoma with gastrointestinal

origin. The patient underwent colonoscopy and was found to have a near obstructing hepatic flexure tumor. Positron emission tomography (PET) scan showed multiple liver lesions which on biopsy confirmed metastatic colon cancer. On exam the patient had radiation changes and abdominal wall atrophy of the right upper quadrant (figure 1).

Results/Outcome(s): Left colectomy with ascending colon to rectal anastomosis was performed on the first patient. Severe radiation changes to the proximal descending and transverse colon and proximal small bowel were found. On pathology, patient was found to have stage II adenocarcinoma. At her five year mark the patient was found to have new ascites and a small bowel mass. The patient had exploratory laparotomy with excision of abdominal mass, the pathology of which was benign. In the second patient with a nearly obstructing lesion, a decision was made to proceed with laparoscopic right colectomy prior to chemotherapy. At laparoscopy, the patient was found to have carcinomatosis with a large, fixed right upper quadrant mass. A laparotomy was performed with a small bowel to transverse colon bypass. The patient was discharged home after an uneventful hospital course. She is currently receiving chemotherapy for her stage IV disease.

Conclusions/Discussion: Our two patients presented with colon tumors two decades earlier than the average age for colorectal cancer. Both primary colon tumors presented in the radiated field. While radiation is known to predispose to subsequent tumor development, there is very little literature regarding childhood radiation and the development of colorectal cancer. Larger numbers are needed, but patients with a history of childhood abdominal radiation would likely benefit from earlier colon cancer screening.

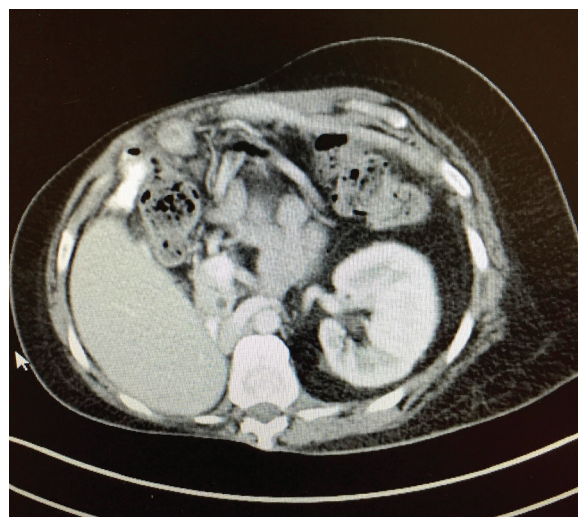


Figure 1. Right upper quadrant subcutaneous wasting due to childhood radiation.

A DIAGNOSIS OF CUTANEOUS ANAL MELANOMA AFTER LONG-TERM TNF INHIBITOR USE.

P105

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Purpose/Background: Anal melanoma is a rare type of melanoma accounting for less than 2% of all diagnoses of malignant melanoma. The typical presentation is a misdiagnosis of hemorrhoidal disease. Risk factors have been difficult to identify due to the rarity of the disease. However, a link between the use of tumor necrosis factor (TNF) inhibitors and the development of malignant melanoma has been suggested in the literature.

Methods/Interventions: Case Description A 65-year-old Caucasian man with a history of rheumatoid arthritis presented with intermittent anal pain and rectal bleeding. Examination of the area revealed a small, violaceous lesion over the anterior anal verge, which was felt to be a thrombosed external hemorrhoid. Excision of the lesion was performed, and pathology revealed a deep and ulcerated malignant melanoma. Staging imaging with a computed tomography scan demonstrated no sign of metastatic disease. He subsequently underwent a wide local excision with adequate margins. The extent of the lesion was found to be distal to the dentate line. Of note, the patient had a 15-year history of etanercept use with a recent switch to infliximab for his rheumatoid arthritis. He stopped infliximab after his diagnosis of malignant melanoma.

Results/Outcome(s): N/A

Conclusions/Discussion: The risk factors for malignant melanoma are well-established, yet the risk factors for anal melanoma are less clear. In this case, the history of TNF inhibitor use provides a possible risk factor. Prior reports have shown an increased risk of melanoma with use of TNF inhibitors in patients with inflammatory bowel disease. This link between TNF inhibitor use and the development of melanoma may provide a clue to the etiology of anal melanoma.



Anal melanoma in the anterior aspect of anal verge

SITUS AMBIGUUS: A RARE CAUSE OF LARGE BOWEL OBSTRUCTION.

P106

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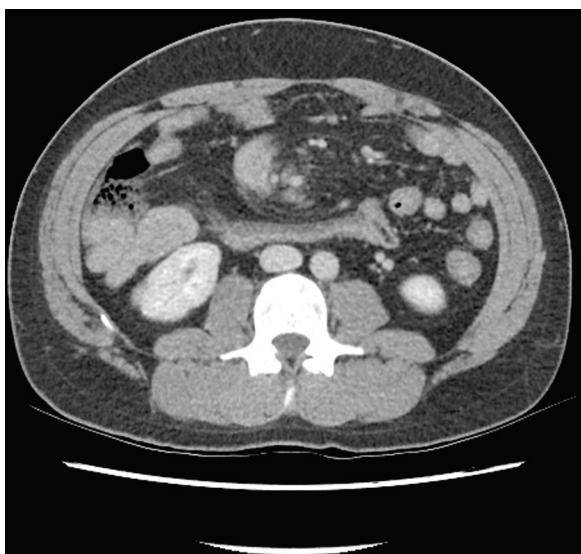
Purpose/Background: Situs ambiguus or heterotaxy syndrome is a rare congenital condition described when thoracic and abdominal organs have not clearly lateralized. A rigid definition of the anomaly is not possible as different characteristics of the condition are seen across the affected population. The condition can be subdivided into left and right isomerism defined by polysplenia or asplenia. Severe congenital heart disease is commonly associated with the syndrome and frequently limits the patient's life expectancy.

Methods/Interventions: An otherwise healthy twenty-six year old male patient presented to the Emergency Department with a longstanding history of intermittent nausea, cramping abdominal pain and bloating. Symptoms were exacerbated postprandial. He had significant symptom progression over a six month interval. On examination, he was afebrile and his vital signs were within normal limits. His abdomen was distended and diffusely tender. Laboratory results were within normal limits. Abdominal computed tomography was suggestive of situs ambiguus with a mid-gut volvulus, midline liver and polysplenia. The

heart was left sided. The transverse colon was compressed between the retroperitoneum and the small bowel posterior to the superior mesenteric vessels. The superior mesenteric artery was stenotic. At laparotomy, the transverse colon showed evidence of chronic obstruction by the small bowel. A mid-gut volvulus was present.

Results/Outcome(s): A subtotal colectomy with ileosigmoid anastomosis and reduction of the mid-gut volvulus was performed. The patient was monitored in hospital and discharged home on post-operative day seven. He was well at one, three and six month follow up with resolution of the abdominal pain and bloating. Fortunately, no structural cardiac anomalies were present on further workup.

Conclusions/Discussion: Large bowel obstructions are commonly seen in General Surgery and Colorectal Surgery practices. Surgical intervention is required in most clinical presentations. We have presented an unusual etiology of a large bowel obstruction. It is critical that patients with suspected situs ambiguus be assessed for potential congenital heart disease with a chest radiograph and echocardiogram.



RARE CASE OF CROHN'S DISEASE ASSOCIATED WITH SMALL BOWEL ADENOCARCINOMA AND DESMOID TUMOR.

P107

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Purpose/Background: We describe a 67-year old male with a 30-year history of Crohn's disease who presents with recurrent small bowel adenocarcinoma and intra-abdominal desmoid tumor.

Methods/Interventions: The patient was taken to the operating room for exploratory laparotomy, three small bowel resections, primary small bowel anastomosis, low

anterior resection, Hartmann's end colostomy, debridement of abdominal wall secondary to metastatic disease, repair of ventral hernia, bilateral myocutaneous flaps, and partial cystectomy.

Results/Outcome(s): The final pathology revealed desmoid fibromatosis involving the small bowel mesentery and metastatic high grade neuroendocrine carcinoma involving mesentery, invading through the bowel muscularis, and extensive invasion through the bladder muscularis into the urothelial lining. Ten of twelve pericolic lymph nodes were positive for metastatic carcinoma and lymphovascular invasion was present.

Conclusions/Discussion: We present a case of recurrent high grade neuroendocrine carcinoma and desmoid tumor in a patient with Crohn's disease. The patient presented with stage IV T4N1M1 disease which was treated in the fashion of a non-small cell lung cancer. Adjuvant chemotherapy included VP-16 and cisplatin. Aggressive oncologic treatment and closer follow-up for recurrence should be considered in the setting of Crohn's disease.

LOCALLY ADVANCED, METASTATIC ADENOCARCINOMA OF THE RECTUM TREATED WITH DEFINITIVE RADIOTHERAPY IN A PATIENT MEDICALLY UNFIT FOR RADICAL SURGERY OR CHEMOTHERAPY.

P108

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Purpose/Background: Left untreated, the median survival for metastatic colorectal (CRC) is 5 months. There is a subset of patients who cannot tolerate the chemotherapy and surgery required to control and possibly cure stage IV CRC. We present the case of an 87-year-old medically inoperable and chemotherapy-intolerant female who was managed definitively with radiotherapy.

Methods/Interventions: An 87-year-old female with an ECOG performance status of 0 presented with bright red blood per rectum during bowel movements. Rectal exam revealed a friable, lobulated 3 cm mass in the posterior anal canal, approximately 2 cm from the anal verge with extension into the anal sphincter. Colonoscopy demonstrated an ulcerated, fungating 6 cm mass in the anal canal/distal rectum. Biopsy of the lesion was consistent with invasive moderately differentiated adenocarcinoma. Pelvic MRI noted the mass extending from the 3:00 to 9:00 position, likely stage T3b, as well as a 1 cm perirectal lymph node. CT revealed a 2.2 cm hypodense mass in the posterior right hepatic dome, with a corresponding maximum SUV of 17.6 on PET-CT, which also demonstrated 2 adjacent 0.5 cm hypermetabolic lesions in the right hepatic lobe.

The patient was diagnosed with Stage IVA (T3b N1 M1a) adenocarcinoma of the rectum. The patient was neither considered a chemotherapy or surgical candidate after review by surgical and medical oncologists of the multidisciplinary tumor board. Therefore, she was treated definitively with dose-escalated radiotherapy to the rectum with a radiosensitizing dose of capecitabine (500 mg AM, 1000 mg PM). The patient received 45 Gy in 25 fractions to the pelvic lymph nodes, 50.4 Gy in 28 fractions to the mesorectum, and 58.4 Gy in 32 fractions to the primary tumor, which was localized with PET-CT fusion. Lymph node and mesorectal fields were delivered via intensity modulated radiotherapy and boost to the primary tumor was given via 3D conformal radiation. The liver lesions were then treated with stereotactic body radiotherapy, each to 40 Gy in 5 fractions, utilizing a 4DCT to account for respiratory motion. Image guidance with megavoltage conebeam was used for all treatments.

Results/Outcome(s): Six months after treatment the rectal mass and treated liver metastases demonstrated complete radiographic response per PET-CT, although a new 3 cm inferior right hepatic lobe lesion developed and treated with additional stereotactic body radiotherapy, this time to 32.5 Gy in 5 fractions, de-escalated due to proximity of the large bowel. Over one year from treatment, the patient is alive without clinical or radiographic evidence of disease or treatment-related toxicity.

Conclusions/Discussion: Dose-escalating radiotherapy to the pelvis with PET-CT treatment planning in combination with SBRT to oligometastatic sites may be a reasonable option for elderly CRC patients who cannot tolerate surgery or chemotherapy.

STANDARDIZATION AND EVALUATION OF ROBOTIC COLORECTAL SURGERY TRAINING BY INCORPORATION OF A DETAILED CASE LOG SYSTEM.

P109

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Purpose/Background: Robotic assisted surgery offers advantages in overcoming difficulties in pelvic dissections and suprapromontory operations. This is due to enhanced visualization, stable field of view, and wristed articulation. These aspects have promoted the rapid adoption of robotic assisted surgery in many colorectal practices. As its utilization becomes more prevalent, mechanisms for training colon and rectal surgery residents in a standardized fashion must be incorporated into training programs.

Methods/Interventions: In order to standardize and monitor robotic training of colon and rectal surgery residents, The Colon and Rectal Surgery Robotic Training Program (CRSRTP) was started during the 2011-2012 academic year, under the auspices of the Association of Program Directors of Colon and Rectal Surgery. Initially the program consisted of online modules, dry lab exercises and simulation, but has grown in recent years to incorporate basic and advanced off-site cadaveric training courses. During the 2016-2017 academic year, a detailed procedure log was developed and utilized to further standardize training of residents in robotic surgery. The procedure log tracks a resident's total number of cases performed, as well as execution of specific steps of eleven colorectal procedures (Table 1). The case log data was accumulated and analyzed to assess fellow progress.

Results/Outcome(s): During the 2016-2017 academic year, 26 of the 54 ACGME accredited colon and rectal surgery residency programs participated in The CRSRTP

P109 Robotic Colorectal Procedures

Robotic Case	Number Reported	Percent of total cases
Abdominoperineal resection	102	9.44%
Ascending colectomy with intracorporeal anastomosis	138	12.78%
Ascending colectomy with extracorporeal anastomosis	46	4.26%
Colostomy takedown	15	1.39%
Low anterior resection	360	33.33%
Rectopexy	70	6.48%
Segmental colectomy with extracorporeal anastomosis	44	4.07%
Segmental colectomy with intracorporeal anastomosis	44	4.07%
Sigmoid resection (anterior resection)	172	15.93%
Total abdominal colectomy	36	3.33%
Ventral rectopexy	53	4.91%
Total	1080	

case log system. A total of 40 of the 93 residents were enrolled. Of the 1009 operations logged, the three most frequently performed procedures were low anterior resections (n=360, 33.3%), sigmoid resections (n=172, 15.9%), and ascending colectomies with intracorporeal anastomosis (n=138, 12.8%). Residents reported participating in an average of 28 cases as the console surgeon (range 1-115). Of the residents that reported performing 10 or more robotic cases, there was a 27% increase in the percent of the procedure performed at the console and a 28% decrease in the percent performed as bedside assist when assessing the first 5 cases and last 5 cases logged. Experience and progression to the console varied by fellow and by program.

Conclusions/Discussion: As the use of robotic surgery for colon and rectal cases continues to become more commonplace, mechanisms for teaching young surgeons robotic techniques must be incorporated into fellowship programs. The detailed and standardized case log system utilized during the 2016-2017 academic year provides a comprehensive assessment of fellow experience and assumed preparedness in performing robotic colon and rectal surgery after completion of their fellowship.

FUNDAMENTALS OF ANORECTAL TECHNICAL SKILLS: A CONCISE COURSE FOR VARIOUS LEVELS OF LEARNERS.

P110

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Purpose/Background: Several "Fundamentals" curricula exist in surgical training that combine didactic sessions with hands-on practice to develop knowledge and skills. Anorectal diseases, among the most commonly treated surgical conditions, are underrepresented in medical training. Additionally, many cases seen by deployed military surgeons involve anorectal disease. Presented is a unique curriculum to teach fundamental knowledge and technical skills needed for the diagnosis and management of common anorectal diseases.

Methods/Interventions: We piloted the course with 18 learners from different groups, including 10 third-year medical students in a surgery clerkship, 4 senior surgical residents, and 4 previously-deployed attending military surgeons. Class sizes were adjusted to maximize instructor-learner ratio at the skill stations. Before the course, a Likert-scale questionnaire was used to assess confidence in diagnosing common anorectal conditions and performing procedures to manage those conditions. A 10-item visual diagnosis quiz was given before the course. Participants underwent a 2-hour training comprising a didactic section and hands-on skill stations (thrombosed external

hemorrhoid excision, internal hemorrhoid banding, anoscopy, rigid proctoscopy, rectal prolapse reduction, and pilonidal cyst incision and drainage). The resident and attending groups also participated in a seton placement station. Each participant performed each procedure with coaching at least once. Following the course, participants were reassessed with a different 10-item visual diagnosis quiz and the same confidence questionnaire. Comparisons of quiz scores and confidence scores were done via paired *t*-tests.

Results/Outcome(s): Medical students had statistically discernable increases in confidence Likert scores in diagnosis of all included anorectal conditions and confidence for all procedures. Senior residents had statistically significant confidence increases in internal hemorrhoids, rectal prolapse, condyloma, band and seton placement, and rigid proctoscopy. There were no discernable differences in other diagnoses or procedures. Attending surgeons had increases in confidence that was not statistically discernable (Table 1). Students scored higher on the visual diagnosis quiz following the course (8.9 vs 5.3 correct, $p < .01$, Cohen's $d = 2.3$). Attending surgeons and senior surgical residents showed no discernable differences in their quiz scores. All participants would recommend the course, particularly for medical students, junior residents, and non-surgical residents.

Conclusions/Discussion: This pilot study demonstrates improvement in objectively-measured disease recognition and participant diagnostic and procedural confidence for medical students following a focused course in common anorectal diseases. Most of the differences for senior surgical residents and attending surgeons were not significant; however, all participants would recommend the course to others.

LAPAROSCOPY AND CLINICAL ADOPTION OF ROBOT COLORECTAL SURGERY: NOT MUTUALLY EXCLUSIVE IN CLINICAL PRACTICE.

P111

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Purpose/Background: Despite the potential advantages of the da Vinci[®] robotic system, its use in colorectal surgery remains controversial and debatable. Postulated advantages include more rapid ascent of the learning curve compared to laparoscopy, 3D visualization, a stable and operator-controlled camera system and improved access to deep and confined spaces. However lack of proven clinical superiority and significantly increased costs have led surgeons to question its value. Since 2013, many colorectal surgery residencies have included robotic surgery as part of their training curriculum. Clinical practice trends regarding

the use of this technology amongst practicing colorectal surgeons have not been fully explored.

Methods/Interventions: From October to November 2017, an anonymous 14-question survey exploring colorectal surgery training including surgical practices and views on robotic colorectal surgery was distributed via email to colorectal surgeons identified by membership databases. Survey responses were tabulated via REDCap database. Pearson's chi square or Fisher's exact tests were performed for categorical variables and multivariate analysis was performed to assess for associations with robot surgery volume (as a surrogate for adoption rate in clinical practice) using SPSS.

Results/Outcome(s): Surveys were sent to the 3211 (85%) of 3770 clinicians who had at least one email address; 296 (9.2%) responded. Univariate analysis revealed robotic volume in clinical practice was associated with the use of laparoscopy in clinical practice ($p < 0.05$). Robotic volume was also associated with strong viewpoints on the importance of robot training in colorectal surgery residency and robot use in most abdominal colorectal procedures (all $p < 0.05$). However, robotic volume/adoption rate was not associated with exposure to laparoscopy ($p = 0.64$) or robot ($p = 0.73$) during residency training. On multivariate analysis, robotic volume/adoption rate was associated with laparoscopy use in clinical practice, percentage of robot skill set obtained after residency, robot

P110 Confidence Increases by Learner Group

	Medical Students		Residents		Attendings	
	Average Increase (SD)	p Value	Average Increase (SD)	p Value	Average Increase (SD)	p Value
Diagnosis						
Internal Hemorrhoids	1.67 (0.89)	<0.01	1.25 (0.50)	0.02	0.50 (0.71)	0.50
External Hemorrhoids	1.33 (0.78)	<0.01	0.75 (0.50)	0.06	0.50 (0.71)	0.50
Anal Fissure	1.25 (1.06)	<0.01	1.00 (0.82)	0.09	0.50 (0.71)	0.50
Rectal Prolapse	1.92 (1.17)	<0.01	1.50 (0.58)	0.01	1.00 (1.41)	0.50
Peri-anal Abscess	1.42 (1.17)	<0.01	0.50 (0.58)	0.18	0.00 (0.00)	*
Fistula-in-Ano	1.75 (0.97)	<0.01	1.25 (0.96)	0.08	1.00 (0.00)	*
Pilonidal Cyst	1.25 (1.14)	<0.01	0.50 (0.58)	0.18	0.00 (0.00)	*
Condyloma	2.00 (1.21)	<0.01	1.25 (0.50)	0.02	1.00 (1.41)	0.50
Pruritis Ani	1.92 (0.90)	<0.01	2.00 (1.41)	0.07	2.00 (1.42)	0.30
Procedure						
Anoscopy	2.17 (1.03)	<0.01	0.75 (0.96)	0.22	0.50 (0.71)	0.50
Banding of Internal Hemorrhoids	2.08 (0.67)	<0.01	1.50 (0.58)	0.01	1.00 (1.42)	0.50
Excision of External Hemorrhoids	1.92 (1.17)	<0.01	1.00 (0.82)	0.09	0.00 (0.00)	*
Abscess Incision and Drainage	2.00 (1.35)	<0.01	0.75 (0.96)	0.22	0.00 (0.00)	*
Rectal Prolapse Reduction	2.58 (0.79)	<0.01	0.75 (0.96)	0.22	1.00 (1.42)	0.50
Seton Placement	N/A	N/A	1.50 (0.58)	0.01	0.50 (0.71)	0.50
Rigid Proctoscopy	2.25 (0.87)	<0.01	1.75 (0.50)	0.01	0.50 (0.71)	0.50

* - p value uncalculable due to variance of 0

use for most abdominal colorectal procedures, and strong viewpoints on robot training during residency (all $p < 0.05$). Time from graduation and having an academic or private practice were not associated with robotic volume/adoption rate (all $p > 0.05$).

Conclusions/Discussion: Time from graduation from colorectal residency was not associated with robot adoption rate, as colorectal surgeons who adopted robotic surgery in their clinical practice attributed their skill set to additional post-residency robot training. While robot adoption in clinical practice is multifactorial, colorectal surgeons performing laparoscopy in clinical practice are more likely to use the robot, indicating that clinical adoption rate of robotic surgery may reflect a willingness to adopt new technology or search for improvements over standard laparoscopy for the treatment of colorectal diseases.

3D PRINTED COLONOSCOPIC TRAINER PERMITS RAPID ACQUISITION OF ADVANCED ENDOSCOPIC THERAPEUTIC SKILLS.

P112

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Purpose/Background: Conventional *in-vitro* and *ex-vivo* models used for diagnostic and therapeutic colonoscopic training are convenient but have significant limitations particularly model accuracy with regards to anatomy. *In-vivo* training is generally prohibitive due to cost and do not simulate human anatomical nuance e.g. looping. Common models include silicone colons mounted in plastic torso or *ex-vivo* tissue mounted to boards. To date, no efforts have been made to directly measure ESD procedural competence through standardized testing using simulation models. The primary reason for this is the lack of an adequate simulation model for the purposes of assessment, particularly with regards to the most difficult areas of colon ESD - the cecum and sigmoid. So we set about constructing a novel *ex-vivo* intestinal model to enable improved evaluation of ESD techniques and methods. Specifically, the learning curve of performing complex cecal ESD.

Methods/Interventions: Model production (see photo 1): Using DICOM images of a female and male pelvis, we measured distance parameters pertaining to the abdomino-pelvic cavity. Both images were selected as to be at the extremes of anatomical variation. Patient dimensions were then inputted into 3-Dimensional modelling software and printed. An abdominal cavity "shell" was 3D printed, then flexible medical grade edges were added to provide realistic abdomino-pelvic borders. Fresh *ex-vivo* porcine tissue was then mounted into the rigid shell with fasteners to simulate human retroperitoneal tethering. **Cecal ESD**

Procedure: A 3cm 'polyp' was created using electrosurgery, demarcating the lesion border and a 5mm margin. Using a pediatric colonoscope (Fuji EC530LS), standard ESD, in 7 specimens, was performed using an electro-surgical knife (Dualknife, Olympus) and ERBE generator (50W cut, 50W coag) by one experienced ESD endoscopist. **Outcomes:** Procedural time as well as muscularis propria injuries and perforations. Subjective assessment of trainer model.

Results/Outcome(s): The 3D printed novel endoscopic trainer provided realistic anatomical movement and subsequent endoscope response. From 1st to 7th ESD, time to perform cecal ESD decreased by over 50% (45 versus 19 minutes). In addition, muscularis injury rate diminished (9 versus 0), and there were no perforations. Subjectively, scope handling and tip characteristics were similar to human ESD.

Conclusions/Discussion: Use of a bespoke, 3-D printed anatomical model using fresh tissue permitted improvement of cecal ESD time and technique for an experienced endoscopist. This model holds promise in advancing therapeutic endoscopic skills such as ESD. Further validation of this model appears warranted.

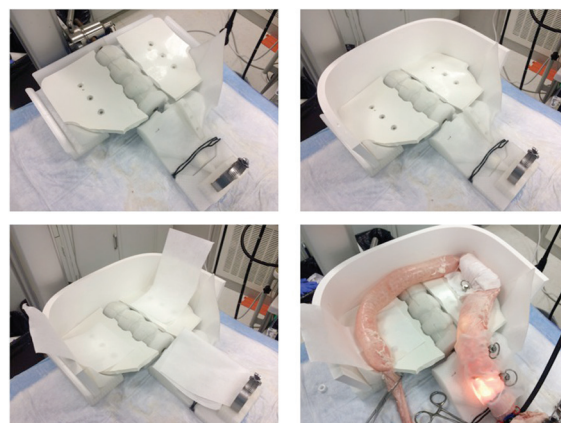


Photo 1: 3D Printed Advanced Endoscopic Trainer

EXPANDING ROBOTIC SURGICAL TECHNOLOGY IN COLON AND RECTAL SURGERY TO AN ACADEMIC SAFETY-NET HOSPITAL.

P113

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Purpose/Background: The use of robotic technology in colon and rectal surgery has grown significantly in the United States over the last decade. Although minimally invasive techniques are associated with significant short-term benefits, including shorter hospital stays and decreased post-operative pain, patients of lower socio-economic status and without private insurance are more

likely to undergo open procedures. Our facility was the first county hospital in California to utilize robotic equipment. In this study, we aimed to review our robotic experience and outcomes after surgery in this underserved population.

Methods/Interventions: A prospectively maintained database of all scheduled colon and rectal surgeries utilizing a da Vinci Xi Surgical System from August 2014 to September 2017 at a single academic urban hospital that serves a large Medicaid and uninsured population was retrospectively reviewed. All cases involved both a chief level general surgery resident on the training console as well as a junior level resident providing bedside surgical assistance under the supervision of a colorectal surgery attending faculty on the teaching console.

Results/Outcome(s): During the time period, 84 robotic-assisted operations were performed with 11 (13.1%) converted to open procedures. Of those completed robotically, the average operative time was 234 minutes. Most patients (42, 57.5%) had at least one significant medical comorbidity, and the average body mass index was 28.8. Procedures performed included 25 (34.2%) sigmoidectomies, 20 (27.4%) right colectomies, 15 (20.5%) low anterior resections, 10 (13.7%) abdominoperineal resections, and 3 (4.1%) colostomy reversals. Malignancy was the most common indication for surgery (68.5%), followed by diverticular disease (20.5%). Over the 3 year time period, the number of procedures completed robotically increased: 18 in the first year, 25 in the second, and 30 in the third. Similarly, the number of operations converted to open decreased: 6, 3, and 2, respectively. The only intraoperative complications were 2 bladder injuries. Twelve (16.4%) patients had post-operative complications, which included 2 small bowel obstructions, 3 superficial wound infections, 1 deep vein thrombosis, 1 episode of acute kidney injury, 3 foley catheter re-insertions, and 2 patients that required blood transfusions. The median length of hospital stay was 5 days, and the 30-day readmission rate was low (6.8%).

Conclusions/Discussion: Our study demonstrates the feasibility of applying robotic technology to an underserved population with a high burden of comorbid disease with good outcomes. Furthermore, this program was successfully integrated into the general surgery residency, providing trainees with critical exposure to the rapidly expanding field of robotic surgery.

IMPLEMENTATION OF AN ANORECTAL SKILLS COURSE FOR PGY1 RESIDENTS IN GENERAL SURGERY IMPROVES PROCEDURAL CONFIDENCE.

P114

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Purpose/Background: General surgery interns frequently care for patients with anorectal complaints. They must become familiar with anatomical landmarks, positioning and conduct of the basic anorectal exam, anoscopy, procedural steps for common interventions, and general management principles of anorectal diseases. While interns can acquire cognitive components of these skills via "book learning," they may be less comfortable with the performance of procedural steps. We performed a surgical education needs assessment for targeted anorectal skills teaching, implemented a hands-on course with expert-guided practice, and evaluated the program's effect on skill confidence.

Methods/Interventions: General surgery PGY1 residents at our institution completed an anonymous needs assessment survey exploring confidence level with anorectal procedures (scored 1-observe attending perform skill to 4-confident performing skill with no supervision), and proper disease management. We designed a hands-on course that included a didactic component outlining principles of positioning (lateral decubitus, prone, lithotomy) and a practical component in which learners practiced technical skills (pudendal nerve block, digital rectal exam, anoscopy, perianal abscess incision and drainage, thrombosed hemorrhoid evacuation, hemorrhoid banding, chemodeneration) using a tactile high-fidelity anorectal model constructed from PVC piping, foam, modeling clay, and other easily obtainable materials. The course highlighted procedures where over 50% of interns responded with a low confidence level (1-2) or demonstrated deficiencies in executing a proper management plan. Interns completed a post-course survey. Pre- and post-course skill confidence was compared using an unpaired t-test.

Results/Outcome(s): Nineteen interns completed the pre-course needs assessment survey. Nine interns attended the course and also completed the post-course survey. All demonstrated understanding of proper disease management. Confidence increased significantly for lateral decubitus positioning, thrombosed hemorrhoid evacuation, abscess, banding, and chemodeneration ($p < 0.05$) and approached significance for prone positioning and anoscopy ($p = 0.08$). Confidence did not increase in performance of digital rectal exam, though this skill had a high pre-test level of confidence (mean 3.7).

Conclusions/Discussion: In response to an educational needs assessment, a targeted, hands-on skills course for interns increased confidence in performing anorectal procedures. By foregoing expensive simulation for thoughtful expert-guided practice using materials with realistic haptics, the course utilized minimal resources while making significant impact. While interns may require additional in vivo exposure to more complex procedures in order to gain confidence, they may benefit significantly from simple, cost-effective educational programs for basic anorectal skills.



Construction of a tactile high-fidelity anorectal model from cost-effective components, and use in skills teaching course.

WHAT DOES THE SURGERY RESIDENT KNOW ABOUT MEDICAL CODING AND BILLING?

P115

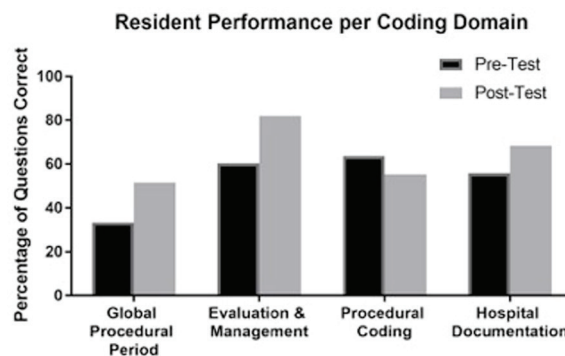
K. Kelley, H. Hoops, L. Palmer, N. Cohen, K. Brasel,
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Purpose/Background: The ACGME revised resident education core competencies include systems based practice and practice-based learning and improvement; however, few programs have described methods of evaluation for these skills. We hypothesize that residents understand the need, but have limited knowledge of how surgeons and hospitals are reimbursed for services, and how documentation reflects their quality metrics.

Methods/Interventions: A single institution 21-question survey was completed of PGY1-PGY5 general surgery residents. Global surgery period, evaluation and management (E/M) coding, procedural documentation, and hospital reimbursement and quality metrics were assessed. This survey was administered as a pre-test (n=50) and a post-test (n=23) over a 6-month period after three educational interventions. Basic statistical analysis was completed.

Results/Outcome(s): Based on results using a 5-point-likert scale questions, residents indicated that education on billing/coding was important during residency and very important as an attending. Residents indicated that they were uncomfortable with the billing/coding process and felt unsure about their ability to optimize documentation of patient encounters for billing/coding and quality metrics at their institution. Comfort level did not differ between junior (PGY1-3) and senior (PGY4-5) residents. Their comfort level after three interventional sessions. Overall, residents answered 57% of questions correctly on the pre-test and 66% on the post-test. Resident performance on the four domains is described in Figure 1. There were statistically significant improvements observed in three of the four domains. There were no significant differences between junior and senior resident performance on either test.

Conclusions/Discussion: General surgery residents recognize the importance of medical coding and billing education, but lack familiarity, confidence, and competency when documenting patient encounters to optimize reimbursement and quality metrics. Similar performances of junior and senior residents may indicate residents do not learn these skills as part of regular clinical duties. This study supports the need for a focused curriculum, which may lead to improved reimbursement, accurate documentation of quality metrics, and increase practice management confidence of graduating surgery residents.



**IMPROVEMENT IN MEDICAL STUDENT
ROBOTIC SURGICAL SKILLS AND PERCEPTION
OF SURGERY AS CAREER CHOICE WITH A
ROBOTIC TRAINING LAB.**

P116

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Purpose/Background: Medical students are nationally afforded minimal, if any, exposure to performing robotic surgical skills, especially in their pre-clinical years. We aimed to assess whether early exposure of medical students to formal robotic training could change their perception of surgery as a career choice, and result in improvement in their robotic surgical skills.

Methods/Interventions: All University of Florida medical students were invited to attend a robotic simulation lab with the Da Vinci surgical system in an IRB-approved study. The students performed three basic simulation exercises on the robotic simulator (Pegboard1, Ring walk1, and Camera & clutching1) after very basic education regarding the functioning of the console. The students then completed brief online training modules introducing them to the basics of the system. They completed a hands-on robotic dry-lab session which consisted of further instructions regarding robotic fundamentals. The simulation exercises were repeated at the

end of the lab with pre- and post-scores recorded. The students were not lectured or informed regarding the scope and future of robotic surgery. A 29 question anonymous survey was given to participants before and after the lab. SPSS v.21 was used for statistical analysis. Student's *t*-test, chi-squared and Fisher's exact tests were used for statistical analysis, where appropriate.

Results/Outcome(s): A total of 17 medical students participated in the sessions (58% female, mean age 23 years). Majority (94%) were in their pre-clinical years, had not observed any robotic cases (53%) or observed <3 cases (88%), had not participated in any robotic cases (94%), and never used the robotic simulator (94%). Of the participants, 47% played video games in the past. After the lab, students showed significantly improved skill and performance on the three simulation activities. This was true for the aggregate score as well as the individual sub-components of the simulation exercise (Table). In regards to the student's perception after the lab, significantly more students felt knowledgeable about robotics, more comfortable operating robotically, and thought that robotic surgery would hold a significant place in the future of surgery (Table). In regards to surgery as a career choice, 13 of 17 students (76%) expressed an interest in a surgical career with 12 students (70%) suggesting that 'the lab had an influence in changing their decision to pursue a surgical career' (quantified at 6.4 on a scale of 1-10). This increase

**P116 Comparison of pre-lab and post-lab results demonstrating the value of the training
and improved medical student perception of surgery**

	Pre-lab	Post-lab	p value
SIMULATION SCORES			
Aggregate score/accuracy (%)	66%	81%	<0.0001
- Exercise 1 (Pegboard 1)	68%	85%	0.002
- Exercise 2 (Ring walk 1)	64%	78%	0.0001
- Exercise 3 (Camera &Clutching 1)	66%	79%	0.003
Score components			
- Time to complete exercise (seconds)	149	90	<0.0001
- Economy of motion (cm)	161	137	0.0002
- Instrument collision (# of times)	2.3	1.5	0.14
- Excessive instrument force (seconds)	2.9	1.2	0.53
- Instrument out of view (cm)	6.7	0.7	0.03
- Master workspace range (cm)	12.9	9.4	0.10
PERCEPTION REGARDING TRAINING LAB (Scale of 1-10)			
Do you feel knowledgeable about robotic surgery in general?	1.88	2.29	0.01
Do you feel knowledgeable about operating on the DaVinci robot?	1.59	2.88	0.0001
Do you feel comfortable with operating on the DaVinci robot?	2.59	3.70	0.0001
Do you feel that robotic surgery will hold a significant place in the future of surgery?	7.47	8.23	0.003

in interest was amplified in all the students (100%) who had played video games in the past.

Conclusions/Discussion: Exposure of medical students to formal robotic training positively impacts their perception of surgery as a career choice, amplifies their interest in general surgery and results in improvement in their robotic surgical skills. Further studies with a larger sample size are needed.

RESIDENT INVOLVEMENT AND OUTCOMES AFTER SURGERY FOR COLORECTAL CANCER.

P117

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Purpose/Background: Surgical residency training aims to prepare the surgical resident to become an independent practitioner of surgery. Resident participation in surgical procedures is essential for training. However, there is paucity of data regarding the outcomes after resident involvement in surgical procedures for colorectal cancer.

Methods/Interventions: We analyzed the National Surgical Quality Improvement Program (NSQIP) database from 2005 to 2012. We included all patients who had the diagnosis of colon cancer and underwent surgical management. Patients were stratified into two groups based on the presence of a resident: attending alone (No-RES) vs. attending with resident (RES). Groups were matched using propensity score matching for demographics, surgical procedure, morbidity probability, and comorbidities. Outcomes of interest were compared for patients with and without resident participation in surgery (RES vs no-RES). We performed a sub-analysis of the RES group by dividing it into junior (PGY 1-3), senior residents (PGY 4-5), and fellows (PGY \geq 6).

Results/Outcome(s): A total of 23,172 patients met the inclusion criteria, of which 5824 (2912: No-RES, 2912: RES) were matched. Mean age was 65.8 ± 21.3 years, and 51.7% were males. There was no difference in mortality in both groups ($p=0.60$), however, overall 30-d complication rates were higher in RES group (29% vs. 21.1%, $p<0.01$). Operative time (OR time) was longer in the RES group (175 min vs. 142 min, $p<0.01$), while there was no difference in hospital length of stay (HLOS) between the two groups ($p=0.17$). **Table 1** shows the sub-analysis based on training level of residency. Complications were higher in junior residents while operative time was highest in operations performed by fellows ($p<0.01$).

Conclusions/Discussion: Resident involvement in surgical management of colon cancer increases the rate of complications without an increase in mortality or HLOS. Resident involvement is an important component of surgical residency. Further assessing and understanding these factors may help improve outcomes.

Table 1. Sub-analysis of RES Group

Variables	Juniors (n=628)	Seniors (n=1707)	Fellows (n=578)	P
30-d Complications, %(n)	30%	26%	24%	<0.01
HLOS, median [IQR]	6[4-9]	6[4-10]	5[4-8]	0.17
OR Time, mean \pm SD	170 \pm 79	173 \pm 78	182 \pm 80	<0.01
Re-operation, %(n)	5.2%	5.8%	5.2%	0.20

HLOS: Hospital length of stay in days, OR Time: Total time in operating room in minutes

ROLE OF SOCIAL MEDIA IN COLORECTAL CLINICS.

P118

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Purpose/Background: Social media is used by approximately 2.46 billion people worldwide. Recent publications have highlighted the benefits of social media engagement to clinicians, including collaboration, innovation, profile-raising and knowledge-sharing. In contrast, there is a paucity of data regarding benefits to the patient. Our aim was to investigate social media engagement among new colorectal clinic patients, and the effect this has on their perception of the treating clinician and institution. We hypothesized social media is an effective platform for achieving these goals.

Methods/Interventions: Following Institutional Review Board approval, a survey was conducted among all new patients seen in the colorectal surgery outpatient clinic over a period of eight weeks. This survey consisted of 21 questions with multiple choice answers and had a completion time of approximately three minutes. Patients scored the importance of each social media platform from 1-5.

Results/Outcome(s): 164 new patients attending the colorectal outpatient department were invited to participate in the study. 136 (83%) completed the questionnaire, of whom 76 (55%) were female with a mean age of 51 years (SD \pm 16.4). The most common pathologies were inflammatory bowel disease (30/136, 22%) and diverticular disease (16/136, 11%). Social media was used by 62% (84/136) of participants, with users more likely to be female (80% vs 69%, $p<0.0001$) and younger (median age 51.5 vs 52, $p<0.0001$). There was no difference between social media use and diagnosis ($p>0.05$). Facebook was the most popular platform (mean score on 5-point scale of most frequent use = 4.2) followed by YouTube (2.1), Instagram (2), Twitter (1.3) and LinkedIn (1.3). The platform most likely to influence patients' perception of their clinician or institution was also Facebook, with other platforms ranking much lower but at a similar level (Figure 1). 92% of social media users participating in our study reported using the platform at least once a day. 16% of the patients have searched this platform about the reason of their clinical visit with 20% have searching it regarding the

institution they will visit and 17% searching it regarding the physician they will visit. The topics patients were most interested in being shared by their physicians were new medical developments and information about their specialty.

Conclusions/Discussion: This study suggests that a high proportion of new patients in a colorectal surgery clinic regularly use social media and are interested in using these platforms to engage with their clinician and treating institution.

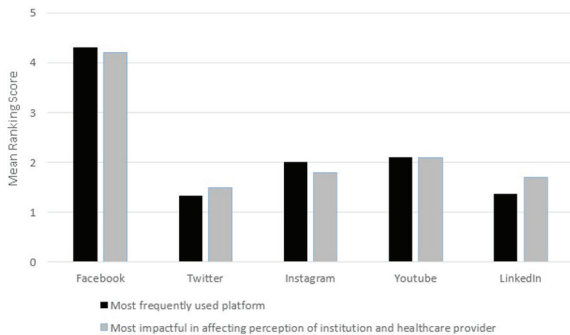


Figure. Ranking of social media platforms among new colorectal clinic patients

NATIONWIDE MALPRACTICE DATA IN COLORECTAL SURGERY.

P119

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Purpose/Background: Total health care cost expenditure has increased in the United States (US) and is expected to reach 20% of gross domestic product (GDP) by 2022. Medical malpractice lawsuits are a significant portion of the rising costs. We aim to investigate the trends in national colorectal litigation, with the hope that such information will modify our practice, improve

surgical outcomes, and improve patient satisfaction within colorectal surgery.

Methods/Interventions: The Comparative Benchmarking System (CBS) is a nationwide database that includes approximately 400,000 malpractice cases (~30% of total US malpractice cases). We analyzed data for cases between 2007 and 2016, in which common colorectal procedures were performed. We performed a sub-analysis including only colorectal services as compared to all other providers.

Results/Outcome(s): In the study period, there were 398 malpractice cases involving a colorectal procedure, costing a total of \$50.6 million. Colorectal services accounted for 19% of these cases, but accounted for 33% of the total payout. The majority of cases (46% for all services) were asserted against improper performance of surgery (\$31.1 million, and \$171,000 per case). Table 1 shows a comparison of the different procedures that are litigated between colorectal and non-colorectal services. The top three contributing factors in litigated cases included technical skill, clinical judgement, and communication. Though male patients had a higher number of cases (221, 56%), female patients had slightly higher amounts paid (\$26.6 million, 51%). This pattern remained true in colorectal service-only analysis. Patients between the ages of 50-59 had the highest number of cases (103, 26%) and the highest amount paid (\$22.9 million, 45%). In colorectal services, the 50-59 age group had the highest average payout (\$510 thousand), but the 60-69 age group had the highest number of cases (20).

Conclusions/Discussion: Of the 398 cases in which a colorectal procedure was performed, colorectal services accounted for 19% of cases and 33% of indemnity paid. The most common allegation was for improper performance of surgery in both groups. The most common procedure to be litigated was for left-sided colon resections, but the largest amount paid was for right hemicolectomy in the overall group. Non-colorectal surgeons were far more likely to be litigated for performing left-sided colon resections as compared to colorectal surgeons. However, colorectal

P119 Table 1 - Comparison of Procedures

	Colorectal Service Only				Non-Colorectal Services			
	# Cases	% Cases	\$ Paid (in millions)	% Paid	# Cases	% Cases	\$ Paid (in millions)	% Paid
Left Colectomies and Sigmoidectomies	8	10	1.37	8	85	26	5.44	16
Right Colectomies	8	10	2.51	15	48	15	7.85	23
All Other Colectomies	13	17	1.04	6	76	24	7.54	22
Rectal Resections	18	23	3.63	22	24	7	2.70	8
Anorectal Procedures	22	29	2.85	17	52	16	7.08	21
Procedures Involving Anastomoses	8	10	5.18	31	36	11	3.43	10
Total	77	100	16.6	100	321	100	34.0	100

surgeons were more likely to be litigated in rectal procedures. While male patients had the highest number of cases, female patients had the highest average payouts for both groups. The both groups, the 50-59 age group had the highest average payout. Understanding and exploring the nuances of the medical malpractice environment in colorectal surgery will better guide surgeons to not only improve surgical outcomes, but also to decrease healthcare costs in the future.

EFFICACY OF PREOPERATIVE ORAL ANTIBIOTIC PROPHYLAXIS FOR THE PREVENTION OF SURGICAL SITE INFECTIONS IN PATIENTS WITH CROHN'S DISEASE. A RESULT OF RANDOMIZED CONTROL TRIAL.

P120

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Purpose/Background: Although oral antibiotic prophylaxis with mechanical bowel preparation (MBP) has been recommended for colorectal surgery, its use remains somewhat controversial. Moreover, its efficacy for inflammatory bowel disease also remains unclear. We investigated the efficacy of oral antimicrobial prophylaxis in surgery for Crohn's disease.

Methods/Interventions: This study was conducted as a randomized control trial at the Hyogo College of Medicine. The study protocols were registered with the University Hospital Medical Information Network Clinical Trials Registry, 000013369. In this study, 335 patients with Crohn's disease who were scheduled to undergo intestinal resection with an open approach were randomly assigned to either group A or group B. Patients in group A received both preoperative oral antibiotics and intravenous antimicrobial prophylaxis, and intravenous antimicrobial prophylaxis alone was given to the patients in group B. All patients underwent preoperative MBP with sodium picosulfate hydrate. The primary endpoint of this study was the incidence of a surgical site infection (SSI) according to an intention-to-treat analysis.

Results/Outcome(s): Although the incidences of overall and organ/space SSI were not significantly different, the incidence of incisional SSI was significantly lower in group A (12/163 patients; 7.4%) than in group B (27/162 patients; 16.6%) ($p = 0.01$). In the multivariate analysis, the lack of oral antibiotic prophylaxis was an independent risk factor for incisional SSI (OR: 3.3; 95% CI: 1.3–8.3; $p=0.01$).

Conclusions/Discussion: Combined oral and intravenous antimicrobial prophylaxis in patients with Crohn's disease contributed to the prevention of SSI.

LONG TERM OUTCOMES OF ILEAL POUCH ANAL ANASTOMOSIS FOR ULCERATIVE COLITIS AND INDETERMINATE COLITIS – A SINGLE INSTITUTION'S EXPERIENCE IN THE ERA OF BIOLOGICS.

P121

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Purpose/Background: The long term outcomes of ileal pouch anal anastomosis (IPAA) has been reported, but in the era of biologics has this changed? We hypothesize that there may be a difference in the failure rate for J pouches in different parts of the country due to differing rates of Crohn's disease. However, we hypothesize that higher rates of failure are being counteracted by higher salvage rates with biologic therapies.

Methods/Interventions: Through retrospective chart review, all patients who had a J pouch constructed within our physician group for ulcerative or indeterminate colitis between 2000 and 2017 were identified. Patients were identified by maintenance of J pouches and ileoanal pouch failure. Pouch failure was defined as complications of the pouch requiring excision or diversion, or recurrent fistulas or other manifestations of Crohn's disease requiring treatment with biologic therapy. Time to failure and the etiology of failure was reported. Subgroup analysis of all patients who had pouch failure was performed, regardless of whether or not they had this done by our group of surgeons.

Results/Outcome(s): Fifty five patients were identified who underwent IPAA with our surgeons. The average follow-up was 71 months (range 3-196). Of these, 16.3% had pouch failure. The average time to pouch failure was 36 months (range 4-82). All pouch failures were analyzed for etiology, regardless of whether they were performed by our physician group. Total pouch failures in this analysis were 22. Pouch failures due to Crohn's disease were 72.7% ($n=16$) but of these 68.7% ($n=11$) were able to be rescued with biologic therapies. Pouch failures due to other etiologies were 27.2% ($n=6$) including persistent, refractory pouchitis ($n=3$), and technical issues ($n=3$).

Conclusions/Discussion: In our cohort Crohn's disease was the major causes of failure, followed by an equal distribution between refractory pouchitis and technical issues. However, pouch failures due to Crohn's disease have high rates of salvage with biologic therapy. This analysis supports higher rates of failure overall and higher rates of failure due to Crohn's disease than what is reported in the literature, which may be due to regional variations in inflammatory bowel disease in Utah.

SURGICAL OUTCOMES OF PATIENTS TREATED WITH USTEKINUMAB VS. VEDOLIZUMAB IN INFLAMMATORY BOWEL DISEASE.

P122

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Purpose/Background: The association between preoperative use of monoclonal antibodies in patients with inflammatory bowel disease (IBD) and post-operative complications is controversial, especially for the latest FDA-approved monoclonal antibodies Vedolizumab and Ustekinumab, where data is limited. We compared the rate of postoperative complications in IBD patients exposed to preoperative Ustekinumab vs. Vedolizumab, and hypothesized that Vedolizumab-treated patients had increased complications compared to Ustekinumab.

Methods/Interventions: We queried our IRB-approved prospective database to identify patients with IBD who underwent colorectal surgery and pre-treatment with Ustekinumab or Vedolizumab within twelve weeks of surgery. Patients who received Ustekinumab were also matched to patients treated with Vedolizumab based on sex, age \pm 5 years, diagnosis, date of surgery \pm 3 years, and type of surgical procedure. Procedures were grouped as: completion proctectomy (CP) + end ileostomy (EI), total abdominal colectomy (TAC)+EI, proctectomy + EI, total proctocolectomy (TPC) + EI, Hartmann's procedure, ostomy procedure, TAC with Ileorectal anastomosis, segmental colectomy, ileocolic resection, enterectomy, and isolated strictuoplasty. Paired univariate analysis and conditional logistic regression of the matched pairs was performed to compare the short-term postoperative outcomes. Our primary outcome was overall complications. Secondary outcomes included infectious complications, readmission, reoperation and length of stay.

Results/Outcome(s): A total of 172 patients, 103(59.9%) with Crohn's disease (CD) and 69(40.1%) with Ulcerative Colitis (UC), met the inclusion criteria (mean age 39.4 \pm 14.3 years; male 51.2%). Overall, 32 received Ustekinumab and 140 were treated with Vedolizumab

preoperatively. The number of other biologics failed before surgery was significantly different between the groups ($p < 0.001$), with 40% of patients receiving Ustekinumab previously been treated with Vedolizumab. On pre-match univariate analysis, Vedolizumab patients had a higher overall postoperative complication rate (50.7% vs. 25.0%, $p=0.008$) and an increased ileus rate (25.0 vs. 3.1%, $p=0.006$). From 27 matched patients in each group, 52(96.3%) with CD and two (3.7%) with UC, logistic regression models demonstrated no significant difference in the primary outcome. The overall infectious complication rate (**Table 1**) and length of stay were also not statistically different among the matched pairs: patients treated with Ustekinumab stayed -1.04 days less than patients who received Vedolizumab (C.I. 95% -4.3, 2.2; $p=0.53$)

Conclusions/Discussion: Patients selected to undergo surgery following treatment with Vedolizumab had a similar risk of overall postoperative complications and perioperative outcomes as compared to Ustekinumab exposure.

MANAGEMENT OF COLORECTAL STUMP AFTER COLECTOMY: WHAT MATTERS? A COMPARISON BETWEEN IBD AND NON-IBD PATIENTS.

P123

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Purpose/Background: There is a controversy around optimal management of the (colo)rectal stump after total abdominal colectomy (TAC) for inflammatory bowel disease (IBD). Various methods such as Hartmann closure, subcutaneous burial of the stump and creation of a mucus fistula have been tried. Limited information is available on comparison of this aspect between IBD and various other non-IBD colonic pathologies. This study aimed to investigate stump related complications in various primary colonic pathologies and compare (colo)rectal stump-related complications between IBD and non-IBD patients.

P122 Case-Matched Logistic Regression for Ustekinumab vs. Vedolizumab

Variable	Odds Ratio (95% CI)	p-value
Any postoperative complication	0.38 (0.10, 1.4)	0.15
Overall infectious complications	1.5 (0.42, 5.3)	0.53
- Abscess – intra-abdominal	3.0 (0.31, 28.8)	0.34
- Sepsis	1.00 (0.06, 16.0)	0.99
- Organ Space SSI	0.50 (0.05, 5.5)	0.57
- Superficial SSI	1.00 (0.14, 7.1)	0.99
Readmission	0.25 (0.03, 2.2)	0.21

N = 27 patients in each group

Methods/Interventions: Patients undergoing partial or TAC with creation of a distal stump from 2010-2017 were assigned to groups based on the primary colonic pathology and method of stump management. Stump related complications within the 30-day postoperative period were recorded and analyzed. Categorical variables were compared using the chi-square test and Fisher exact test when appropriate. Independent sample t test was used for continuous variables.

Results/Outcome(s): Of 164 patients, 79 had IBD and 85 did not; gender distribution was even between the groups ($p=0.346$). Non-IBD group was significantly older (mean age 61.8 vs. 45.4 years, $p=0.001$), and had significantly more comorbidities ($p=0.001$). As expected, more IBD patients were pre-operatively receiving immunosuppressants ($p=0.001$). Overall, IBD group had a significantly higher rate of laparoscopic procedures, ($p=0.001$). Methods of stump management were similar in both groups (Hartmann-type: 82 in non-IBD vs. 77 in IBD group). Non-IBD had only one mucus fistula vs. 10 in IBD group ($p=0.288$). Five patients had stump blowout [4 in IBD and 1 in non-IBD group (odds ratio [OR], 0.095; 95% confidence interval [CI], 0.010–0.910; $p=0.032$)] requiring reoperation in all; 4/5 stump blowouts were related to ulcerative colitis. No association was noted between immunosuppression and stump blowout. Further analysis showed no relationship with a particular category of immunosuppressants. No statistically significant difference was noted in both groups for rates of wound infection or dehiscence, although the overall complication rate was significantly higher in the non-IBD group (OR 0.316; 95% CI, 0.163-0.612; $p=0.001$). No mortality was reported in either group.

Conclusions/Discussion: With the limitations of a small retrospective study, the IBD group had a statistically significant higher stump leak rate; however, the method of stump closure had no bearing on the leak rate. Overall complication rate was significantly higher in the non-IBD group, which was independent of mean age.

Parameters	Non-IBD	IBD	P value
Total Number	85	79	
Mean age (years)	61.8	45.418	0.000
Body Mass Index	26.9	26.5	0.753
Gender distribution			
Female	40	31	0.346
Male	45	48	
Comorbidities	79	56	0.000
Immunosuppressed	5	73	0.000
Surgery			
Laparoscopic	9	50	0.000
Open	72	12	
Stump closure methods			
Staple	82	77	0.999
Hand sewn	1	0	
Stapled reinforced	1	2	
Stump management			
Hartmann	82	69	0.288
Subcutaneous	1	10	
Mucus fistula	2	0	
Overall complications	41	59	0.001
Stump Blowout	1	4	0.032
Thirty-day Morbidity	39	18	0.003
Length of stay (days)	10.9	7.29	0.139
Readmission Rate	12	8	0.386

Table 1
Categorical variables were compared using the chi-square test and Fisher exact test when appropriate. Independent sample t test was used for continuous variables. Independent significant predictors from the univariate analysis were further evaluated in SPSS ver. 25.0 (SPSS Inc., Chicago, IL, USA). Power of the study was calculated by univariate general linear model. Statistical significance was defined as $P \leq 0.05$.

UNDERSTANDING PATIENTS WITH INFLAMMATORY BOWEL DISEASE AND HIDRADENITIS SUPPURATIVA: OUTCOMES AFTER COLORECTAL PROCEDURES.

P124

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Purpose/Background: Little is known about the relationship between Hidradenitis Suppurativa (HS) and Inflammatory Bowel Disease (IBD). Further, it is unknown how the postoperative outcomes of patients with both IBD and HS compare to patients with only one of these diseases. The aim of our study is to identify the prevalence of HS among patients with IBD from a national database and to determine postoperative outcomes in patients with both diseases. We hypothesize that patients with both IBD and HS will have an increase in the infectious and overall complication rates following surgery when compared to patients with IBD alone.

Methods/Interventions: We queried the National Inpatient Sample (NIS) database to identify patients with a diagnosis of IBD, HS, or both who underwent colorectal procedures from 2003 to 2013. IBD was defined as a

diagnosis of either Ulcerative Colitis or Crohn's Disease and diagnoses were based on International Classification of Diseases (ICD-9) diagnostic codes. Relevant colon, rectal, and anal procedures were chosen from ICD-9 procedural codes. Complications were defined according to the NIS, based on ICD-9 codes, and were limited to the inpatient hospitalization. Our primary outcome of interest was any NIS defined complication. Our secondary outcome included any infectious complication. The rates of any complication and infectious complications among patients with IBD and HS were compared to patients with IBD alone using multiple logistic regression. P-values <0.05 were considered significant.

Results/Outcome(s): Our cohort included 47,354 patients who underwent colorectal procedures during the study. Of those patients, 46,502 were diagnosed with IBD alone (98.2%), 790 with HS alone (1.7%), and 62 with both IBD and HS (0.13%). Of the patients with both IBD and HS, 8 (12.9%) had Ulcerative Colitis and 54 (87.1%) had Crohn's Disease. Overall, patients with IBD have significantly increased complication rates during their hospital stay compared to patients with HS (OR 2.15, 95% CI 1.746-2.646, $p < 0.0001$). Similarly, the odds of having an infectious complication were significantly increased in patients with IBD compared to patients with HS (OR 2.51, 95% CI 1.47-4.27, $p < 0.0008$). However, when comparing patients with both IBD and HS to patients with IBD alone, there was no significant difference in the overall or infectious complication rates (OR 0.613, 95% CI 0.325-1.156, $p = 0.130$; OR 0.602, 95% CI 0.145-2.498, $p = 0.485$).

Conclusions/Discussion: Patients with IBD are at an increased odds of having postoperative complications when compared to patients with HS after undergoing the same procedures. However, when comparing complication rates for patients with both IBD and HS to IBD alone, there was no significant difference found in their postoperative complication rates. Future work is necessary to understand the relationship between HS and IBD and the optimal management of both diseases.

BOWEL FUNCTION AFTER ILEOCOLIC RESECTION FOR TERMINAL ILEAL CROHN'S DISEASE.

P125

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Purpose/Background: Ileocolic resection for terminal ileal Crohn's disease is the standard surgical treatment for patients with complications from the disease or those whose disease is medically refractory. The bowel functional effects of ileocolic resection for terminal ileal Crohn's disease is largely unknown due to the lack of baseline bowel function data. The purpose of this study is to evaluate the effects of ileocolic resection for terminal ileal Crohn's disease on bowel function.

Methods/Interventions: All patients with terminal ileal Crohn's disease who underwent ileocolic resection over a two year period were included. The Colorectal Functional Outcome (COREFO) questionnaire was administered prospectively to patients during the initial visit and at follow-up after resection and anastomosis or after subsequent loop ileostomy reversal. The questionnaire assesses bowel function in five domains (incontinence, frequency, social impact, need for medication and stool related aspects) and total score; scores for each range from 0 (best function) to 100 (poorest function). The null hypothesis was that there would be no difference in bowel function scores in any domain or total score. Demographic, operative, and questionnaire results were linked and analyzed. Paired t-test analysis was used to evaluate the score changes at time of final follow-up.

Results/Outcome(s): A total of nineteen patients were included in the study. Mean (SD) age was 43(19) years with thirteen women; all patients had Crohn's disease confined to the terminal ileum. Seven patients had complicated disease: six with previous ileocolic resection and one with an ileosigmoid fistula and abscess. Ten patients were on Anti-TNF therapy at time of initial visit, three were on steroids, and six were on immunomodulators. All patients

P125 Bowel Function Scores after Ileocolic Resection for Terminal Ileal Crohn's Disease (n=19)

	Mean (SD) Baseline Scores	Mean (SD) Final Follow-Up Scores	p
Incontinence	10.9 (11.7)	7.3 (7.4)	NS
Social Impact	24.1 (22.5)	17.4 (16.7)	NS
Frequency	22.4 (21.1)	23.0 (12.7)	NS
Stool Related Aspects	21.1 (26.0)	10.1 (12.3)	<0.05
Need for Medication	18.9 (22.0)	13.2 (20.8)	NS
Total COREFO Score	18.5 (14.7)	13.0 (8.6)	NS

A higher score indicates worse function

underwent an ileocolic resection with primary anastomosis; two patients had additional resections, one had a separate small bowel resection unrelated to Crohn's disease and the other an anterior resection due to distal sigmoid fistula. Two patients had a diverting loop ileostomy created that was subsequently reversed. Eighteen of the nineteen resections were performed minimally-invasively. Bowel function scores are shown in the Table. Median (IQR) number of days between initial to final follow-up questionnaire completion was 78 (48-90) days. There were no differences in most domain and Total COREFO scores; the mean stool-related aspects score improved following resection.

Conclusions/Discussion: Bowel function is mostly unchanged following ileocolic resection for terminal ileal Crohn's disease. Stool-related aspects such as blood with bowel movements and perianal skin irritation improve following surgery.

SELF-EFFICACY OF PATIENTS WITH CROHN'S DISEASE CAN BE EFFECTIVELY IMPROVED BY SOCIAL MEDIA COMMUNITY: EXPERIENCE FROM A SINGLE INSTITUTION IN CHINA.

P126

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Purpose/Background: Many factors can influence disease management and quality of life with patients of Crohn's disease (CD). Recent studies had demonstrated that self-efficacy is one of important factors for objective assessment of disease management and improves treatment outcomes. The prevalence of social media community, such as WeChat in China, enhance communication and interaction between doctors and patients effectively. Our aim is to evaluate the outcomes of self-efficacy in patients managed with WeChat social media community and analyse influence factors of efficacy level.

Methods/Interventions: This is a prospective, cross-sectional designed study. The patients with Crohn's disease managed with WeChat social media community whom treated in our institution were enrolled. All patients were asked to fill out the questionnaire (including general information, activity index of disease and "IBD-yourself"). Internal reliability of "IBD-yourself" was assessed by standardised Cronbach's α . Median self-efficacy scores per domain were calculated. Influence factors of the efficacy level were analyzed with chi-square.

Results/Outcome(s): Seventy-five patients (75/91) complete the questionnaire. The domains of the "IBD-yourself" for the patients showed good to excellent internal consistency, with Cronbach's α ranging from 0.64 to 0.93. Median self-efficacy scores of patients managed by the WeChat community varied from 81 to 100%, excepting for nutritional status (Median self-efficacy scores 62.5%). Male patients had significantly more knowledge of their disease (median score 90% vs. 81.5%, $P = 0.035$), females were better able to tell family, friends and coworkers about their disease (95% vs. 81%, $P = 0.048$), and patients who received university education had significantly more knowledge of diagnostic tests (median score 90% vs. 81%, $P = 0.01$). Additionally, patients who treated with infliximab had higher self-efficacy management compared with who did not (median score 91% vs. 80%, $P = 0.033$).

Conclusions/Discussion: Our study indicate that managed with WeChat social media community can improve patient's self-efficacy. Multi-specialists, such as nutritionist, participating community management can improve Self-efficacy of patients with Crohn's disease.

P126 Median total domain scores of the "IBD-yourself" questionnaire for CD patients

Domain	No of question	Score range	Median score	% of max score	no. of maximal score
1	5	0-20	18	90	30
2	6	0-24	22	91.7	25
3	6	0-24	21	87.5	22
4	8	0-32	28	87.5	18
5	4	0-16	10	62.5	12
6	9	0-36	34	94.4	30
7	4	0-16	13	81.3	25
8	4	0-20	17	85	37
9	3	0-6	6	100	55

THE COMBINATION OF SURGERY AND BIOLOGICS IN FISTULOUS PERIANAL CROHN'S DISEASE: A TALE OF TWO TREATMENTS.

P127

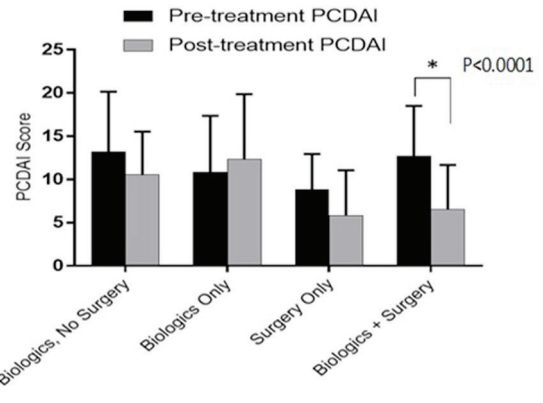
S. Naffouj, J. Sugrue, S. Eftaiha, C. Warner, J. Park, K. Kochar, A. Mellgren, J. Nordenstam
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Purpose/Background: The treatment of fistulous perianal Crohn's disease (PCD) remains challenging. Although the effectiveness of biologics in treating intestinal Crohn's disease (CD) has been well established, their effectiveness in treating PCD is still controversial. This study was designed to evaluate the effectiveness of biologics in treating patients with PCD.

Methods/Interventions: A retrospective review was performed at a single institution. All patients with fistulous PCD treated between 2005 and 2016 were included. Patients were divided into 4 treatment groups: traditional treatment such as antibiotics, steroids, and immunosuppressive therapy (no biologics + no surgery), biologics alone, surgery alone, and surgery + biologics groups. Definitive surgery was defined as a fistula operation with curative intent, excluding proctectomies, diversions, and procedures that aim to control or ameliorate symptoms such as seton placement. The primary outcome was the rate of fistula healing defined as cessation of drainage with closure of the external opening for at least 3 months. Secondary outcome was the perianal Crohn's disease activity index (PCDAI) score changes.

Results/Outcome(s): 79 patients were included: 31 were treated with biologics alone, 25 were treated with biologics + surgery, 7 were treated with surgery alone, and 16 received neither biologics nor surgery. 41 patients (51.9%) were males and the mean age was 38 ± 14 years. Patients treated with surgery alone or surgery + biologics had significantly higher healing rates than those treated with biologics alone or those who received traditional treatment ($p < 0.0001$). A combination of surgery and biologics did not improve healing, compared to surgery alone (56%, 71%, respectively, $p = 0.67$). In addition, there was no significant difference in healing rates between the biologics alone group and the traditional treatment group (16%, 6%, respectively, $p = 0.64$). However, the combination treatment resulted in significant improvement of PCDAI scores; the other therapies did not (Figure 1).

Conclusions/Discussion: Surgery remains the cornerstone for treatment of fistulous perianal Crohn's disease. However, this series suggests that the combination of biologics with surgery may improve disease control.



BICONTINENTAL ANALYSIS OF TRANSANAL ILEAL POUCH-ANAL ANASTOMOSIS FOR ULCERATIVE COLITIS AND INFLAMMATORY BOWEL DISEASE-UNCLASSIFIED.

P128

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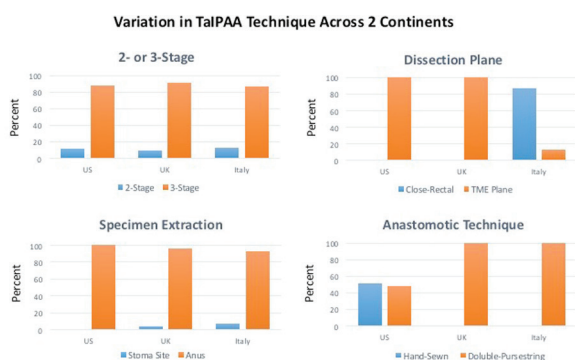
Purpose/Background: Transanal proctectomy, initially developed for rectal cancer, is gaining popularity as a viable, minimally invasive option with presumably improved outcomes over transabdominal proctectomy. This approach has been extended to benign disease, with initial reports suggesting safety and feasibility of transanal ileal pouch-anal anastomosis (TaIPAA). The purpose of this study was to evaluate differences in technique and results of TaIPAA across two continents.

Methods/Interventions: Prospective IPAA registries from 3 institutions in the US and Europe were queried for patients undergoing TaIPAA. Demographic, preoperative, intraoperative, and postoperative data were compiled into a single database and evaluated.

Results/Outcome(s): 62 patients underwent TaIPAA for ulcerative colitis (n=60) or inflammatory bowel disease-unclassified (n=2). Median age was 38 (range; 16-68) years and 43 (69%) patients were male. A large majority of patients were otherwise healthy, with almost all patients being American Society of Anesthesiologists class 2 (n=58;94%) and most patients (n=43; 69%) having no comorbid disease. However, perioperative corticosteroid (56%) and biologic use (63%) was common. Diverting ileostomy was performed in all cases and most patients had a 3-stage IPAA (n=55;89%). Close rectal dissection (CRD) was performed in 13 (21%) patients and dissection was in the total mesorectal excision (TME) plane in 49 (79%) patients. The specimen was removed either through the stoma site (56%) or anus (42%). The pelvic

anastomosis was created using a double-pursestring technique in 50 (81%) patients or hand-sewn either directly to the rectal cuff in 4 (6%) patients or to the dentate line after mucosectomy in 8 (13%) patients. Median operative time was 266 (range; 180-576) minutes and median estimated blood loss was 100 (range; 10-500) cc. Institutional variations in technique are depicted in the Figure. No intraoperative complications occurred. Median hospital length of stay was 6 (range, 2-24) days. 30-day overall and Clavien-Dindo grade 3 or higher complications occurred 18 (29%) and 4 (7%) of patients, respectively. Pelvic anastomotic leak occurred in 5 (8%) patients. An anastomotic leak occurred in none of the 13 patients having CRD compared to 5 of the 49 (11%) patients having dissection in the TME plane ($p=NS$). In addition, the incidence of anastomotic leak was similar in patients having a hand-sewn (1/12; 8%) vs. double-pursestring anastomosis (4/50; 8%) ($p=NS$). No other clinical factor was predictive of anastomotic leak.

Conclusions/Discussion: This is the first collaborative report of TaIPAA across continents. Although technical aspects of the procedure vary across institutions, TaIPAA is technically feasible and appears to be safe.



ROLE OF C-REACTIVE PROTEIN KINETICS AFTER SURGERY FOR CROHN'S DISEASE.

P129

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Milan, Italy

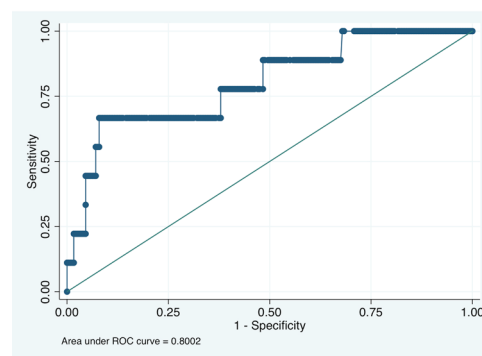
Purpose/Background: C-reactive protein (CRP) is a reliable predictor of major anastomotic leak after colorectal resection for cancer. However, there is lack of data on its role when surgical resection is performed for Crohn's disease (CD). Moreover, the higher postoperative CRP level of CD patients, as a consequence of an enhanced postoperative inflammatory response, may not reflect an actual underlying septic complication. The aim of this study is to characterize postoperative CRP kinetics with regards to postoperative course and its relevance in predicting anastomotic leakage after CD surgery.

Methods/Interventions: All CD patients undergoing surgical resection with primary anastomosis between January 2013 and January 2017 were retrospectively analyzed. Demographic, surgical, comorbidity was collected. Postoperative CRP levels, measured daily until discharge, were retrieved. Data regarding postoperative course including anastomotic leakage, infectious and non-infectious complications were retrieved. The discrimination ability of CRP levels in predicting the incidence of anastomotic leakage was evaluated according to the area under the curve (AUC), using the receiver-operating characteristic (ROC) methodology.

Results/Outcome(s): A series of 251 consecutive patients who underwent elective colorectal surgery in a specialized unit was retrospectively analyzed. Anastomotic leak was detected in 10 patients (4%). C-reactive protein level was a good predictor of anastomotic leak on postoperative day 3 to 5 (AUC equal to 0.741, 0.783 and 0.825 for day 3, 4 and 5, respectively). A delta cut-off of 14 measured between the first and the third day after surgery (AUC .800) maximizes sensitivity and specificity (NVP: 98.6% PPV 27%).

Conclusions/Discussion: Postoperative C-reactive protein could be a useful tool to rule out anastomotic complications after surgery for CD. Its high negative predictive value is crucial to allow early discharge and reduce hospital-acquired infection in particularly fragile CD patients after surgery.

FIG 3 Receiver operating characteristic curve for C-reactive protein DELTA (POD1-3) as predictor of major anastomotic leak. Area under the curve: 0.800.



FUNCTIONAL OUTCOMES AFTER TRANSANAL ILEAL POUCH ANAL ANASTOMOSIS.

P130

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Purpose/Background: Transanal ileal pouch anal anastomosis (taIPAA) has been reported as a safe procedure. Short term outcomes after taIPAA have shown lower morbidity when compared to the transabdominal approach. The functional outcomes after pouch surgery are of utmost importance and there is lack of data on the functional outcomes of this approach. This study aims to assess quality of life (QoL), functional outcome and social impact following ta-IPAA for ulcerative colitis (UC) and familial adenomatous polyposis (FAP).

Methods/Interventions: QoL and functional outcomes of patients undergoing taIPAA were prospectively collected and analyzed retrospectively. QoL and functional outcome and social impact at 6 weeks, 3 months, 6 months and 12 months after surgery was assessed using the validated Cleveland Global Quality of Life (CGQL) score.

Results/Outcome(s): Forty seven patients (45 UC, 2 FAP) were included in the study. Mean CGQL after surgery was 0.67, 0.71, 0.75 and 0.81 at 6 weeks 3 months, 6 months and 12 months after surgery respectively. A statistically significant improvement was found at 3, 6 and 12 months (p<0.05). A significant improvement in the 24h bowel frequency and nocturnal frequency was found across the different time points with up to 80% of patients having 6 to 8 bowel movements and 80% of patients reporting absence of nocturnal frequency. A positive trend was also found in relation to social, work, dietary and sexual activity during the 12 month follow up.

Conclusions/Discussion: TaIPAA produces promising results in terms of QoL, and functional outcomes at 12 months after surgery. Further long term follow up studies, including comparison with transabdominal approach, are needed to confirm these findings.

Figure 1.

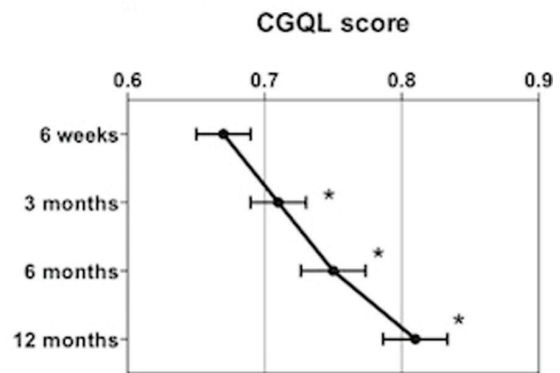


Figure 2

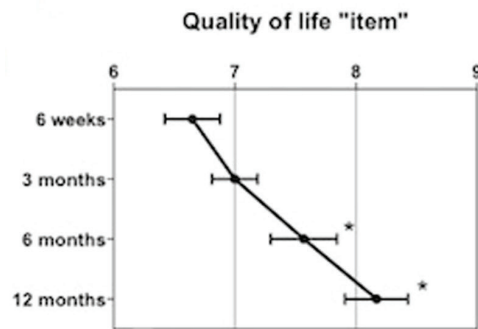


Figure 3.

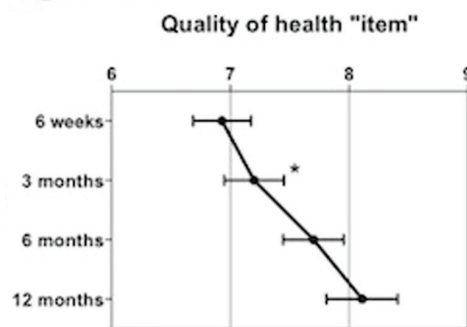
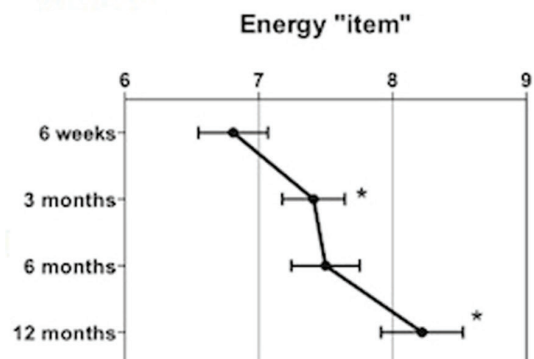


Figure 4.



WHAT ARE THE CONSEQUENCES OF THE PROFOUND SHIFTS IN ULCERATIVE COLITIS MANAGEMENT?

P131

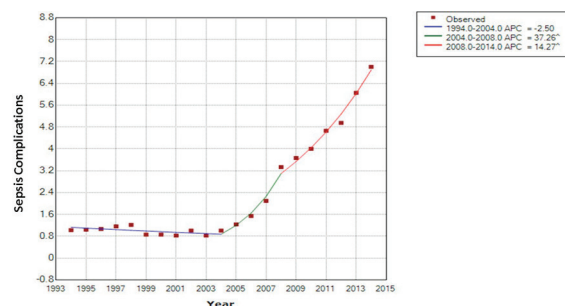
T. Francone, C. Stafford, L. Bordeianou, H. Kunitake,
R. Ricciardi
Boston, MA

Purpose/Background: We hypothesized that the profound shifts in the management of ulcerative colitis (UC) have led to reduced use of surgical procedures, both restorative and non-restorative. Therefore, we analyzed the consequences of these treatment changes on the development of colorectal cancer and infectious complications.

Methods/Interventions: We analyzed data from the Nationwide Inpatient Sample of the Agency for Healthcare Research and Quality for the time-period of 1/1/1994 through 12/31/2014. First, we used standard ICD-9-CM codes to identify patients with a hospital discharge for UC, with and without a concomitant diagnostic code of colorectal cancer, sepsis, and/or *C. difficile* infection. Next, we identified all patients who underwent ileoanal pouch reconstruction (IPAA), proctectomy with permanent ileostomy, total abdominal colectomy as well as other resections of the colon and rectum. Then, we calculated rates of surgical procedures, colorectal cancers, and infectious complications (sepsis and *C. difficile* infections) by UC discharge. Last, we used Joinpoint analyses from the National Cancer Institute to calculate the annual percentage change (APC) in UC discharges, surgical procedure utilization, concomitant colorectal cancer treatment, and concomitant infectious complication over the study period. All statistical tests were subsequently confirmed with nonparametric Kendall correlation analyses.

Results/Outcome(s): In the United States, hospital discharges for UC rose from 50,297 in 1994 to 114,800 in 2014, a 230% increase over the 20-year study period. IPAA has been declining with an annual percentage change of 5.2% since 1997 (APC=5.2%; $p<0.05$ for trend). Since 1997, proctectomy with end ileostomy has also been declining with an annual percentage change of 12.1% (APC=12.1%; $p<0.05$ for trend) and total abdominal colectomy has been declining at 4.8% (APC=4.8%; $p<0.05$ for trend). UC discharges with a concomitant diagnosis for colorectal cancer have declined more gradually at 3.2% during the study period (APC=3.2%; $p<0.05$ for trend). However, diagnoses for infectious complications have considerably increased. A concomitant diagnoses of sepsis increased from 1.0% of all primary diagnostic codes in 1994 to 7.0% in 2014 (700% increase), rising substantially starting in 2004 with an APC of 37.3% ($p<0.05$ for trend). Similarly, *C. difficile* rose from 0.4% of all primary diagnostic codes in 1994 to 3.6% in 2014 (900% increase) rising substantially starting in 2004 with an APC of 46.2% ($p<0.05$ for trend).

Conclusions/Discussion: Over the past two decades, there have been substantial declines in surgical procedures for UC across the country. These declines have not been met with an increased rate of colorectal cancer. However, there was a marked and alarming increase in infectious complications (sepsis and/or *C. difficile* infections) leading us to recommend a re-evaluation of indications for the surgical management of UC.



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level. Final Selected Model: 2 Joinspoints.

VENOUS THROMBOEMBOLISM IN INFLAMMATORY BOWEL DISEASE: IS IT THE DISEASE, THE OPERATION, OR BOTH?

P132

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E. Habermann
Rochester, MN

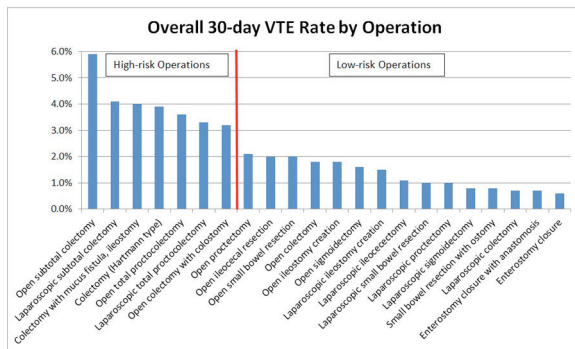
Purpose/Background: Patients with inflammatory bowel disease have a higher baseline risk of venous thromboembolism (VTE). However, whether the increased risk of post-operative VTE is secondary to the operation or underlying disease process is frequently debated. The aim of this study was to determine the relative or combined effects of Crohn's disease (CD) or chronic ulcerative colitis (CUC) and the operation performed on post-operative VTE.

Methods/Interventions: The American College of Surgeons National Surgical Quality Improvement Project multicenter database from 2005-2016 was queried for patients with a diagnosis of CD, CUC, small or large bowel malignancy, diverticulosis, diverticulitis, and clostridium difficile who underwent the 22 most common operations performed in patients with CD. Patients were grouped according to diagnosis of CD, CUC, malignancy, or benign disease (diverticulosis, diverticulitis, and clostridium difficile). Procedures with a post-operative VTE rate of 3% or greater were deemed high-risk. Operation-specific univariate and multivariable logistic regression analyses were conducted.

Results/Outcome(s): A total of 137,144 operations were analyzed. The rate of 30-day VTE ranged from 0.6% for ostomy takedown to 5.9% for open subtotal colectomy. One-third (37%) of VTEs were diagnosed in the outpatient setting, at a median post-operative day of 9. CD

was independently associated with an increased risk of VTE compared to benign disease only within laparoscopic colectomy (odds ratio [OR] 2.1; 95% confidence interval [CI]: 1.1-4.0). CUC was not independently associated with VTE for any operation analyzed. Malignancy (OR 5.2; 95% CI: 1.7-16.0) was associated with increased risk of VTE compared to benign disease only within small bowel resection. Risk factors for VTE identified across multiple operations included obesity, malnutrition (albumin < 3.5 g/dL), and preoperative corticosteroid use. Overall, several procedures, in addition to open subtotal colectomy, were deemed high risk: laparoscopic subtotal colectomy, open and laparoscopic total proctocolectomy with end ileostomy, colectomy with end colostomy and a Hartmann's segment, colectomy with end colostomy and a mucus fistula, and colectomy with cecostomy or colostomy (Figure).

Conclusions/Discussion: The diagnosis of CD or CUC itself does not appear to confer an increased risk of VTE in patients undergoing abdominal surgery. However, increased risk of VTE was related to the operation performed. Patients undergoing high-risk operations or those with multiple risk factors for VTE warrant extended 30-day VTE prophylaxis regardless of their underlying diagnosis.



IS IT POSSIBLE TO PREDICT POSTOPERATIVE RECURRENCE IN THE ANASTOMOTIC SITE AFTER INITIAL INTESTINAL RESECTION WITH CROHN'S DISEASE?

P133

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Purpose/Background: Postoperative recurrence is still serious problem in Crohn's disease (CD). The prediction of the patients with high recurrence rate is important for the prophylactic treatment of preventing recurrence with the cost effectiveness and without side effects of the medication including biologics. In this study, the postoperative recurrence in the anastomotic site which is thought to

be relevant to surgery and the risk factors of anastomotic recurrence were analyzed.

Methods/Interventions: Of 1002 Crohn's disease patients with initial intestinal resection in our institute, 969 patients excluding cancer patients were included and main surgical indications were intestinal stricture in 55% of the patients and fistula in 29%. The postoperative reoperation for the recurrence in the anastomotic site or the other lesions was performed in 336 patients (35%) including 159 patients with recurrence in only anastomotic site. The median follow up period was 75 months after the initial operation. The risk factors of reoperation for anastomotic recurrence were analyzed in 159 patients retrospectively.

Results/Outcome(s): Postoperative reoperation rate after 5 years and 10 years was 40%, 70% in the patients with recurrence in anastomotic site or other lesions (n=336) and 23%, 55% in the patients with recurrence in only anastomotic site (n=159), respectively. The risk factors of recurrence in the anastomotic site by comparing between the patients with recurrence in the anastomotic site or other lesions and those with only anastomotic recurrence were gender, age onset of CD (\geq or < 20 years), duration of CD to the surgery (\geq or < 5 years), extent of disease (small intestine, large intestine, small and large intestine), surgical indication (perforating, non perforating), anastomotic procedure (FEE, others), site of resection (small intestine, large intestine, small and large intestine), postoperative biological treatment including prophylaxis or treatment for recurrence (n=63). No risk factors were identified statistically (Log Rank and Generalized Wilcoxon test).

Conclusions/Discussion: It was difficult to predict postoperative recurrence in the anastomotic site which is relevant to surgery in the Crohn's disease patients with initial intestinal resection irrespective of the lack of smoking history. The scheduled examination after surgery by endoscopy or image study such as barium enema seems to be necessary to perform optimal treatment for prevention of recurrence in Crohn's disease.

ILEAL POUCH-ANAL ANASTOMOSIS WITH FLUORESCENCE ANGIOGRAPHY: INITIAL EXPERIENCE AND POTENTIAL APPLICATION.

P134

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¹Milan, Italy; ²Curtiba, Brazil; ³Geneva, Switzerland

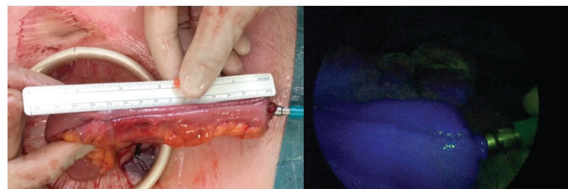
Purpose/Background: Background: there are currently no descriptions of the use of fluorescence imaging during pouch construction. **Objective:** to demonstrate the feasibility and the initial results of the use of fluorescence imaging with indocyanine green in ileal pouch-anal anastomosis.

Methods/Interventions: Design: retrospective study of a prospectively maintained database of patients submitted to ileal pouch-anal anastomosis. **Settings:** two referral centers, one from Italy and other from Switzerland. **Patients:** 32 patients (25 with ulcerative colitis and 7 with familial adenomatous polyposis). **Interventions:** minimally invasive ileal pouch-anal anastomosis procedures with the use of fluorescence imaging guidance to reduce tension and gain mesenteric length. **Main Outcome Measures:** demographic characteristics (age at surgery, gender), body mass index and approach (2- or 3-stage). Perioperative data, such as operative time, conversion to laparotomy and the need for ileocolic vessels ligation were also checked. Length of hospital stay, Clavien-Dindo early postoperative complications, readmission and the need for reoperation were additionally analyzed.

Results/Outcome(s): Results: 21 men and 11 woman, with a median body mass index of 22 (15-36) were included. Twelve patients had 2-stage procedures and 20 had 3-stage. Proctectomy was performed transanally in 19 and transabdominally in 13 cases. Safe ligation of ileocolic vessels after fluorescence was performed in 15/32 (47%) patients. One patient underwent intraoperative re-do IPAA because sectorial ischemia was diagnosed by fluorescence angiography. Subsequent ICG check confirmed adequate IPAA perfusion. The majority of patients (60%) had no postoperative complications. Six patients had Clavien-Dindo I and 6 had Clavien-Dindo II complications. One patient had a IIIb complication and underwent reoperation. There were no leaks, readmissions or mortality in the current series.

Conclusions/Discussion: Fluorescence imaging in minimally invasive ileal pouch-anal anastomosis is feasible, with low complication rates, and may impact in a reduction of leaks and pouchitis by reducing ischemia. A prospective comparative trial in pouch construction using or not fluorescence is warranted.

Figure 2. ICG assessment after pouch construction



UTILIZATION AND COST OF POST-DISCHARGE VENOUS THROMBOEMBOLISM PROPHYLAXIS AFTER MAJOR ABDOMINAL SURGERY FOR INFLAMMATORY BOWEL DISEASE.

P135

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Madison, WI

Purpose/Background: Patients with inflammatory bowel disease (IBD) have a three-fold higher risk of venous thromboembolism (VTE) than the general population. IBD also increases the risk of postoperative VTE, and this risk is known to continue after discharge. The efficacy and safety of post-discharge VTE prophylaxis for patients undergoing major abdominal surgery for cancer has been demonstrated and such prophylaxis is recommended by multiple national organizations. While there are not similar guidelines for IBD patients, there is growing consensus that post-discharge VTE prophylaxis is indicated for this surgical population as well. Our objective was to identify factors associated with post-discharge VTE prophylaxis after major abdominal surgery for IBD and to quantify associated costs to patients and insurers.

Methods/Interventions: Adult patients with IBD (ulcerative colitis (UC) or Crohn's disease) undergoing colectomy and/or proctectomy in 2012-2015 were identified in the Truven Health MarketScan[®] databases, which

P135 Receipt of post-discharge VTE prophylaxis and associated costs by procedure and diagnosis.

Procedure or Diagnosis	Percent of patients receiving post-discharge VTE prophylaxis	Median Number of days prescribed (interquartile range)	Median cost borne by insurer (interquartile range)	Median out-of-pocket cost to patient (interquartile range)
Proctectomy	6.2%	20 (14-30)	\$373 (\$265 - \$550)	\$10 (\$5 - \$15)
Colectomy	3.1%	27 (14-30)	\$286 (\$118 - \$515)	\$20 (\$10 - \$50)
Ulcerative Colitis	6.4%	23 (14-30)	\$373 (\$265 - \$563)	\$10 (\$5 - \$30)
Crohn's Disease	2.7%	20 (14-30)	\$236 (\$108 - \$479)	\$14 (\$10 - \$32)

include comprehensive claims for a nationwide cohort of commercially insured patients. Patients on anticoagulation preoperatively or with a VTE diagnosis prior to discharge were excluded. Use of post-discharge VTE prophylaxis and associated costs to insurers and patients were assessed. Multivariable logistic regression, including demographics, comorbidities and surgical factors, assessed predictors of receipt of post-discharge VTE prophylaxis.

Results/Outcome(s): Of 3,984 patients undergoing major abdominal surgery for IBD, 3.9% received post-discharge VTE prophylaxis. The median cost to payers was \$346 (interquartile range \$185-\$539), while median patient out-of-pocket costs were \$12 (interquartile range \$7-\$32). The table displays receipt of post-discharge VTE prophylaxis and associated costs by procedure and diagnosis. The risk-adjusted predicted probability of receiving post-discharge VTE prophylaxis was higher for patients with UC compared with Crohn's (5.5% vs 3.1%, $p < 0.01$) and for patients undergoing laparoscopic procedures (5.0% vs 3.6% for open, $p = 0.04$) or proctectomy (5.3% vs 3.5% for colectomy, $p = 0.02$). Significant regional variation was observed, with patients in the Northeast having the highest risk-adjusted predicted probability of receiving post-discharge prophylaxis and patients in the West the lowest (5.2% vs 2.1%, $p = 0.04$).

Conclusions/Discussion: The vast majority of patients undergoing major abdominal surgery for IBD do not receive post-discharge VTE prophylaxis. This is despite strong evidence that compared with the general population, patients with IBD have a higher risk of postoperative VTE that extends beyond the initial inpatient period. These findings suggest a need for development and wide implementation of evidence-based guidelines regarding the efficacy and safety of post-discharge VTE prophylaxis for patients with IBD undergoing major surgery.

THE EFFECT OF SURGICAL TECHNIQUE ON UTILIZATION OF TWO-STAGE RESECTIONS FOR ULCERATIVE COLITIS.

P136

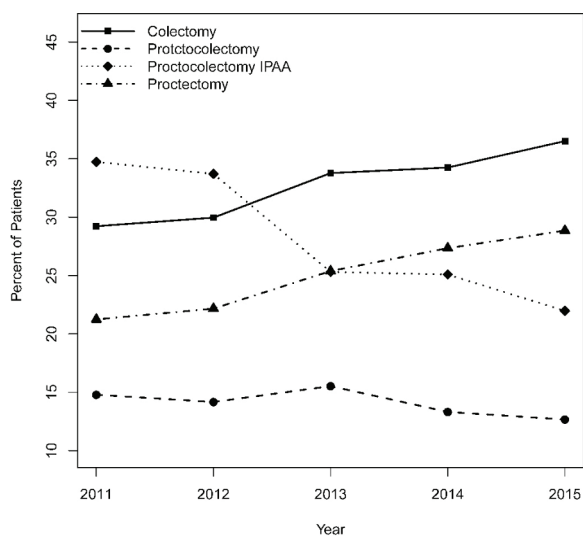
A. Gasior, A. Hinton, C. Zhang, S. Husain
Columbus, OH

Purpose/Background: Widespread utilization of biologics in UC has led to a perception that patients present for surgery at a more advanced stage and are worse surgical candidates than their counterparts in pre-biologic era leading to an increasing trend towards utilization of three-stage procedures. We sought to delineate the relationship between the operative approach and the type of UC operations.

Methods/Interventions: NSQIP data was analyzed from 2011 to 2015. UC patients undergoing elective Total Colectomy with Ileostomy, Proctocolectomy with Ileostomy, Proctocolectomy IPAA and Ileostomy and Proctectomy with IPAA were identified. Emergency cases were excluded. Patient demographics and surgical outcomes were assessed. Logistic regression odds ratios, Fisher's exact test were used.

Results/Outcome(s): 5,944 patients were identified. The odds of receiving a laparoscopic resection increased with each successive year (2011 Odds Ratio (OR) 1.35 vs 2015 OR 1.90; $p < 0.001$). There was a reduction in the relative incidence of proctocolectomy with IPAA and ileostomy with concomitant increase in total colectomy with ileostomy and proctectomy with IPAA and ileostomy. Total proctocolectomy (without IPAA) with ileostomy remained relatively unchanged. Graph 1 Subgroup analysis of proctocolectomy with IPAA and ileostomy identified 1,618 patients (Laparoscopic: 1,008, Open: 610). Compared to laparoscopic group, patients in the open group were more likely to be male (62.62%, $p = 0.013$), older (43.66 yrs, $p = 0.001$), higher BMI (26.77, $p = 0.001$), higher ASA score ($p < 0.001$) and higher scores for probability for morbidity ($p < 0.001$) and mortality ($p = 0.001$). The laparoscopic group had a higher incidence of steroid use ($p = 0.007$) and longer operative time ($p < 0.001$). The surgical outcomes were comparable between the two groups with the exception of wound related complications and sepsis / septic shock which were noted more frequently in open group ($p = 0.002$ and 0.043 respectively). Anastomotic leaks (organ space infection) were not significantly different between the two groups. Over the study period, the relative utilization of proctocolectomy with IPAA and Ileostomy dropped 43.57% for laparoscopic procedures compared to 29% for open procedures. The ASA class of patients undergoing proctocolectomy and IPAA remained stable through the study period. Finally, the NSQIP calculated probability of morbidity improved from 2011 to 2015 while probability of mortality remained stable

Conclusions/Discussion: While the overall utilization of laparoscopic approach has increased for elective UC operations, there has been a significant drop in relative frequency of two-stage procedures. This reduction is much more pronounced in laparoscopic approach compared to open technique despite favorable demographics. These findings indicate that the decreased utilization of two-stage procedures is more dependent on surgical technique (laparoscopy) than patients' pre-operative morbidities.



Graph 1: Overall trend of surgeries for Ulcerative Colitis patients by year

PREDICTORS OF 30-DAY READMISSION FOLLOWING MAJOR ABDOMINAL SURGERY FOR CROHN'S DISEASE.

P137

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Purpose/Background: Surgery is required in up to 75% of patients with Crohn's disease. Postoperative readmission within 30 days of discharge adds cost, morbidity, and is closely scrutinized as a surrogate of quality of care provided. We aimed to identify risk factors associated with 30-day readmission in Crohn's disease patients undergoing major abdominal surgery.

Methods/Interventions: A retrospective review of patients who underwent major abdominal surgery for a diagnosis of Crohn's disease at the University of Florida between May 2011 and May 2017 was performed. Factors

associated with 30-day readmission were identified. Pearson's chi-squared, student T-test, and Wilcoxon-rank-sum test were used for univariate analysis. Logistic regression was used for multivariate analysis.

Results/Outcome(s): A total of 149 patients were included with a median age of 39 years and median BMI of 24. Females comprised 55% of the study population. Postoperatively, 24 patients (16.7%) were readmitted within 30 days. Factors associated with increased risk of readmission on univariate analysis were: African American race (OR 4.03, $p=0.045$), preoperative history of venous thrombosis (OR 3.7, $p=0.016$) and $>10\%$ weight loss in the past 6 months (OR 5.92, $p=0.001$). Weight loss was a significant risk factor for readmission, regardless of preoperative albumin level. On multivariate logistic regression using a model adjusting for age >65 years, creation of primary anastomosis without a diverting ostomy, emergent surgery and presence of severe intra-abdominal complications (enteroenteric fistula, abscess, obstruction) on pre-operative imaging, the above risk factors maintained significance (Table 1). Age >65 years, gender, active smoking, preoperative albumin level, prior history of abdominal surgery, emergent surgery, duration of disease, perioperative use of steroids, and perioperative use of biologic therapy were not associated with an increased risk for 30-day readmission.

Conclusions/Discussion: African American race, preoperative history of venous thrombosis, and a weight loss of $>10\%$ body weight in the six months prior to surgery are significant risk factors for 30-day readmission in Crohn's disease patients undergoing bowel resection. Interestingly, pre-operative weight loss, but not albumin level was predictive of readmission. Attention to weight loss patterns preoperatively may be prudent to stratify readmission risk. The role of preoperative intensive nutritional supplementation in patients demonstrating malnutrition requires further study.

P137 Multivariate logistic regression for 30-day re-admission following major abdominal surgery

	Adjusted Odds Ratio (OR)	P	95% Confidence Interval
African American race	14.5	0.009	1.9-109.2
History of venous thrombosis	4.4	0.031	1.1-16.9
Weight loss $> 10\%$	7.0	0.004	1.9-26.5
Age >65	1.2	0.853	0.2-7.5
Preoperative steroid use	1.4	0.527	0.5-4.2
Preoperative biologic use	0.6	0.355	0.2-1.9
Creation of primary anastomosis without diverting ostomy	1.7	0.432	0.5-6.3
Presence of severe intra-abdominal complications on pre-operative imaging	0.6	0.438	0.2-2.1

RISK FACTORS FOR IBD ASSOCIATED MALIGNANCY IN AN AFROCENTRIC POPULATION: LESS COMMON THAN YOU THINK.

P138

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Purpose/Background: To determine the presence IBD and its risk factors for malignancy in a Jamaican population of patients with colitis.

Methods/Interventions: All colonoscopies performed during the study period of 2008 to 2016 with an endoscopic diagnosis of having acute inflammation, including patients previously diagnosed with IBD, were matched with their corresponding histology reports. Variables analyzed included: demographics, indication for colonoscopy, severity and extent of acute inflammation, presence of polyps at endoscopy and the presence of dysplasia on histology. Histologically diagnosed IBD were compared to other causes of acute inflammation.

Results/Outcome(s): Of 3361 colonoscopies, 80 (2%) patients within the ages of 13-85 years were endoscopically suspicious for IBD with mean age of 51 years. There were 49 (61%) women and 31 (39%) men. IBD was confirmed histologically in 43 (1%) patients (or were previously confirmed 40%) with only 1 patient having Crohn's colitis. Evidence of bleeding (51%) and diarrhoea (20%) were the leading indications for colonoscopy and 63% of the group had involvement of the rectum and colon while 11% had pancolitis. Most patients had mild inflammation (74%) but severe inflammation was seen in 11% and a similar number (13%) had polyps. Dysplasia was present in only 2 patients, both with IBD. Compared to IBD patients (mean age 47 years), the control group were older with mean age 56 years ($p=0.020$), 19 (54%) had acute self-limiting colitis while 15% had radiation-related inflammation. With the exception of patients with a past history of IBD, there was no difference in the presenting symptoms and their histological diagnosis.

Conclusions/Discussion: IBD is not uncommon in our population however, dysplasia, polyps and pancolitis, which are all risk factors for malignant degeneration are rare in this population.

EVALUATING THE IMPACT OF VEDOLIZUMAB ON POSTOPERATIVE COMPLICATIONS IN INFLAMMATORY BOWEL DISEASE PATIENTS.

P139

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Purpose/Background: Vedolizumab has been previously shown to increase the risk of surgical site infections (SSI) compared to other biologic agents. Vedolizumab's

selective inhibition of leukocyte migration in the gut is postulated as the mechanism. We aimed to investigate the impact of vedolizumab on postoperative complications in patients with inflammatory bowel disease (IBD).

Methods/Interventions: All patients who underwent major abdominal procedures due to IBD between 05/2014 and 10/2016 were screened for inclusion in this IRB-approved study. Patients were divided into three groups based on preoperative medication usage: vedolizumab (group 1), biologics other than vedolizumab (group 2), no biologic therapy (group 3). Patients being treated with one of these medications within 8 weeks of surgery were considered for inclusion in the treatment groups. Patients actively being treated with steroids were excluded. Fisher's exact, Pearson's Chi-square, or Kruskal-Wallis test was used as appropriate.

Results/Outcome(s): Of 101 patients screened for inclusion, 30 patients on preoperative steroids were excluded and a final 71 patients were included; 16 on vedolizumab, 37 on biologics other than vedolizumab, and 18 not on biologics. Baseline characteristics were similar between groups. No 30-day postoperative mortality was noted. Overall, 20 patients developed postoperative complications (28%). Eight patients (11%) had SSI, 4 (6%) required reoperation and 3 (4%) developed DVT/PE. Nine patients (13%) required readmission, and 7 (10%) required an emergency room (ER) visit within 30 days. No association was noted between the treatment groups and the overall complication rate ($p=0.690$). Similarly, no association was noted between the treatment groups and individual complications, including SSI ($p=0.89$), reoperation ($p=0.80$), DVT/PE ($p=0.11$), readmission ($p=0.36$), and ER visit ($p=0.15$). Specifically, SSI rate was similar between groups (6% for group 1 vs. 14% for group 2 vs. 11% for group 3; $p=0.89$).

Conclusions/Discussion: Preoperative use of vedolizumab was not associated with an increased risk of 30-day postoperative complications among IBD patients compared to patients using anti-TNF, or a combination of anti-TNF with immunomodulators.

DUODENAL STRICTURES IN CROHN'S DISEASE.

P140

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Purpose/Background: Crohn's disease (CD) of the duodenum is uncommon and represents a diagnostic and treatment challenge, with very little available data. Our goal was to evaluate our experience in diagnosing and managing stricturing duodenal CD with the hypothesis that proper management requires a multidisciplinary approach.

Methods/Interventions: After IRB approval, a prospectively maintained database was queried for duodenal CD from 2005 to 2017. Patients without endoscopic or cross-sectional imaging of CD duodenal strictures or a stricture not associated with CD were excluded.

Results/Outcome(s): Twenty-three patients were identified with duodenal stricturing CD. Fourteen were male (61%). The average age when initially diagnosed with CD was 29 (12-68 years old) and the average age when first diagnosed with duodenal CD diagnosis was 34 (12-82) years old. All but one patient had concomitant distal disease (ileocolic distribution (61%), midgut disease (22%), perianal 13%, and colitis 8%). Computerized topographic enterography (CTE) was used solely for diagnosis in 13% of patients. The remaining 87% were diagnosed with EGD, and 30% of those underwent additional MRI/CTE. Presenting symptoms included upper abdominal pain (39%), nausea/vomiting (39%), gastric outlet obstruction (13%) and infectious complications in 1 patient. Patients with concomitant duodenal and distal disease received steroid therapy 70% of the time, with 48% of patients receiving one or more biologic agents (infliximab-64%, adalimumab- 54%, certolizumab- 18%, vedolizumab-18%). One patient with isolated duodenal CD was treated with infliximab. Surgical treatment was: four patients had a Heineke-Mikulicz strictureplasty, 4 had bypass and the remaining 15 patients (65%) were managed by endoscopic dilatation alone. The indications for strictureplasty were persistent pain (2) and outlet obstruction (2). Bypasses were indicated after a perforation from EGD (1), inability to Koherize (1), and D4-jejunal resection with primary anastomosis and gastroduodenostomy (1), and Jaboulay gastroduodenostomy for a friable D1 stricture with normal D2 (1). Sixty percent of duodenal stenosis seen on EGD were in D2, 22% were in D1, 13% were in D3 and 4% were in D4. Overall, 22 patients had endoscopic dilatations ranging from 1-21 dilations (average 2.8). Patients who were operated on had an average of 2.75 (range 1-5) dilations prior to surgical intervention with an average time from duodenal stricture to operation of 6 years (0.5-11 years).

Conclusions/Discussion: Strictureing duodenal CD is rare, usually occurs concomitant with distal CD and multidisciplinary team approach is required for its management. Endoscopic dilatations along with a combination of steroid and biologic therapy is successful in majority of patients. However, despite the advancement in medical therapy, surgery, including strictureplasty or bypass, it remains an option for patients with persistent or refractory disease.

WHAT IS THE BEST SURGICAL TREATMENT FOR POUCH-VAGINAL FISTULAS?

P141

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Purpose/Background: Pouch-vaginal fistula (PVF) is a debilitating condition with no single best surgical treatment described. Closure of these fistulas can be incredibly difficult. Transanal, transabdominal and transvaginal approaches have been reported with varying success rates. Recurrence is a major problem and could eventually result in repeat redo-pouch or permanent diversion. The aim of our study was to investigate healing rates for procedures done for PVF closure.

Methods/Interventions: Patients who underwent surgery for treatment of PVF from 2010-2016 were identified from prospectively maintained institutional IRB approved database and data was complemented with chart review. Patients who had inadequate follow-up to verify fistula status after the surgery were excluded. Success was defined as procedures with no reported recurrence of fistula on last follow-up.

Results/Outcome(s): A total of 99 patients underwent a total of 234 procedures including seton insertion, pouch excision with end ileostomy and various fistula repairs. When IPAA was originally created 83 patients were diagnosed with Ulcerative Colitis, but 18 of these patients later had the diagnosis changed to Crohn's disease. 53 (53.5%) patients had a fistula originating from anal transition zone to dentate line to the vagina (not at the pouch anastomosis). Procedures that were done in 70 patients with the intent to close the fistula and outcomes are listed in Table. In these 70 patients our successful closure rate was 39/70 (56%).

Conclusions/Discussion: Numerous procedures may be used in an attempt to close PVF and none is superior. Pouch advancement and redo pouch are the most commonly performed with acceptable success rates.

Procedures done to	All fistulas n=70		At/Above Anastomosis n=31		Below Anastomosis n=39	
	Total number	Successful closure	Total number	Successful closure	Total number	Successful closure
definitively close PVF						
(final procedures as most patients had several attempts at closure)	(%)	(%)	(%)	(%)	(%)	(%)
Beal pouch advancement flap	23 (33)	14 (61)	5(16)	4(80)	18(46)	10(55)
Transvaginal repair	4 (6)	1 (25)	1(3)	0(0)	3(7)	1(33)
Transanal repair with/without tissue interposition	14 (20)	5 (36)	6(19)	2(33)	8(20)	3(37)
Redo IPAA	26 (37)	18 (69)	19(61)	13(68)	7(18)	5(71)
Fistula plug	3 (4)	1 (3)	0(0)	0(0)	3(7)	1(33)
Total	70 (100)	39 (56)	31(100)	19(61)	39(100)	20(51)

THE INCIDENCE OF POLYP FORMATION FOLLOWING BARIATRIC SURGERY.

P142

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Purpose/Background: The adenoma-to-carcinoma sequence is a widely accepted stepwise progression from normal epithelium to dysplasia to carcinoma. There has been particular interest recently into clinical, genetic, molecular and cytogenetic influences on this progression especially in obesity. Previous studies have associated increased risk of colon cancer with obesity. Recent literature suggests greater weight loss after bariatric surgery may be associated with lower risk for solid organ malignancy. However, the impact of bariatric surgery on specifically mitigating colon cancer risk has yet to be elucidated. We sought to examine the effects of bariatric surgery on the incidence of premalignant (tubular, villous, tubulovillous adenomas) and malignant (adenocarcinoma) colon polyp formation as a pathway to colon carcinoma.

Methods/Interventions: We performed a retrospective review of our single institutional bariatric surgery database from January 2010 to January 2017. Patients who underwent bariatric surgery and subsequent colonoscopy were queried for premalignant and malignant polyps. Patient demographics, comorbidities, type of bariatric surgery, and polyp pathology were examined. Descriptive statistics and multivariate analysis utilizing a Cox Proportional Hazards Model were utilized to identify factors associated with polyp incidence.

Results/Outcome(s): A total of 2,622 patients had bariatric surgery from January 2010 to January 2017, of which, 366 patients underwent colonoscopy following surgery. Pre-malignant or malignant polyps were reported in 76 patients (20.8%). The median time to a positive colonoscopy was 992 days (IQR 498, 1565). The majority of patients were female (80.3%) and most had a roux en y gastric bypass (74%). The mean age of these patients was 50.4 years old, with a mean body mass index of 46.5. Demographic factors significantly associated with a polyp incidence included age (HR 1.05 95% CI [1.02, 1.10], $p = 0.0004$) and male sex (HR 2.39 95%CI [1.39, 4.13], $p = 0.0017$). More importantly, neither BMI at the time of surgery nor the bariatric procedure performed were found to be associated with increased risk for polyp formation.

Conclusions/Discussion: Our study showed a lower incidence (20.8%) of adenomatous polyps when compared to what is reported in the literature (25-40%). Only age and gender were associated with increased incidence of polyp formation. In order to further investigate a possible protective benefit, subsequent analysis will compare the incidence of polyps in bariatric surgery patients to obese patients who have not had bariatric surgery based on comparable BMI categories.

CAN WE IMPORVE THE EFFICIENCY OF CARE IN PATIENTS WITH COLORECTAL CNACER FROM TEH TIME OF THEIR INITIAL REFERRAL FOR COLONOSCOPY TO SURGICAL RESECTION?

P143

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Purpose/Background: Background: Delays in the diagnosis and treatment of colorectal adenocarcinoma (CRC) remain distressing to patients and clinicians alike. The typical patient pathway involves referral from a family practitioner (FP) to a gastroenterologist (GI), followed by referral to a surgeon for consideration of resection, whilst some patients are referred directly to a surgeon for both colonoscopy and subsequent surgery. The primary aim of this study was to evaluate this process for potential delays and direct subsequent improvements.

Methods/Interventions: Methods: A population-based, Province-wide administrative database was employed to identify all patients with resected CRC over a 12-month period. Patient demographics, colonoscopy date and indications, colonoscopist details and surgery date were extracted from the electronic medical record. The date of the referral from the FP to the colonoscopist was obtained by individual phone calls to each FP office. Standard statistical methodology was employed ($p < 0.05 = \text{significant}$).

Results/Outcome(s): Results: Of 224 patients who had a CRC resected across southern Alberta, 170 (76%) received their preceding colonoscopy by a GI. Patient characteristics were similar irrespective of who scoped them (GI or surgeon). Patients waited significantly longer between their colonoscopy and surgical resection when their scope was performed by a GI within metropolitan Calgary (43 vs. 27 days; $p = 0.02$). The total time from 'FP referral to colonoscopy to surgical resection' was also shorter with a surgeon performed colonoscopy within Calgary (105 vs. 114 days; $p = 0.03$). GI was responsible for 86% and 23% of colonoscopies within metropolitan Calgary and outside of Calgary (i.e. community setting) respectively. Patients outside of Calgary displayed no significant differences in patient flow for any interval regardless of which service scoped them ($p > 0.05$).

Conclusions/Discussion: Conclusion: Patient flow through the health care system is similar whether a GI or surgeon performed their colonoscopy overall, except for an evident delay between colonoscopy completion and surgical resection within metropolitan Calgary. Targeted improvements for transitions in care should target communication strategies between GI and surgeons in patients with CRC within the urban environment.

RECTAL CANCER IN YOUNG PATIENTS - IS OBESITY TRULY A RISK FACTOR?

P144

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Purpose/Background: Recently, there has been a rising incidence of rectal cancer diagnoses in patients younger than 40 years of age, which is in contrast with the overall decrease in colorectal cancer nationally. The etiology of this is not completely understood, but a high obesity rate among young persons is thought to increase the risk for these patients. Despite this, we have treated a number of young rectal cancer patients who are not obese. This younger cohort generally presents at a later stage, and often has more aggressive tumor biology. We hypothesized that patients diagnosed with rectal cancer prior to age 40 would have a lower BMI than those diagnosed after age 40.

Methods/Interventions: A retrospective chart review was used to identify all new rectal cancer diagnoses at our institution from 1/2008-9/2017 using the ICD-9 code for rectal cancer (154.1). Demographic, procedural, and clinical data were collected. Patients were stratified according to age at diagnosis, with young patients defined as those under 40 years. The primary outcome assessed was BMI at time of diagnosis. Simple descriptive statistics was used for analysis. A Wilcoxon rank-sum test was used to compare median BMIs between the two groups.

Results/Outcome(s): A total of 290 new cases of rectal adenocarcinoma were diagnosed at our institution between 2008 and 2017; median age at diagnosis was 60.71 years (Table 1). Nineteen (6.5%) diagnoses were made in patients younger than 40 years of age. BMI was recorded in 278 patients at or near the time of diagnosis. The median BMI of all patients was 26.64 kg/m². The median BMI in patients younger than 40 years was 26.93 kg/m², which was not significantly different than those older than 40 years (27.78 kg/m², p=0.6233).

Conclusions/Discussion: Our institutional experience demonstrates that young patients diagnosed with rectal cancer have a similar BMI to patients over age 40 at the time of diagnosis. This data may challenge the hypothesis that obesity is responsible for an increased risk of rectal cancer diagnoses in patients younger than 40 years of age.

P144 Table 1

	All patients (N=290)	Age < 40 years (N=19)	Age > 40 years (N=271)
Age (years)			
Median	60.71	35.13	61.88
Range	24.80 - 92.42	24.80 - 39.84	41.50 - 92.42
BMI (kg/m ²)			
Median	26.64	25.78 ^a	26.73 ^a
IQR	23.51 - 31.16	23.96 - 28.32	23.44 - 31.25
Range	16.14 - 58.20	19.26 - 39.24	16.14 - 58.20
Diagnoses per year			
2008	16	2	14
2009	29	2	27
2010	23	1	22
2011	25	0	25
2012	31	3	28
2013	34	2	32
2014	33	2	31
2015	23	3	20
2016	47	4	43
2017	29	0	29
Total	290	19	271

Table 1. Demographic data of all patients diagnosed with rectal cancer between 1/2008-9/2017. (a) Medians are not statistically different (p=0.6233). IQR, interquartile range.

A NOMOGRAM BASED ON CLINICAL FACTORS FOR PREOPERATIVE PREDICTION OF LYMPH NODE METASTASIS IN CLINICALLY NODE NEGATIVE RECTAL CANCER PATIENTS.

P145

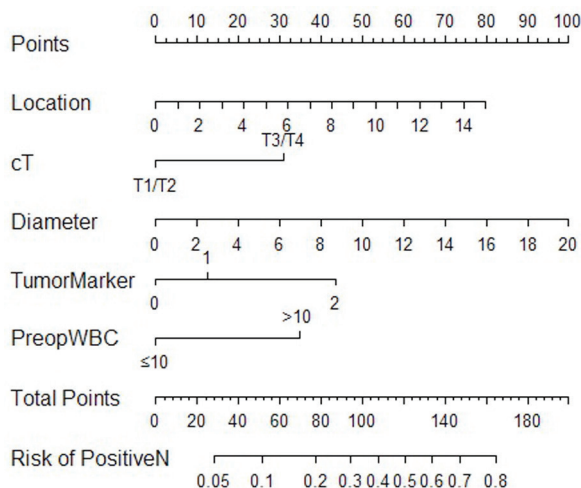
C. Zhou, H. Liu, Z. longjuan, X. Liu, Y. Chen, X. Zheng, T. Hu, J. Ke, X. He, Y. Zou, J. Hu, W. Xiaojian, W. Xianrui, L. Ping, X. He
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Purpose/Background: The aim of this study was to incorporate the preoperative clinical factors to establish a nomogram to predict lymph node metastases (LNM) in clinically node negative rectal cancer patients.

Methods/Interventions: The least absolute shrinkage and selection operator (LASSO) technique was used for feature selection. Selected suboptimal clinical risk factors of LNM were then identified by multivariate logistic regression analyses. A nomogram to predict the probability of LNM in clinically node negative rectal cancer patients was constructed based on the multivariate logistic regression model.

Results/Outcome(s): Six potential risk factors were selected by LASSO technique and 5 of them were indicated as independent risk factors for LNM by multivariate analysis, including MRI-reported tumor location, clinical T stage, MRI-reported tumor diameter, white blood cell count and preoperative elevated tumor markers. A nomogram consisting of these factors was developed and showed good discrimination. This nomogram was evaluated by decision curve analysis which was indicated as clinically useful.

Conclusions/Discussion: A nomogram based on clinical factors including MRI-reported tumor location, clinical T stage, MRI-reported tumor diameter, white blood cell count and preoperative elevated tumor markers seems to be a useful tool for individualized prediction of the LNM status in clinically node negative rectal cancer patients.



OVERUSE AND LIMITED BENEFIT OF CHEMOTHERAPY FOR STAGE II COLON CANCER IN YOUNG PATIENTS.

P146

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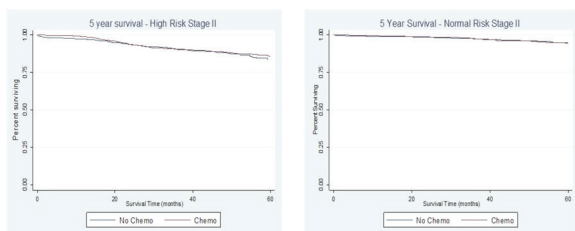
Purpose/Background: The incidence of colorectal cancer in patients <50 years old is increasing. Given their young age and fitness, aggressive therapy, including systemic treatment, is attractive in this cohort. While guidelines provide for consideration of adjuvant chemotherapy(aCXT) in high-risk stage II patients, few studies have confirmed a survival benefit, especially in young patients. We used the National Cancer Database(NCDB) to explore the use and efficacy of aCTX in both normal risk(NR) and high risk(HR) young stage II colon cancer patients.

Methods/Interventions: We used the NCDB to identify patients diagnosed with Stage II colon cancer who underwent surgical resection between 2010 to 2015. Patients were classified as high risk by the presence of at least one of the following: lymphovascular or perineural invasion, <12LNs identified, poor/un-differentiation, T4, positive margins. Rates of aCTX by age and risk were calculated. Overall survival was estimated using the Kaplan–Meier method for patients younger than 50, stratified by risk group and use of aCTX. Cox multivariable analyses was used to examine the relationship between aCTX and survival adjusting for other patient and hospital variables.

Results/Outcome(s): 81,917 patients underwent resection for Stage II Colon cancer. 6147 (7.5%) were <50 years old, and of these, 2715 (44.2%) were HR and 3432 (55.8%) were NR. In the HR group, 58% received aCTX, while 32% of the NR group received aCTX. This rate decreased significantly with age for both HR and NR groups (p<0.001). In multivariable logistic analysis, the most significant predictors of receipt of aCTX were high risk features (OR 3.33, 95% CI 3.21-3.48) and younger age. On univariate analysis, there was no significant survival benefit associated with receipt of aCTX in patients less than 50 years old with normal risk (p = 0.49) and high risk tumors (p = 0.09) (Figure 1). Adjusted analysis also failed to demonstrate a survival benefit for aCTX for both HR (HR 0.89, p=0.37) and NR stage II tumors (HR 0.90, p=0.62).

Conclusions/Discussion: In our cohort, both HR and NR young patients received aCXT more frequently than older patients; in fact, over 30% of NR young Stage II patients received aCXT. In both risk groups, however, we demonstrate no survival benefit associated with aCXT. It may be tempting in young patients to believe that aggressive therapy is warranted given their age and relative fitness. Chemotherapy, however, is not without long-term side effects, even in young patients. Our data suggests

relative over treatment with aCXT in both the NR cohort, where there are no recommendations for aCXT, and in the HR cohort, where our data suggests minimal survival benefit. This highlights the need for better identification of stage II patients who actually benefit from aCXT to target therapy more effectively and avoid the risks of over-treatment.



TREATMENT IMPLICATIONS OF UNIVERSAL MISMATCH REPAIR GENE SCREENING IN COLORECTAL CANCER PATIENTS.

P147

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Purpose/Background: Universal testing for mismatch repair (MMR) gene abnormalities can identify patients previously unknown to have Lynch syndrome affecting surgical decision making and surveillance recommendations. However, the real-life effects of a universal testing program are not well known.

Methods/Interventions: A retrospective review was performed across four healthcare systems in a major metropolitan area from July 2012 to April 2017. Specimens establishing a new diagnosis of colorectal cancer were universally screened with immunohistochemistry for loss of MMR gene expression. MLH1 promoter hypermethylation phenotypes were excluded. Demographic, clinical, and pathologic data were collected including referrals for genetic counseling and subsequent testing.

Results/Outcome(s): Seventy-eight patients met inclusion criteria (mean age 59.6 years, 62.4% male). Eleven patients (14.1%) had a known or family history of Lynch syndrome. Gastroenterologists (71.2%) performed most colonoscopies, followed by general (13.7%) and colorectal surgeons (11.0%). 62.3% of colon cancers were right-sided vs. 37.7% left-sided, including 12 rectal cancers. Mean interval between colonoscopy and surgery was 48.5 days. A positive MMR screening test changed the operative approach from a segmental to subtotal colectomy in 21.8%. Referral for genetic counseling was submitted 70.5% of time. Colorectal surgeons were more likely than general surgeons to refer patients for genetic counseling (56.7% vs 31.3%, $p=0.10$) although a large number of these patients had already been or were eventually referred by another specialty (medical oncology, internal medicine). Twenty

patients (25.6%) were diagnosed with Lynch syndrome (2 MLH1, 13 MSH2, 4 MSH6, 0 PMS2), 15 (19.2%) were deemed Lynch-like, 15 (19.2%) did not complete genetic testing, and 6 (7.7%) were found have double somatic mutations. Average times along the continuum of care were colonoscopy to surgery (48.5 days), surgery to genetic counseling referral (65 days), genetic counseling referral to first visit (70.9 days), and first genetic counseling visit to disclosure of genetic testing (50.6 days). Genetic counseling referrals initiated by the endoscopist tended to have a shorter time between colonoscopy and disclosure of genetic testing results (105 vs. 159 days, $p=0.21$).

Conclusions/Discussion: In this study, universal screening changed the operative management in a substantial portion of patients. However, 29.5% of MMR deficient patients were not referred for genetic counseling and there were long intervals from genetics referral to first visit and first visit to disclosure of genetic testing results. The endoscopist should initiate the genetic counseling referral upon receipt of pathology results to minimize non-referrals and delays.

TRANSANAL TOTAL MESORECTAL EXCISION FOR RECTAL CANCER: A SINGLE CENTRE EXPERIENCE.

P148

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Purpose/Background: Transanal total mesorectal excision (TaTME) offers a promising alternative to standard abdominoperineal approach for rectal cancer by improving access to the distal rectum. The aim of this study is to report on experiences from a single centre performing TaTME for rectal cancer.

Methods/Interventions: Thirty five consecutive patients with histologically proven rectal adenocarcinoma underwent TaTME between November 2015 and November 2017 in a single centre. A retrospective analysis of a prospective database was undertaken to analyse outcomes.

Results/Outcome(s): Procedures performed included low anterior resection ($n=33$), abdominoperineal resection ($n=1$) and panproctocolectomy ($n=1$). 94% of patients were male. The mean BMI of patients was 28.2 kg/m^2 . The mean tumour distance from the anal verge was 5.1cm. The rate of conversion to open surgery from planned minimally invasive approach was 8.6%. The mean lymph node yield was 24.3 (10-65). R0 resection was achieved in 91.4% of patients (32/35). A complete or near complete TME specimen was delivered in 100% of cases. There was one post operative mortality. 3 patients had a significant post operative morbidity (Clavien-Dindo grade III). The mean length of stay was 7.4 days.

Conclusions/Discussion: This data suggests that TaTME is a feasible, safe operation for patients with rectal cancer with an acceptable pathological outcome when compared to the conventional approach. TaTME has the potential to define the resection margins more clearly than the conventional approach in patients for whom laparoscopic surgery is likely to be challenging. Further studies are required to investigate the long term oncological outcomes of TaTME.

IMPLEMENTING NEW SURGICAL TECHNOLOGY: A NATIONAL PERSPECTIVE ON CASE VOLUME REQUIREMENT OF PROFICIENCY IN TRANSANAL TOTAL MESORECTAL EXCISION (TATME).

P149

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Purpose/Background: Transanal total mesorectal excision (TaTME) for rectal cancer has been proposed as a means of circumventing the difficulty of low pelvic dissection. Performing TaTME is technically demanding, and therefore introducing this new technology requires a thoughtful, safe and systematic approach. The purpose of this study is to understand the current approach to the management of rectal cancer; and perspectives on introducing and implementing TaTME in Canada.

Methods/Interventions: Canadian surgeons treating rectal cancer were identified from their membership to relevant professional surgical societies. Surgeons were then invited to complete an anonymous web-based survey. The survey elicited management practices as they relate to rectal cancer surgery, and experience and opinion regarding TaTME. A descriptive analysis was performed on all data, excluding incomplete surveys and respondents who do not operate on rectal cancer.

Results/Outcome(s): The survey had a completion rate of 38% (94/249), with 86 surgeons operating on rectal cancer. Of these, the majority are fellowship trained (92%) in either colorectal surgery (38%), surgical oncology (20%), or minimally invasive surgery (34%). These surgeons however, have a wide range of annual rectal cancer cases (1-80, median 15), and the majority (64%) state that less than 25% of their clinical volume is made up of rectal cancer. Only 27% of rectal cancer surgeons currently perform TaTME, all of whom have an academic affiliation, and a higher annual volume of rectal cancer surgery than those who do not perform TaTME (median 23 cases, IQR (15-49); versus 10 (7-20)). Forty three percent of surgeons who do not perform TaTME plan on learning it, endorsing mentorship and formal courses (76% and 82% respectively) as critical components for

skill acquisition. Several differences were noted between TaTME and non-TaTME surgeons. First, 90% of surgeons who perform TaTME “strongly agreed” that advanced laparoscopic skill is required for this procedure, compared to only 64% of non-TaTME surgeons. Second, TaTME surgeons felt that a higher volume of rectal cancer cases per year was required to maintain proficiency in TaTME (median 20 (15-25); versus 15 (10-20)). Finally, TaTME surgeons also felt that a higher annual volume of TaTME cases were required to maintain proficiency median 12 (10-19); versus 9 (5-10)).

Conclusions/Discussion: This study highlights the wide range of annual rectal cancer cases amongst Canadian surgeons. Only a minority of surgeons currently perform TaTME; and there is a clear discrepancy between TaTME and non TaTME surgeons in the perceived number of annual cases of both rectal cancer and TaTME cases thought to be required for proficiency in this technique. In a geographically disparate country such as Canada, this has implications for training and credentialing in this technically demanding procedure.

DOES METABOLIC SYNDROME INCREASE THE RISK OF POSTOPERATIVE COMPLICATIONS IN PATIENTS UNDERGOING COLORECTAL CANCER SURGERY?

P150

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Purpose/Background: Rates of obesity and metabolic syndrome (MetS) continue to rise worldwide. Increasing evidence supports the association of MetS with colorectal cancer; however, the impact of MetS on outcomes following colorectal cancer surgery remains poorly described. We investigated the effects of MetS on 30-day postoperative morbidity, mortality, and hospital resource utilization in a large cohort of patients undergoing elective colorectal cancer surgery in the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database.

Methods/Interventions: Adult patients who underwent open or laparoscopic colectomy from 2010-2016 were identified in the NSQIP database. MetS was defined as a body mass index ≥ 30 kg/m² with concurrent diagnoses of diabetes and hypertension requiring medications. Univariate and multivariable analyses were performed for 30-day mortality, morbidity, major complications, and utilization of hospital resources (length of stay [LOS], readmissions, and perioperative blood transfusion).

Results/Outcome(s): Of the 91566 patients included in the study, 7603 had MetS (8.3%). Patients with MetS were older (mean age 66.9 years vs 65.4 years, $P<.001$), and had higher American Society of Anesthesiologists (ASA) scores (ASA 3-4 84.6% vs 55.3%, $P<.001$). On unadjusted analysis, MetS was associated with an increased risk of overall morbidity (28.3% vs 22.2%), pulmonary complications (5.0% vs 3.6%), cardiac complications (1.7% vs 1.0%), renal complications (5.5% vs 3.5%), wound complications (12.7% vs 9.8%), sepsis (4.6% vs 3.6%), unplanned readmission (18.2% vs 13.5%), blood transfusion (10.7% vs 8.7%), longer mean operative time (3.3 hours vs 3.1 hours), and mean LOS (7.4 days vs 6.9 days) ($P<.001$ for all). MetS was not associated with an increased risk of postoperative mortality (1.7% vs 1.4%, $P=.06$). On multivariable analysis, MetS was an independent predictor of overall morbidity (odds ratio [OR] 1.19, $P<.001$), cardiac complications (OR 1.32, $P=.005$), renal complications (OR 1.44, $P<.001$), wound complications (OR 1.27, $P<.001$), sepsis (OR 1.14, $P=.02$) and unplanned readmission (hazard ratio [HR] 1.24, $P<.001$). Further multivariable analyses were performed to assess the impact of MetS as compared with its individual components. Patients with MetS did not have a higher risk of overall morbidity/mortality compared to diabetic patients without the composite exposure of MetS (OR 1.03, $P=.45$), suggesting that the increased risk of adverse outcomes was driven by diabetes. However, MetS conferred a significantly increased risk of renal complications (OR 1.21, $P=.007$), wound complications (OR 1.23, $P<.001$), and unplanned readmissions (HR 1.11, $P=.04$) compared to diabetes without MetS.

Conclusions/Discussion: Patients with MetS have an increased risk of 30-day postoperative renal and wound complications as well as unplanned readmissions following surgery for colorectal cancer.

PREDICTION OF TRANSABDOMINAL TME DIFFICULTY BY NOVEL METHOD ACCORDING TO PELVIC FLOOR ATTACHMENT TO BONY PELVIS.

P151

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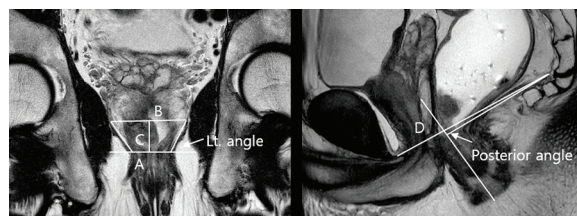
Purpose/Background: TaTME has been attempted to overcome difficulties when TME is expected in deep, narrow pelvis. According to 2nd international consensus conference in Paris, it will be indicated for high BMI, enlarged prostate, less than 12cm from the anal verge, and narrow deep pelvis, etc. But there is no consensus what is narrow, deep pelvis and previous studies were only about bony structure. We hypothesize shape of pelvic floor muscle (PFM) may impact the pelvic dissection difficulty. This study aimed to evaluate what parameters of PFM

affects to surgical difficulty and classify PFM in terms of TME difficulty.

Methods/Interventions: A retrospective cohort study including patients underwent curative resection for mid-low rectal cancer (stage I, II, III) at a tertiary hospital from January 1, 2015, through December 31, 2015. The cohort included 93 patients in the given period, excluding patients who underwent combined operation for other disease and dissection of pelvic lymph node and distant lymph node. Along the border of the PFM, we newly defined several anatomical indices using MRI. Inter-anorectal junction diameter (A), Inter-arcus tendineus diameter (B), Height of PFM (C) were obtained on the coronal plane corresponding to the center of the anal canal. Lateral mean angle (LMA) is the angle between the line connecting A, B and the extension of A. Pubo-anococcygeal diameter (D), Posterior angle (PA) was measured from mid-sagittal plane. Anatomical variables significantly correlated with operation time in multivariable analysis became indicator for classification of PFM. On the basis of this index, the cohort were divided into easy and difficult group, and cut-off value was determined as the point where the value of Mann Whitney's U was maximized in comparison with operation time.

Results/Outcome(s): 96% of Total patients were treated by laparoscopic or robotic surgery. Multivariable analysis showed age, multivisceral resection, protective stoma, LMA were significantly associated with operation time ($P=0.002$, $P=0.0001$, $P=0.0001$, $P=0.009$, respectively). As the LMA increased by 1 degree, the operation time was increased by 3 minutes. The cut off value of LMA was 54 degree, and difference of operation time between two groups was 51.1 minutes (Mann Whitney's U = 1370.5, $P=0.026$).

Conclusions/Discussion: LMA was independent predictor for difficulty of TME in mid-low rectal cancer. If the patient showed LMA of more than 54 degrees, transabdominal TME is expected to be difficult. This index can be a one of indication to perform TaTME.



SURVIVAL BENEFIT OF LYMPH NODE DISSECTION IN SURGERY FOR COLON CNACER IN ELDERLY PATIENTS: A MULTICENTER POPENSITYY SCORE-MATCHED CASE-CONTROL STUDY IN JAPAN.

P152

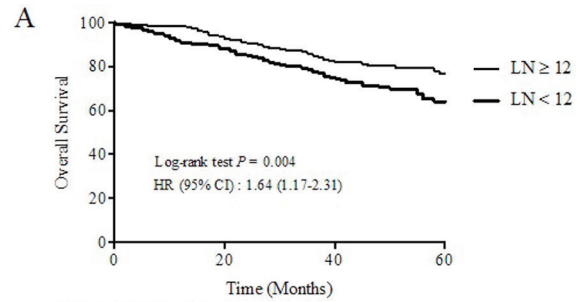
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Purpose/Background: In surgery for elderly patients with colorectal cancer (CRC), it is unclear whether radical lymph node (LN) dissection gives a survival benefit with maintenance of safety. The aim of this study is to evaluate the impact of the lymph node yield in elderly patients in surgery for CRC.

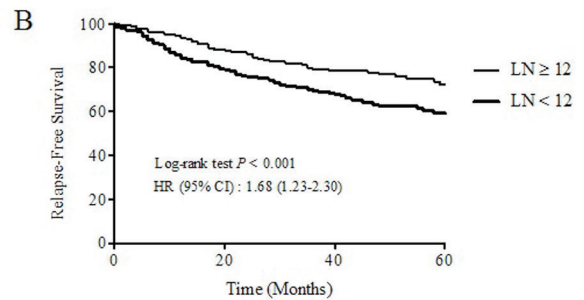
Methods/Interventions: The subjects were selected from a surgival database of 2,065 patients aged ≥ 80 years old who underwent surgery for CRC at 41 hospitals in Japan between 2003 and 2007. The patients were divided into groups with ≥ 12 and < 12 harvested LNs, with subsequent propensity score matching to balance the baseline characteristics.

Results/Outcome(s): Of the 954 patients initially selected, 331 and 623 were in the < 12 LN and ≥ 12 LN group, respectively. After case-matching, 293 patients were allocated to each group and all covariates were balanced. For short-term outcomes, the time for surgery was longer in the ≥ 12 LN group, but there was no significant difference in morbidity between the groups. Overall, relapse-free, and cancer-specific survival rates were higher in the ≥ 12 LN group ($p=0.004$, 0.001 , and 0.02).

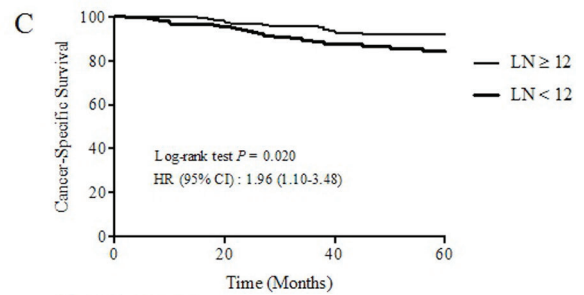
Conclusions/Discussion: In patients aged ≥ 80 years old with stage II - III colon cancer, harvesting of ≥ 12 LNs provides a survival benefit, and thus limited LN dissection is not recommended in these patients.



Number of patients at risk				
	0	20	40	60
LN < 12	293	237	135	46
LN ≥ 12	293	251	144	55



Number of patients at risk				
	0	20	40	60
LN < 12	293	206	121	44
LN ≥ 12	293	232	139	53



Number of patients at risk				
	0	20	40	60
LN < 12	293	237	135	46
LN ≥ 12	293	251	144	55

RELATIONSHIP OF GALLSTONE DISEASE TO LOCATION OF COLONIC POLYPS.

P153

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Purpose/Background: Recent studies have provided strong evidence that suggests a link between gallstone disease (GSD) and right-sided colorectal cancer (CRC). Current theories suggest that GSD and/or cholecystectomy predispose the right colon to a larger burden of secondary bile acids, which are considered carcinogenic, and to an altered colonic microbiota. While the relationship between GSD and CRC has been demonstrated in prior studies, no studies to date have examined the association of GSD with various types of colonic polyps stratified by type and

location. We hypothesized that patients with GSD would have an increased risk for polyps in the right colon.

Methods/Interventions: Patients from our institution who underwent both abdominal imaging (with CT or US) and colonoscopies were identified through a query of electronic medical records. Colonoscopy and pathology reports were reviewed to ascertain polyp location. Our primary endpoint was the presence of potentially premalignant polyps in the cecum and ascending colon as we hypothesized that the colonic mucosa would be most accessible to bile in this part of the large bowel. We used a bivariate analysis with a threshold of 50% of polyps located in the cecum and ascending colon as the endpoint to facilitate adjustment for risk factors. We defined polyps as adenomas, advanced adenomas (with high grade dysplasia, >25% villous architecture, size >9mm), hyperplastic and sessile serrated adenomas/polyps. Descriptive statistics were performed to identify differences in patient characteristics and polyp types and location between the two groups. This was followed by multivariate logistic regression to identify odds of detection of polyp/location based elements in patients with GSD controlling for demographic and clinical factors.

Results/Outcome(s): There were 4,963 patients, including 3,713 (74.8%) with GSD and 1,250 (25.2%) without. Patient demographics and number of patients with >50% of polyps in the ascending colon and cecum are shown in Table 1. Patients with GSD were more likely to have polyps overall (43.8% vs. 37.9%, $p<0.001$) as well as to have more than 50% of their polyps in the cecum and ascending colon (21.2% vs. 15.5%, $p<0.001$). Adjusting for various demographic and clinical factors, patients with GSD had increased odds of the following

polyp-based elements in the cecum and ascending colon: total polyps [OR=1.5 95%CI (1.2, 1.7), $p<0.001$], total adenomas [OR=1.3 95%CI (1.1, 1.6), $p=0.007$], advanced adenomas [OR=1.8 95%CI (1.1, 3.1), $p=0.027$], hyperplastic polyps [OR=1.8 95%CI (1.3, 2.5), $p=0.001$], and sessile serrated polyps [OR=1.7 95%CI (1.1, 2.8), $p=0.03$]. There were no polyp endpoints favoring incidence distal to the hepatic flexure.

Conclusions/Discussion: GSD is an independent risk factor for the presence of potentially premalignant polyps of all types in the cecum and ascending colon. This suggests a global pro-neoplastic effect rather than a pathway-specific one.

INDIVIDUAL PERSONALITY OF THE COLORECTAL SURGEON INFLUENCES THE DECISION TO ANASTOMOSE IN RECTAL CANCER SURGERY.

P154

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Purpose/Background: Colorectal surgeons have to make the decision to anastomose, defunction or form an end colostomy when performing surgery for rectal cancer. Anastomotic practice in the U.K. varies despite similar surgical experience and training, intra-operative scenarios and patient characteristics. Heuristics is an evolving area

P153 Demographics and polyp distribution by group

Variable	All patients, n(%)	GSD, n(%)	No GSD, n(%)	P value
Overall	4936(100)	3713(74.8)	1250(25.2)	
		Gender		
Female	2650(53.4)	1980(53.3)	670(53.6)	0.87
Male	2313(46.6)	1733(46.7)	580(46.4)	
Median Age [25th-75th percentile]	61[53-69]	62[54-70]	58[50-66]	<0.001
		>50% of polyps in cecum/ascending colon		
Polyps (total)	981(19.8)	787(21.2)	194(15.5)	<0.001
Total adenomas	748(15.1)	595(16.2)	153(12.2)	<0.001
Advanced adenomas	120(2.4)	103(2.8)	17(1.4)	0.005
Tubulovillous or villous adenomas	67(1.6)	57(1.5)	10(0.8)	0.05
Hyperplastic polyps	247(5.0)	205(5.5)	42(3.4)	0.002
Sessile serrated polyps	130(2.6)	107(2.9)	23(1.8)	0.05
High grade dysplasia	22(0.4)	18(0.5)	4(0.3)	0.45
Colorectal cancer	15(0.3)	13(0.4)	2(0.2)	0.29

striving to identify biases that influence decision-making. This study aimed to define the personality traits of colorectal surgeons and analyse any influence on the anastomotic decision.

Methods/Interventions: The **Edinburgh Delphi** (when to avoid or Defunction a rectal anastomosis: what Behaviours and situational factors Underlie the decision-making pathway) was developed and designed with the support of the Association of Coloproctology of Great Britain and Ireland. Using a modified Delphi approach, all attendees of the ACPGBI 2016 conference in Edinburgh, Scotland were invited with the inclusion criteria being that they had to independently and regularly make rectal anastomotic decisions. 50 surgeons were enrolled and underwent personality testing including: alexithymia score (inability to understand emotions); type of thinking process used (intuitive vs rational) and personality traits (extraversion; agreeableness; openness; emotional stability; conscientiousness). Questions were answered regarding anastomotic decisions in various clinical scenarios and results analysed to reveal any influence of the surgeon's personality on anastomotic decision.

Results/Outcome(s): Participants were: male (86%); consultants (84%); England based (68%) and 30% reported 10-20 years of consultant experience [Table 1]. 4% had alexithymia and when compared to published population norms from large European cohorts, participating surgeons had lower levels of alexithymia. (norm 10-13%); 81% displayed intuitive thinking (reflex, fast). Compared to population norms, participants scored highly in emotional stability (ability to remain calm) and conscientiousness (organised, methodical). Personality traits influenced next anastomotic decision if surgeons reported: recent Morbidity and Mortality meeting criticism (if low in conscientiousness); working with an untrusted anaesthetist (if high in alexithymia or low in openness) and no anastomotic leaks for >1 year (if high in openness).

Conclusions/Discussion: This is the first study to explore the influence of personality on the heuristics of colorectal surgeons. Colorectal surgeons displayed a range of personality traits, but had significantly higher levels of conscientiousness and emotional stability. This challenges the perceived 'surgical personality' stereotype of impatience, extraversion, being unfriendly and emotionally

P154 Demographics and Years of experience as Surgeon of The Edinburgh Delphi Participants

		Number	%
Age	<35	2	4
	35 - 39.9	7	14
	40 - 49.9	21	43
	50 - 59.9	16	32
	>60	4	8
Gender	Male	43	86
	Female	7	14
Status	Specialist registrar	4	8
	Associate specialist	3	6
	Post-CCT fellow	1	2
	Consultant	42	84
Years of experience as consultant §	0 - 2	5	11
	> 2 - 5	8	18
	>5 - 10	8	18
	>10 - 20	15	34
	>20	8	18
Place of work	Scotland	4	8
	England	34	68
	Ireland	3	6
	Wales	3	6
	Other European Country	0	0
Number of consultant colorectal colleagues in your department †	Outside Europe	6	12
	1 - 3	5	10
	4 - 6	26	54
	7 - 10	14	29
	> 11	3	7

§ percentage expressed from a total n=44 as 2 associate specialists responded.

† percentage expressed as total n= 48 as n=2 non responders

distant. In conclusion, colorectal surgeons have speciality relevant personalities that influence the anastomotic decision that may potentially explain the variation in practice across the U.K. and requires further exploration.

DOES ROBOTIC FACILITATE MINIMALLY INVASIVE TREATMENT OF TRANSVERSE COLON CANCER WITH COMPLETE MESOCOLIC EXCISION?

P155

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Purpose/Background: Generalizability and efficacy of laparoscopic complete mesocolic excision (CME) are criticized due to large deviations of the outcomes, lack of mesocolic plane assessment and relatively low number of harvested lymph nodes. Furthermore, operative difficulties are doubled for tumors of the transverse colon. While total or partial removal of the transverse colon is usually required based on the basic principles of CME for right or left sided colon tumors, the role of robotic technique for the tumors primarily located in the transverse colon has been poorly studied. In this study, we assessed the feasibility and short-term outcomes of robotic CME for transverse colon cancer.

Methods/Interventions: A retrospective review of a prospectively maintained database of consecutive patients undergoing robotic surgery (da Vinci Xi®) for transverse colon adenocarcinoma between December 2014 and November 2017 was performed. Transverse colon cancer was defined as a tumor located between the hepatic and splenic flexures, including the flexures. Patients with transverse colon and a synchronous colonic tumor requiring ligation of the middle colic artery at its origin were also included. Data on demographics, tumor characteristics, postoperative 30-day, and oncologic outcomes were analyzed.

Results/Outcome(s): Twenty-eight patients were included. There were 19 men and 9 women with a mean age of 62.9 ± 15.6 years and a body mass index of 26.4 ± 4.8 kg/m². Of the 28 robotic CME procedures, 13 patients underwent extended right hemicolectomy, 8 extended left hemicolectomy, 6 subtotal colectomy and one total colectomy. The mean operative time and estimated blood loss were 321.7 ± 111.3 min and 106.9 ± 111.3 ml, respectively. Intraoperative complication (injury to a jejunal branch of the superior mesenteric vein) occurred in one patient, which was repaired uneventfully. There were no conversions. All the resections were complete with clear surgical margins. The mean number of harvested lymph nodes was

45.6 ± 23.6 . The rate of mesocolic plane surgery was 79% (Table 1). The mean time to first bowel movement was 3.5 ± 1.3 and length of hospital stay was 7.1 ± 3.0 days. The postoperative complication rate was 25%, and included pulmonary emboli in one patient, nosocomial pneumonia in one, atelectasis in one, adynamic ileus in two and wound infection in two patients. At a mean follow-up time of 17 ± 10 months, there were no recurrences or disease-related mortality.

Conclusions/Discussion: Robotic CME for transverse colon cancer is feasible and can be a procedure of choice to achieve good quality of minimally invasive resections.

P155 Table 1. Pathology results

Tumor location, n (%)	
hepatic flexure	6 (21.4)
transverse colon	8 (28.5)
splenic flexure	10 (35.7)
transverse colon + cecum	1 (3.5)
transverse colon + ascending colon	1 (3.5)
transverse colon + splenic flexure	1 (3.5)
splenic flexure + cecum	1 (3.5)
TNM classification, n (%)	
0	1 (3.5)
1	1 (3.5)
2	15 (53.6)
3	10 (35.7)
4	1 (3.5)
Tumor size, cm, mean \pm SD	5.7 \pm 2.6
Number of harvested lymph nodes	
mean \pm SD	45.6 \pm 23.6
median (range)	37.0 (17 - 111)
Length of specimen, cm, mean \pm SD	51.9 \pm 24.9
Proximal resection margin, cm, mean \pm SD	23.5 \pm 20.0
Distal resection margin, cm, mean \pm SD	18.2 \pm 10.8
Radial resection margin, cm, mean \pm SD	5.1 \pm 2.5
Length between vascular tie and tumor, cm, mean \pm SD	14.1 \pm 4.9
Completeness of CME, n (%)*	
mesocolic plane	11 (79)
intramesocolic plane	2 (14)
muscularis propria plane	1 (7)
undefined	14

* CME completeness was rated among patients with available data

COMPARISON OF MINIMALLY INVASIVE AND OPEN PROCTECTOMY FOR RECTAL ADENOCARCINOMA: A NSQIP ANALYSIS OF POSTOPERATIVE AND SHORT TERM ONCOLOGIC OUTCOMES.

P156

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Purpose/Background: Despite a growing trend towards utilization of minimally invasive techniques in the surgical management of rectal adenocarcinoma, recent trials question their benefits in terms of postoperative outcomes and oncologic impact compared to open surgery. Considering the robustness of data-definitions included in the American College of Surgeons-National Surgical Quality Improvement Project (ACS-NSQIP) targeted proctectomy

sample, we propose to add the current debate by evaluating findings outside of a trial.

Methods/Interventions: The 2016 ACS-NSQIP databases were used to identify patients who underwent proctectomy for rectal cancer. Cases were stratified by surgical approach as laparoscopic (LP), robotic (RP) and open proctectomy (OP). Multivariate regression analysis was used to compare short term postoperative outcomes, complications, oncologic outcomes and mortality.

Results/Outcome(s): A total of 1,810 patients underwent proctectomy for rectal adenocarcinoma, 802 (44%) underwent OP, 645 (36%) underwent LP and 363 (20%) RP. OP had greater preoperative COPD, disseminated cancer, ASA Class III & IV and T4 tumors ($P < 0.05$ for all). Patients who underwent LP and RP were more likely to be ASA Class I & II and T2 or T3 tumors ($P < 0.05$ for all). RP specifically was more likely to be used in patients

P156 Multivariate Analysis of Postoperative and Oncologic Outcomes of Proctectomy Stratified by Operative Approach

Laparoscopic vs Open Proctectomy	aOR	95% CI	P-value
Length of Stay (< 25th percentile)	2.7	1.8 – 4.2	<0.05
Bleeding requiring transfusion	0.5	0.3 – 0.7	<0.05
Anastomotic Leak	1.0	0.4 – 2.3	0.9
Total LN harvest \geq 12	1.2	0.8 – 1.6	0.8
Negative Margins-Radial	1.9	0.9 – 2.7	0.1
Negative Margins-Distal	2.4	0.7 – 7.8	0.2
Negative Overall Margins	1.6	0.4 – 6.5	0.5
Overall Morbidity	0.7	0.5 – 0.9	<0.05
Mortality	1.1	0.3 – 4.4	0.9
Robotic vs Open Proctectomy	aOR	95% CI	P-value
Length of Stay (< 25th percentile)	3.9	2.5 – 6.1	<0.05
Bleeding requiring transfusion	0.4	0.2 – 0.6	<0.05
Anastomotic Leak	1.3	0.5 – 3.2	0.6
Total LN harvest \geq 12	1.0	0.7 – 1.4	0.8
Negative Margins-Radial	1.3	0.7 – 2.3	0.4
Negative Margins-Distal	0.9	0.3 – 2.6	0.9
Negative Overall Margins	0.8	0.2 – 2.8	0.7
Overall Morbidity	0.6	0.5 – 0.9	<0.05
Mortality	0.8	0.1 – 4.3	0.8
Robotic vs Laparoscopic Proctectomy	aOR	95% CI	P-value
Length of Stay (< 25th percentile)	1.4	1.0 – 2.1	0.1
Bleeding requiring transfusion	0.8	0.4 – 1.4	0.5
Anastomotic Leak	1.3	0.5 – 3.5	0.6
Total LN harvest \geq 12	0.8	0.6 – 1.2	0.3
Negative Margins-Radial	0.8	0.4 – 1.6	0.6
Negative Margins-Distal	0.4	0.1 – 1.5	0.2
Negative Overall Margins	0.5	0.1 – 2.3	0.4
Overall Morbidity	0.9	0.6 – 1.4	0.7
Mortality	0.7	0.1 – 4.2	0.7

with tumors in the middle or lower third of the rectum ($P < 0.05$). In an intent-to-treat model, multivariate analysis comparing LP & RP to OP revealed improved short term postoperative outcomes including shorter length of stay (OR 2.7 95% CI: 1.8 – 4.2 and OR 3.9 95% CI: 2.5 – 6.1 days respectively, $P < 0.05$), lower bleeding requiring transfusion (OR 0.5 95% CI: 0.3 – 0.7 and OR 0.4 95% CI: 0.2 – 0.6 respectively, $P < 0.05$) and lower overall morbidity (OR 0.7 95% CI: 0.5 – 0.9 and OR 0.6 95% CI: 0.5 – 0.9 respectively, $P < 0.05$). There were no significant advantages using LP & RP in terms of anastomotic leak, overall margin status, total lymph node harvest ≥ 12 and 30-day mortality. Comparing RP to LP, there were no significant advantages in terms of postoperative and oncologic outcomes or overall mortality.

Conclusions/Discussion: This analysis of the targeted NSQIP proctectomy cohort suggests that the minimally invasive approach has improved short-term postoperative outcomes while short term oncologic outcomes and mortality are similar. There was no clear benefit of RP over LP in either postoperative or oncologic outcomes. The true postoperative and oncologic benefit of minimally invasive proctectomy compared to the open technique will need to continue to be validated in randomized controlled trials comparing the two modalities.

RECEIPT OF ADJUVANT CHEMOTHERAPY IN STAGE 2 COLON CANCER.

P157

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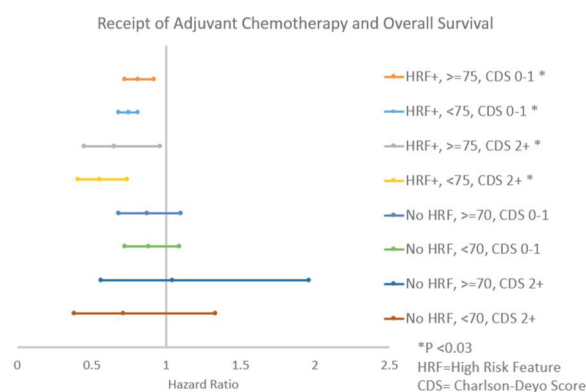
Purpose/Background: Given the lack of standardized recommendations, there are variations in the use of adjuvant chemotherapy in stage II colon cancer. There is some evidence to support its use in patients with high risk features. Understanding factors associated with practice patterns can help identify the appropriate and inappropriate use of adjuvant therapy. We sought to understand these factors and whether or not adjuvant chemotherapy is associated with improved overall survival.

Methods/Interventions: The National Cancer Data Base was used to collect treatment and survival data. Patients included Stage II, IIa, and IIb diagnosis with exclusion criteria of rectal cancer, receipt of radiation therapy, neoadjuvant therapy or unknown adjuvant therapy. High risk features were defined by any one of the following: T-stage 4 (T4), positive perineural invasion, positive lymphovascular invasion, or positive surgical margins. In addition to collective analysis and multivariable regression based on socioeconomic factors, 8 subgroups were stratified and analyzed on the presence of high risk features, age, and Charlson-Deyo (CD). Co-variables included race,

insurance status, median income of residency area, and treatment facility type.

Results/Outcome(s): From 2004-2014, 77,739 patients were identified as Stage II colon cancer who met inclusion criteria. Overall, 14,214 (18.3%) received adjuvant chemotherapy. Patients with high risk features had a 29.0% chemotherapy treatment rate compared to 5.7% for patients without high risk features. Patients < 75 years old with high risk features and a CD score of 0-1 had the highest chemotherapy treatment rate of 46.7%. The lowest rate was 2.1% in patients > 75 years old without high risk features and a CD score of 2+. Multivariable logistic regression analysis showed that the odds of receiving adjuvant chemotherapy for a healthy patient (< 70 y) without high risk features was greater at community programs vs Academic/Research programs (OR = 1.26 $p < 0.01$). Equal odds of receiving chemotherapy were observed in younger (< 75) patients with high risk features (OR = 1.08, $p = 0.33$) and CD score 0-1. Adjuvant chemotherapy use was associated with improved overall survival in both younger and older patient with high risk features (HR .81 $p < .001$) (HR .75 $p < .001$). This association was not seen in patients with no high risk features.

Conclusions/Discussion: In the presence of multiple patient, clinical and facility factors, adjuvant chemotherapy was associated with improved overall survival in patients with high risk path features, but not in patients with a lack of high risk features. Given this, there appears to be inappropriate use of adjuvant chemotherapy in younger, healthy patients without high risk features in some community based hospitals. These findings are relevant to clinical practice in order to avoid inappropriate use or non-use of adjuvant chemotherapy based primarily on age and co-morbidities.



CAN THE ANASTOMOTIC LEAKAGE IN LAPAROSCOPIC COLORECTAL SURGERY DECREASE USING BY LINEAR STAPLER IWTH BIOABSORBABLE STAPLE LINE REINFORCEMENT MATERIAL?

P158

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Purpose/Background: Anastomotic leakage (AL) is serious complication in colorectal surgery. Incidence of AL remains still high in anterior/low anterior resection (AR/LAR) with double-stapling technique (DST) anastomosis, despite development of surgical techniques. Some papers report the disruption of anastomosis is likely to occur at the corner of lateral intersecting margins of rectum (called "dog ear"). Thus, we use a linear stapler (LS) with bioabsorbable staple line reinforcement material (NEOVEIL™) to diminish incidence of AL. The aim of this study is to examine the incidence of AL in patients using by LS with NEOVEIL™ (Neo-LS) compared with in those using by LS without NEOVEIL™ (Conventional-LS).

Methods/Interventions: Between 2013 and 2017, we identified 132 colorectal cancer patients who underwent laparoscopic anterior/low anterior resection with DST anastomosis in our prospective database. From October 2016, Neo-LS and intraoperative colon fiber which confirmed the mucosal adaptation of corner of dog ear were performed in all patients. In this study, patients with recurrent tumor, benign disease, emergent surgery or construction of diverting stoma were excluded.

Results/Outcome(s): Twenty-eight out of 132 patients underwent surgery using by Neo-LS (21.2%), and 104 using by Conventional-LS (78.8%). Patient characteristics included age, gender, BMI, smoking history, diabetes mellitus, large bowel obstruction, and clinical stage were not significant difference between two groups. Ten patients underwent LAR in Neo-LS group (35.7%) and 29 in Conventional-LS group (27.9%). Surgical time and blood loss were not statistical significance. Intraoperative colonoscopy showed that all cases had sufficient adaptation at anastomosis in Neo-LS group. No patient occurred AL classified as more than Clavien-Dindo grade III in Neo-LS group (0%) and 7patients did in Conventional-LS group (6.7%). However, the incidence of AL was not significant difference in two groups ($p=0.18$).

Conclusions/Discussion: This result suggests that Neo-LS in patients who underwent laparoscopic AR/LAR did not significantly affect the incidence of AL, although mucosal adaptation at anastomosis is sufficient in patients using by Neo-LS. Further study in terms of correlation between AL and mucosal adaptation is needed.

DOES OBESITY HAVE IMPACT ON THE COST OF OPEN COLORECTAL CANCER SURGERY?

P159

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Purpose/Background: The prevalence of obesity is increasing at a rapid rate. Obesity is a well-known risk factor of colorectal cancer, and greater use and higher costs in healthcare resources can be attributed to obesity. Although there are wide variations in healthcare and medical reimbursement policies which would impact the total cost of colorectal cancer surgery worldwide, we intended to analyze the impact of obesity on colorectal cancer surgery cost in Korea.

Methods/Interventions: We retrospectively collected hospital billings for patients who underwent surgery for stage I-III colorectal cancer and analyzed the association between obesity and the hospital cost. Obesity was assessed by preoperative body mass index (BMI) and computed tomography-assessed adipose tissue area; total adipose tissue (TAT), visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT) areas. Receiver operation characteristic (ROC) curve was drawn and the optimal cutoff value and area under the curve (AUC) of obesity indices for total medical cost were calculated. We defined obese as the value over the cutoff value. The primary outcome was hospital costs assessed by direct hospital billing during hospitalization.

Results/Outcome(s): A total of 656 patients were analyzed in the study. Mean BMI was 23.92 ± 2.91 kg/m², mean total adipose tissue (TAT) area was 249.57 ± 92.82 cm² and mean visceral adipose tissue (VAT) area was 101.50 ± 56.57 cm². Mean postoperative hospital stay was 7.51 ± 3.13 days and the mean cost during index admission was 5856.51 ± 2254.94 \$. The optimal cutoff value was 312.66 cm² for TAT area, 109.61 cm² for VAT area and 25 kg/m² for BMI. In univariate analysis, age, tumor location, admission route (scheduled vs emergent), ASA class and TAT area was significantly associated with an increased total medical cost. In multivariate analysis by each obesity indices after adjusting for confounders, only the obese patients defined by TAT area was significantly associated with higher total medical cost (5674.31 ± 1671.70 \$, $n=456$ versus 6043.21 ± 2067.02 \$, $n=141$, respectively; $p=0.046$). Additional subgroup analysis was performed with detailed medical cost subdivided into 8 independent components: anesthesia, laboratory test, operation/consultation, radiology test, room, medication, surgical supplies and blood. Multivariate analysis with these variables according to TAT area revealed that only the operation/consultation cost was significantly higher in the obese group (1610.71 ± 397.44 \$, $n=456$ versus 1738.20 ± 65.92 \$, $n=141$, respectively; $p=0.003$). There was no significant difference in length of postoperative

hospital stay according to TAT area ($p=0.335$, 7.4 ± 2.4 days versus 7.7 ± 4.1 days).

Conclusions/Discussion: In contrast to general belief, BMI was not related to cost difference. Only total adipose tissue area as associated with higher medical costs in colorectal cancer patients, owing to difference in operation/consult cost (i.e., doctor's fee).

COMPARISON OF ANTHROPOMETRIC PARAMETERS AFTER ULTRA-LOW ANTERIOR RESECTION AND ABDOMINOPERINEAL RESECTION IN VERY LOW-LYING RECTAL CANCERS.

P160

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Purpose/Background: Ultra-low anterior resection (uLAR) as a sphincter-saving procedure has been widely performed as the treatment of very low-lying rectal cancers. However, patients tend to complain about controlling their stools and even loss of appetite with decreased body weights after uLAR. The purpose of this study is to compare the anthropometric and nutritional parameters after uLAR and abdominoperineal resection (APR) for patients with very low-lying rectal cancers.

Methods/Interventions: Data regarding surgeries of curative intent for rectal cancers located within 3 cm from anal verge were retrospectively reviewed. Patients who underwent either uLAR or APR in 2012 and showed disease-free for more than three years after surgeries were included. Data of a total 35 patients including body weights, BMI and the level of total protein, albumin, hemoglobin and the lymphocyte count were measured. The values at discharge and one, two, three months and one, two, three years after discharge were compared to evaluate the pattern of changes in all parameters. Changes of body weight were measured by calculating the proportion of change at the designated time, [(value at the designated time - preoperative value) / preoperative value] \times 100 (%).

Results/Outcome(s): Body weight, BMI and the level of hemoglobin over three years after discharge had changed differently between two groups. (Fig) The body weight increased $5.30 \pm 5.42\%$ of preoperative body weight in APR group, but it decreased $1.41 \pm 7.31\%$ in uLAR group ($P=0.004$). The changes of BMIs after the same periods were $+1.25 \pm 1.30 \text{ kg/m}^2$ in APR group, but $-0.36 \pm 1.61 \text{ kg/m}^2$ in uLAR group ($p=0.003$). The type of surgery was the only risk factor for weight loss at three years after discharge in the multivariate analysis ($p=0.049$).

Conclusions/Discussion: The reason why the weight recovery of uLAR patients was slow until three months after discharge may be the effect of ileostomy. However, considering that all patients in our study underwent

ileostomy closure in about six months after discharge, the slow recovery of body weight after one year in uLAR group is mainly due to LARS (low anterior resection syndrome)-induced changes in dietary habit. Among the nutritional parameters, only hemoglobin level changed differently between two groups. The reason why the recovery of hemoglobin in uLAR group was slow until one year after discharge seems to be the effect of an ileostomy which can cause Vitamin B12 and iron deficiencies. In conclusion, the capacities of recovering the anthropometric status were not extent to aggravate the nutritional status in both groups. However, the recovery of the body weight, BMI and hemoglobin after APR were more stable than that after uLAR. These findings indirectly reflected the LARS effect after uLAR and can help surgeons to better select surgical methods and better counsel patients with very low-lying rectal cancers who are being considered APR.

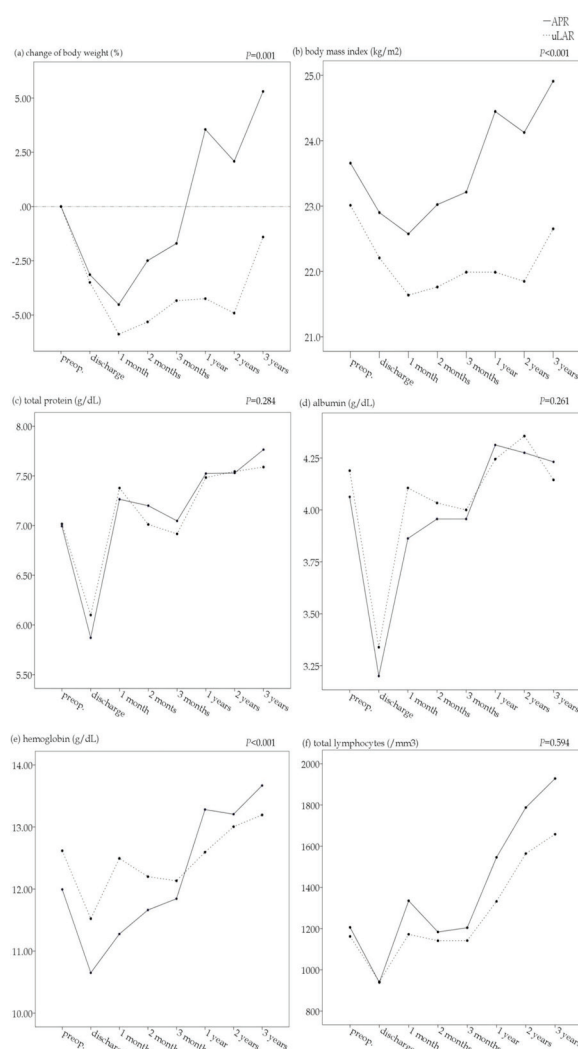


Figure. Changes of anthropometric and nutritional status (a) Proportion of changed body weight, (b) body mass index and the level of (c) total protein, (d) albumin, (e) hemoglobin and (f) total lymphocyte count, analyzed by ANOVA model for repeated measures.

COMBINED COLORECTAL & UROLOGIC ROBOTIC-ASSISTED SURGERY: A SINGLE INSTITUTION'S CASE SERIES.

P161

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Purpose/Background: Robotic-assisted surgery (RAS) was FDA approved in 2000, initially for the use of urologic surgery. The first colorectal RAS followed in 2001 and trends have demonstrated an increase by 158% since 2011. The treatment of some colorectal diseases also involves the genitourinary tract and requires the expertise of urologic colleagues. In this case series, we report 14 patients who have undergone a combined colorectal and urologic RAS at a single institution. To the best of our knowledge, this is the largest case series of combined RAS.

Methods/Interventions: The surgical database of 3 colorectal surgeons and 4 urologists were queried for patients who had undergone a colorectal or urologic RAS using the Da Vinci Xi or Si from 2014 to 2017 at The University of California in San Diego. The only inclusion criteria were that patients had a simultaneously performed colorectal and urologic RAS. This included elective cases and cases where an intraoperative consult lead to a combined case. Charts were retrospectively reviewed for patient demographics, surgical treatments, OR costs and outcomes.

Results/Outcome(s): 157 procedures were reviewed and 14 patients met criteria. The average age was 60 years (range 45-75), BMI was 25.5 (20.2-31.6), ASA was 2.8 (2-4) and 79% (n=11) were male. The indications for requiring a combined RAS were 4 due to rectal cancer, 3 due to diverticulitis, 3 due to prostate cancer, 2 due to IBD, 1 due to a renal cell carcinoma with a mass in the terminal ileum and 1 due to colon cancer. 6 patients had a colorectal and urologic fistula, 3 had a ureteral stricture/obstruction, 6 had prior pelvic radiation and 2 were undergoing immune therapy. The average length of surgery was 453 minutes (206-695), EBL 173mL (50-350) and 1 patient required one unit of PRBCs intraoperatively. 2 cases were converted to open. 11 patients had prolonged foley catheterization, which were removed at an average of 17.6 days (2-56). The average length of stay was 6.5 days (3-14) and average time for return of bowel function was 4 days (2-10). The average OR supply cost was \$5,887.55 (\$3,809.21 - \$9,783.63) and average cost of OR time at \$140 a minute was \$63,420 (\$28,840 - \$97,300). 5 patients had a 30-day postoperative complication: 1 readmission for dehydration from increased ileostomy output, 3 pelvic abscesses, 1 case of c. diff colitis and 1 had a perineal wound dehiscence. There were no post-operative UTIs or DVTs. 4 patients had a diverting loop ileostomy at the time of RAS, 3 have had them taken down and 1 is scheduled for surgery.

Conclusions/Discussion: Here we present the feasibility and safety of performing combined colorectal and urologic RAS in patients who have complicated disease processes within each of these fields. As more surgical specialties become proficient in the use of RAS, the opportunities to provide patients with combined RAS that have comparable outcomes to traditional forms of surgery becomes a huge advantage.

SITE OF RECURRENCE IS ASSOCIATED WITH SURVIVAL AFTER SALVAGE SURGERY FOR LOCALLY RECURRENT RECTAL CANCER.

P162

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Purpose/Background: Surgery for recurrent rectal cancer is associated with high morbidity and mortality. There is little consensus about classification of recurrence based on site, or whether recurrence site correlates with survival. We present a retrospective review from a single institution assessing factors related to recurrence pattern and potential impact on clinical outcomes.

Methods/Interventions: A prospectively maintained rectal cancer database was queried for all operations done for recurrent disease between 1997 and 2012. A total of 147 patients were identified; 33 were excluded for metastatic disease or multiple sites of recurrence. The remaining 114 patients were radiologically classified by readers blinded to clinical data into peri-anastomotic (PA, n=76), surgical field (SF, n=25) or lateral lymph node (LLN, n=13) sites of recurrence. Demographic and clinical and pathological features were compared to identify risk factors associated with recurrence site. Comparisons for categorical variables were made using Fisher's exact test; numerical variables were compared using two-tailed t-tests using the Bonferroni correction to adjust for multiple comparisons. Kaplan-Meier estimates and log-rank test were used to determine differences in survival after surgery for recurrent disease relative to recurrence site for disease-free survival and overall survival (DFS and OS).

Results/Outcome(s): The median follow-up period for the 114 patients was 4.4 years (IQR 2.1 - 7.2 years). Site of recurrence correlated with positive circumferential resection margin at initial resection (PA (6%) vs. SF (19%) vs. LLN (25%), p=0.027) and receipt of neoadjuvant therapy for the primary tumor (PA (75%) vs. SF (72%) vs. LLN (31%), p=0.008). However, no association was noted with primary T or N stage, tumor differentiation, lymphovascular invasion, or adjuvant therapy for the primary tumor. PA recurrences were more commonly observed in upper rectal tumors (45% (PA) vs. 23% (SF) vs. 8% (LLN), p<0.001). PA recurrences were also associated with increased DFS when compared to SF and LLN recurrences

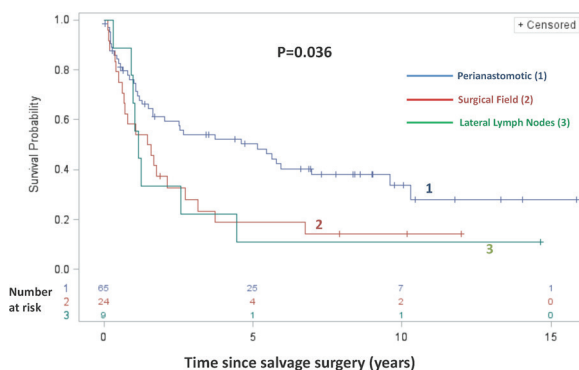
P161 Combined Colorectal & Urologic RAS

Patient	Age	Gender	BMI	ASA	Pelvic Radiation	Indication for Surgery	GI Procedure	GU Procedure	OR time (min)	Case Cost per minute
1	45	M	27.6	2	Y	Locally invasive rectal cancer	LAR, loop ileostomy	prostatectomy	644	\$92,960.0
2	55	M	24.7	2	N	coloureteral fistula & left ureteral obstruction 2/2 diverticulitis	LOA, repair of colo-ureteral fistula	ureteral reimplantation with psoas hitch	557	\$77,980.0
3	52	M	20.2	3	N	colovesicular fistula from Crohn	LOA, LAR, loop ileostomy, takedown of CVF/RVF	bladder flap to close RVF	244	\$34,160.0
4	63	F	27.1	3	N	right RCC & tumor at terminal ileum	ileocolic resection	right partial nephrectomy	215	\$30,100.0
5	61	M	23	2	N	colovesicular fistula 2/2 diverticulitis	LAR	bladder repair	206	\$28,840.0
6	55	M	26.9	3	Y	colorectal anastomotic stricture & left ureteral obstruction 2/2 rectal cancer	ultra LAR w revision of anastomosis	left ureteral implantation with psoas hitch	353	\$49,420
7	67	F	22.4	2	N	left ureteral stricture 2/2 diverticulitis	LAR	left ureteral implantation with psoas hitch	445	\$62,300.0
8	63	M	28.7	3	Y	rectourethral fistula 2/2 prostate cancer	radical cystoprostatectomy with ileal conduit & debridement of perirectal abscess cavity	left ureteral implantation with psoas hitch, completion proctectomy with takedown of colostomy, coloanal anastomosis, diverting loop ileostomy	665	\$93,100.0
9	55	F	31.6	3	Y	rectal cancer	LAR, loop ileostomy	right pelvic lymph node dissection	492	\$68,880.0
10	72	M	23.6	4	N	locally invasive prostate cancer	LAR with end colostomy. PLASTICS: right vertical myocutaneous flap for pelvic coverage	radical cystoprostatectomy with ileal conduit, bilateral pelvic LN dissection	687	\$96,180.0
11	75	M	21.3	3	Y	rectourethral fistula 2/2 prostate cancer	LAR with repair of rectal stump defect & end colostomy	cystoprostatectomy, sigmoid urinary conduit, I&D of pelvic abscess	421	\$58,940.0
12	49	M	31.2	3	Y	recurrent metastatic rectal cancer	APR	cystoprostatectomy with ileal conduit	695	\$97,300.0
13	56	M	25.3	3	N	metastatic colon cancer	LAR, SBR	partial cystectomy	391	\$54,740.0
14	74	M	22.9	3	N	colovesicular fistula 2/2 ulcerative colitis	LAR, loop ileostomy, I&D of pelvic abscess	partial cystectomy	325	\$45,500.0

(Median DFS, 5.1 vs. 1.5 vs. 1.2 years, $p=0.036$, **Figure 1**). Higher R0 rates were noted for PA (72%) vs. SF (52%) or LLN (54%) recurrences. R0 resection of the recurrent tumor was associated with improved DFS (3.7 vs 1.5 vs 0.3 years, $p=0.002$) when compared to R1 and R2 resection; this finding persisted for OS. No differences in survival were noted with respect to chemotherapy or radiation given prior to salvage surgery.

Conclusions/Discussion: Peri-anastomotic recurrence is associated with distinct risk factors and better survival after salvage surgery for locally recurrent rectal cancer. These data imply different causes, preventive strategies, and outcomes according to site of recurrence and warrant validation in independent cohorts.

Disease-Free Survival by Site of Recurrence



NEOADJUVANT STRATEGIES LEADING TO A COMPLETE CLINICAL RESPONSE AND NON-OPERATIVE MANAGEMENT FOR RECTAL CANCER: A SINGLE INSTITUTION EXPERIENCE.

P163

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Purpose/Background: Non-operative management (NOM) strategies have emerged as an option for patients with rectal cancer experiencing a complete clinic response (cCR) after neoadjuvant therapy.

Methods/Interventions: We performed a retrospective review of a prospectively collected database for patients with rectal cancer treated from 2012-2016. We identified patients that had elected for NOM after receiving neoadjuvant therapy and achieving documented cCR. Patients were followed on a strict surveillance schedule that included physical exam, laboratory testing, endoscopy and imaging.

Results/Outcome(s): A total of 33 patients (54% female, 46% male) elected to undergo NOM. Mean patient age was 70.8 years. Twenty-three patients (69%) had low

tumors (≤ 7 cm from anal verge) and 42% of patients were treated with total neoadjuvant therapy (induction or consolidation, and long course chemoradiation). During a median follow-up of 22 months, there were 5 (15.1%) recurrences (1 local, 1 local and distant, and 3 distant). Two of the isolated distant recurrences were to the lung or liver and were amenable to metastasectomy. Another patient experienced a synchronous distant liver and local recurrence treated with resection of the primary tumor and liver metastasectomy. One patient experienced a local recurrence alone and was also successfully salvaged with surgery. Of the 5 total recurrences, 4 (80%) were salvaged. There was 1 mortality, due an unrelated cause.

Conclusions/Discussion: Neoadjuvant treatment strategies may facilitate greater rates of cCR. Durable responses after these treatments may enable more patients to undergo NOM. More research is required to identify the appropriate patient population. For those patients experiencing recurrence, surgical salvage is often possible.

SURVIVAL FOLLOWING DIAGNOSIS AND TREATMENT OF SQUAMOUS CANCER OF THE ANUS IS NOT AFFECTED BY HIGH RISK HUMAN PAPILLOMAVIRUS STATUS.

P164

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Purpose/Background: Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States. HPV subtypes 16 and 18 have been associated with squamous carcinoma of the anus. The purpose of this analysis is to quantify the effect of HPV status on survival following diagnosis and treatment of squamous cell carcinoma of the anus.

Methods/Interventions: The National Cancer Database (NCDB) from 2010 to 2015 was reviewed for all cases of invasive squamous cell carcinoma of the anus (SEER Histology Codes 8070-8079) where HPV status was available. Groups were separated based on the presence of high risk HPV subtype 16 or 18. Multivariate regression analysis was used to account for the differences in preoperative characteristics and treatment regimens between groups. The primary outcome was survival following diagnosis of squamous cell carcinoma of the anus.

Results/Outcome(s): The inclusion criteria identified 3606 cases of squamous cell carcinoma of the anus diagnosed and treated between 2010 and 2015, 1551 (43%) of patients had HPV subtype 16 or 18. HPV negative patients were older (60.63 vs. 59.22 years, $p<0.001$), more often male (31.3% vs. 28%, $p=0.03$) and presented with earlier stage disease (Stage I 22% vs. 18.4%, Stage II 39.5% vs. 36.8%, $p<0.001$). Chemotherapy and radiation was administered equally to both groups (84.8% vs. 86.5%, $p=0.152$). Need for salvage abdominal perineal resection

was equal between groups (2.9% vs. 2.5%, $p=0.114$). After controlling for differences in the cohorts, survival following diagnosis and treatment was not significantly affected by HPV subtype 16 or 18 compared to HPV negative patients (HR 0.422, 95% CI 0.791 to 1.103, $p=0.422$) (Table 1).

Conclusions/Discussion: Survival following diagnosis and treatment of invasive squamous cell carcinoma of the anus is similar for patients with and without HPV subtype 16 or 18.

Cox Regression Analysis (n=2807)	HR	95% CI	P
HPV Subtype 16 or 18	0.934	0.791 to 1.103	0.422
Age (Years, Continuous)	1.031	1.023 to 1.038	<0.001
Female vs. Male (Control)	0.594	0.503 to 0.701	<0.001
NCDB Analytic Stage vs. In-Situ Disease			
Stage I	0.850	0.117 to 6.158	0.872
Stage II	1.619	0.226 to 11.582	0.631
Stage III	2.811	0.393 to 20.115	0.303
Stage IV	7.474	1.034 to 54.018	0.046
Local Resection	0.604	0.479 to 0.762	<0.001
AP Resection	1.461	0.995 to 2.145	0.053
Chemotherapy and Radiation	0.563	0.453 to 0.700	<0.001

Table 1:
Table 1: Cox regression analysis for survival following diagnosis and treatment of squamous cell carcinoma of the anus as reported to the NCDB between 2010 and 2015.

DIFFERENCES BETWEEN STAGE I AND STAGE III PT1 LOWER RECTAL CANCER IN LONG-TERM SURVIVAL AND PREOPERATIVE CT IMAGES OF MESORECTAL LYMPH NODES.

P165

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Purpose/Background: The standard treatment for pT1 lower rectal cancer which had risk factor of lymph node metastasis (LNM) is radical resection of rectum. There is little report about prognosis obtained by radical resection of pT1 rectal cancer, because pT1 rectal cancers are classified into TNM stage I or III, depending on the existence of LNM. Although there are many reports about preoperative diagnosis of LNM by modern imaging, they have still not be able to solve the problem of how to diagnose LNM accurately. And because of the possibility of LNM, most of lower rectal cancer patients have been undergoing radical resection which often causes deterioration of patient's quality of life such as anal or urinary dysfunction. The purpose of this study is to clarify differences in prognosis of lower rectal cancer patients between with and without LNM. And to evaluate the role of preoperative modern image to predict whether absence or existence of LNM.

Methods/Interventions: We reviewed 155 consecutive patients with pT1 lower rectal cancer with risk factors of LNM, located below the peritoneal reflection, who underwent radical resection in our hospital without any neoadjuvant treatment such as chemotherapy or chemoradiation therapy. Patients were classified into two groups based on the existence of LNM, and the oncological outcomes and clinical characteristic were compared between groups. We also measured mesorectal lymph node sizes in preoperative

enhanced CT images with 5 mm slice interval, and analyzed the relationship between the size of lymph node in images and LNM.

Results/Outcome(s): 132 patients without LNM in mesorectum were classified into pN0 group, and 23 with LNM were into pN+ group. Type of operation included 82 (53%) cases of low anterior resection and 69 (45%) of intersphincteric resection and 4 (3%) of abdominoperineal resection. Regarding of anal function, the median Wexner score of 90 patients preserved their sphincter function was 8. The 5-year overall survival rate were 96% in pN0 group and 100% in pN+ group, and the 5-year recurrence free survival rate were 98% in pN0 group and 96% in pN+ group, respectively. Adjuvant chemotherapy was performed in 57% of patients in pN+ group. With the cut-off value of 4 mm in short axis, the diagnostic accuracy of lymph node metastasis by preoperative CT was 84% in sensitivity, 68% in specificity, and 70% in accuracy. In the cases which lymph node structure couldn't be pointed out in CT images, only 3 of 84 patients had LNM.

Conclusions/Discussion: The prognosis of pT1 low rectal cancer with LNM was much better than that of other stage III rectal cancer, and same to pT1 low rectal cancer without LNM. Although it is impossible to make perfect lymph node metastasis prediction with preoperative CT, the absence of lymph node structure in preoperative CT may reduce the possibility of existence of LNM in lower rectal cancer patients.

LYMPHOVASCULAR INVASION AND PERINEURAL INVASION NEGATIVELY IMPACT OVERALL SURVIVAL FOR STAGE I AND II ADENOCARCINOMA OF THE COLON.

P166

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Purpose/Background: Lymphovascular invasion (LVI) and perineural invasion (PNI) are two histopathological features associated with higher risk colon cancer. The purpose of this analysis was to quantify the impact of LVI and PNI on overall survival following diagnosis and to determine the protective effect of adjuvant chemotherapy for early adenocarcinoma with high risk factors.

Methods/Interventions: Retrospective database review of the 2010-2014 National Cancer Database for colon cancer. Individuals diagnosed with invasive adenocarcinoma of the colon (histology code 8140) with primary surgical resection, greater than 12 nodes harvested with no positive nodes on pathological exam. 49172 patients underwent definitive surgical resection for stage I or II adenocarcinoma of the colon. Multivariate regression analysis of the impact of LVI, PNI and adjuvant chemotherapy

on overall survival following diagnosis of node negative adenocarcinoma of the colon.

Results/Outcome(s): Four-year survival following diagnosis was lower for individuals with LVI (45%), PNI (39%), and both LVI and PNI (38.5%) versus LVI and PNI negative disease (54%, $p=0.018$). Adjuvant chemotherapy improved four-year survival for individuals with LVI (74.2%), PNI (75%), and both LVI and PNI (61%) versus LVI and PNI negative disease (75.3%, $p=0.018$). After controlling for differences in cohorts, cox regression analysis reported hazard ratios of 1.19 (CI 1.11 to 1.27) for LVI, 1.35 (CI 1.20 to 1.51) for PNI and 1.45 (CI 1.261 to 1.66) for LVI and PNI as well as a protective effect of chemotherapy hazard ratio 0.762 (CI 0.688 to 0.844) (Figure 1).

Conclusions/Discussion: LVI and PNI have a detrimental effect on survival following diagnosis with node negative stage I or stage II adenocarcinoma of the colon. Chemotherapy may be protective for early stage cancers when LVI and PNI are present.

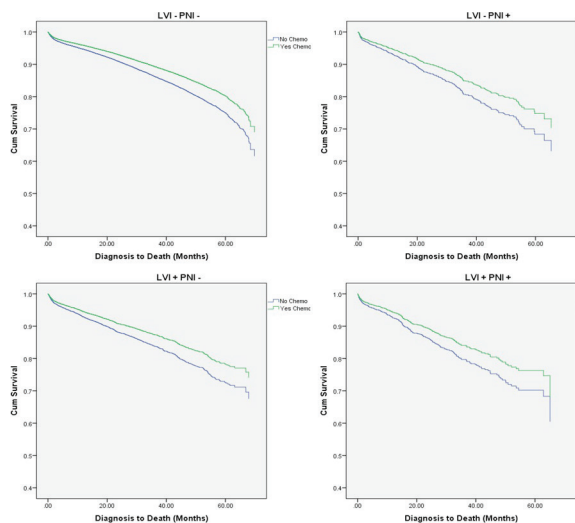


Figure 1: Cox regression analysis of overall survival following diagnosis of adenocarcinoma of the colon based on histological LVI and PNI status and adjuvant chemotherapy. This analysis indicated that for all groupings of LVI and PNI individuals who received chemotherapy had higher survival compared to those who underwent surgical resection alone.

PREOPERATIVE MRI ASSESSMENT OF CRM PREDICTS RECURRENCE FOR LOWER RECTAL CANCER WITHOUT PREOPERATIVE CHEMORADIO THERAPY.

P167

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Purpose/Background: There are few reports about the relationship preoperative MRI and prognosis of lower rectal cancer treated with surgery without preoperative chemoradiotherapy. This study of 358 patients with lower rectal cancer without preoperative chemoradiotherapy reports the relationship between MRI assessment

of circumferential resection margin (CRM) involvement, and clinical variables with relapse-free survival (RFS) at a single-institution tertiary care cancer center.

Methods/Interventions: Patients who underwent radical resection for low rectal cancer located below the peritoneal reflection between 2000 and 2014 were retrospectively assessed. A radiologist and a surgeon measured depth (cT), lymph node status (cN), CRM (mrCRM), and distance of mesorectal tumor extension from muscular layer (mrDME) without clinical information retrospectively. We examined the accuracy of cT and cN compared with pathological results. A cox proportional hazards model was used in multivariate analysis to determine the relationship of MRI assessment and clinicopathological covariates to RFS.

Results/Outcome(s): Positive predictive value (PPV) of cT2 and cT4b were 45.4% and 40.0%, and negative predictive value (NPV) were 94.7% and 100% respectively. PPV and NPV of cN were 76.1% and 80.9%. MRI predicted mrCRM clear 261 patients, and mrCRM positive 97 patients. The 5-year relapse free survival was 75.6% in patients with mrCRM clear compared with 56.1% in patients with mrCRM positive ($p<0.001$). RFS HR for mrCRM involved was 1.89 (95% CI, 1.25-2.85; $P=0.003$). MRI CRM was the only preoperative staging parameter that remained significant for RFS on multivariate analysis.

Conclusions/Discussion: MRI CRM involvement is associated with recurrence; therefore, lower rectal cancer terms could intensify treatment and follow-up.

TRANSANAL TOTAL MESORECTAL EXCISION IN RECTAL CANCER-INITIAL EXPERIENCE & SHORT-TERM OUTCOME IN COMPARISON WITH LAPOROSCOPIC TOTAL MESORECTAL EXCISION IN A REGIONAL HOSPITAL.

P168

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Purpose/Background: TaTME offers a promising alternative to the standard surgical approach for rectal cancer. The aim of this study was to review our experience of this technique, focusing on oncological&short-term outcomes. A comparison with conventional LapTME was also performed

Methods/Interventions: This is a retrospective study on a prospectively collected database between 16 -17, involving 21 patients with histologically proven middle or low rectal cancer. Baseline characteristics, operative, histopathological details&postoperative complication were evaluated. To minimize any potential bias, a comparison with a retrospective cohort of consecutive patients of identical characteristics treated by Lap TME in the immediate chronological period 14-15 was also performed.

P168 Demographics, Surgical Characteristics and short-term outcomes

Table 1a	Lap TME (n=22)	TaTME (n=21)	P value
Age (Mean)	73	71	0.341
Sex (M:F)	14:8	14:7	0.835
BMI (Mean)(kg/m ²)	23.3 (16.51-32)	22.3 (17.3-27.3)	0.302
Previous laparotomy	Yes: 2 No:20	Yes: 0 No: 21	0.157
ASA	II: 16 III: 6	II: 18 III: 3	0.295
Height of tumor from Anal verge (cm)	5.9 (3-10)	5.3 (3-8)	0.206
Table 1b	Lap TME (n=22)	TaTME (n=21)	P value
Operation Time (Median) (mins)	280	274.5	0.184
Team	1 team: 22	1 team: 2 2 teams: 19	
Type of anastomosis	Stapled: 17	Stapled: 12 Handsewn: 9	
Type of Surgery	TME: 17 APR: 4 Hartmann's operation: 1	TaTME: 21	
Conversion	0	0	N.S.
Blood loss (Median) (ml)	82	87	0.769
Intraoperative complication	0	0	N.S.
SPECIMEN			
Tumor size (Mean) (cm)	3.7	4.1	0.638
Circumferential margin involvement	Clear: 20 Involved: 2	Clear: 20 Involved: 1	0.578
Distal margin (Mean) (cm)	2	1	0.545
No. of LN (Median)	16.5	16	0.327
pT stage	T1: 2 T2: 5 T3: 12 T4: 2	T1: 3 T2: 6 T3: 11 T4: 0	0.517
pN stage	N0: 9 N1: 8 N2: 5	N0: 8 N1: 7 N2: 5	0.985
Table 1c	Lap TME (n=22)	TaTME (n=21)	P value
Hospital Stay (Median) (days)	13	9	0.615
30-d postoperative complications	1	3	0.345
Type of postoperative complications	Stoma complication:1	Stoma complication: 1 Small bowel perforation: 1 Minor leakage: 1	0.272
30-d reoperation	1 (stoma complication)	2 (stoma complication & small bowel perforation)	0.522
Readmission	0	0	N.S.
30-d mortality	0	0	N.S.

Preoperative workup, surgical technique & postoperative management were standardized.

Results/Outcome(s): 21 patients with middle & low rectal cancer treated by TaTME assisted by laparoscopy were included. 22 consecutive patients treated by LapTME in the immediate chronological period were included as control group. Characteristics of these patients were described in **Table 1a**. There were no statistically significant differences between both groups with respect to age, sex, BMI, previous abdominal surgery, ASA grade, tumor stage & tumor location from anal verge & tumor size. This confirmed the comparability between both groups. Surgical time was shorter in 2-team approach in TaTME. In LapTME, there were 4/22 (18.2%) patients requiring abdominoperineal excision & 1/22 (4.5%) patient requiring Hartmann's operation with permanent stoma due to difficult dissection, narrow pelvis & low tumor at 3cm from anal verge. There was no conversion, intraoperative complication or statistically significant difference in blood loss between both groups **Table 1b**. **Table 1c** describes the short-term outcomes after surgery. The length of stay was shorter in TaTME (9 vs 13 days). 2/21 (9.5%) patients in TaTME required reoperation due to ileostomy complication & small bowel perforation. 1/22 (4.5%) in LapTME required reoperation due to stoma complication. There was no readmission & 30-day mortality in both groups. There was no urethral injury in TaTME & no clinically evident anastomotic leakage in LapTME. Regarding the pathological examination of resected rectal cancer specimen, there were no statistically significant differences with respect to tumor size, no of lymph node harvested, circumferential resection margin involvement, distal resection margin & pathological TN staging **Table 1b**

Conclusions/Discussion: Evaluation of short-term outcomes demonstrated that TaTME is a feasible and safe technique associated with lower permanent stoma rate. Further study on more advanced tumor including post neoadjuvant therapy rectal cancers, long-term & functional outcomes were warranted.

INTERVAL COLORECTAL CANCER FOLLOWING VIRTUAL COLONOSCOPY: INCIDENCE IN A SINGLE INSTITUTION.

P170

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Purpose/Background: Screening strategies for preventing colorectal cancer (CRC) include stool sampling, radiologic exams, such as computed tomography colonography (CTC), and endoscopic exams, such as optical colonoscopy (OC). In CRC screening, the main measure of effectiveness of the modality is the risk of diagnosing a CRC within a period of time following an exam that did

not detect one and the next recommended exam (interval incidence). The rate of interval CRC has been well documented for OC, with possible reasons proposed. Rates of interval CRC in patients screened with CTC are not well studied, particularly with patients who had an initial CTC, but followed up with an OC.

Methods/Interventions: All patients undergoing CTC for CRC screening at a single institution in 2005 were identified from the electronic medical record (EMR). The EMR is linked to other institutions within the same hospital system, which allowed for longitudinal review of patients who moved to other hospitals within the system. Records for which there were no follow up studies or in which a polyp was found on the initial test were excluded from analysis. Although all initial exams were done for average risk screening, follow up exams included both screening and diagnostic exams. We examined age at initial study, interval lengths, and incidence of interval neoplasia or adenocarcinoma.

Results/Outcome(s): There were 1152 records with screening studies done in 2005. 413 patients did not have follow-up exams noted. 103 records were excluded for neoplastic polyps on initial screening requiring immediate removal, including 2 cases of CRC found on initial screening. In 638 patients (60.3% male), had follow up studies (55.4%), either by CTC or OC, and 112 had a third follow up exam performed, totaling 750 intervals. The mean age at initial exam was 57.5 +/- 9.0 years, and the average interval between exams was 5.19 +/- 0.49 years. 39.7% of patients switched to an OC for their first interval exam. Of those that first underwent a CTC follow up study, 43.8% switched to an OC for their third exam. Only 3 interval cancers were identified in this cohort of 750, for a 0.4% interval CRC rate following screening CTC. These cancers were found in the cecum (T3N2 obstructing mass not seen on CTC 2.9 years prior), hepatic flexure (T2N0 seen as diminutive polyp on CTC 1.0 year earlier), and transverse colon (T4aN1c found on screening CTC after not being seen on CTC 4.0 years prior). Follow up exams showed no evidence of pathology in 76.4%. One or more adenomas were detected in 21.6% of exams. One study detected an intra-colonic metastasis from a primary lung cancer.

Conclusions/Discussion: This cohort's very low interval CRC rate (0.4%), below the published rate of up to 9% for interval cancers in OC exams, supports the safety of the 5-year interval screening recommendation. The difference between CTC and OC suggest that the current interval recommendation for OC screening should be shortened.

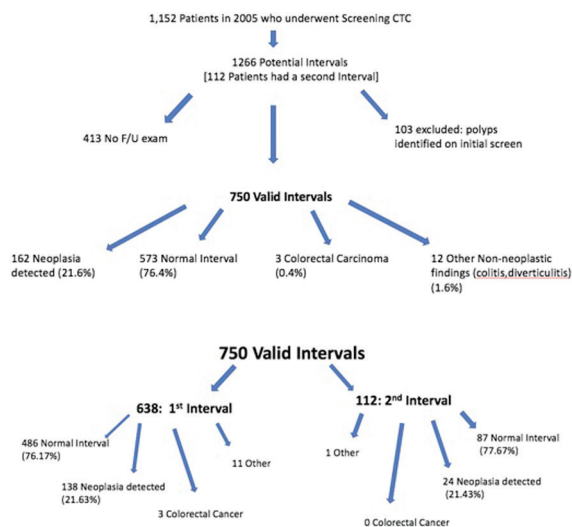


Figure 1. Breakdown of Reviewed Cases

EPIDEMIOLOGY AND HISTOPATHOLOGY CHARACTERISTICS OF HISPANICS WITH COLORECTAL CANCER IN THE PUERTO RICO BIOBANK.

P171

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Purpose/Background: Colorectal cancer (CRC) is the second most commonly diagnosed cancer worldwide and is the overall leading cause of cancer in Puerto Rico (PR). Racial differences have been reported in CRC, and studies have shown that Hispanics present at more advanced stages and younger ages when compared to non-Hispanics. The study aims to describe the basic demographics and the pathological profile of CRC cases in Puerto Rico.

Methods/Interventions: Since July 2013, 138 consecutive patients underwent CRC surgery at St. Luke's Memorial Hospital (Ponce, PR, USA) and were recruited for entry into the Puerto Rico Biobank (PRBB), the tissue procurement facility administered by the NCI-funded PHSU-Moffitt Cancer Center partnership. Epidemiologic questionnaires were given to all subjects to provide information on demographics, medical history, family history of cancer, risk factors, and diet. Pathology data from the surgical specimens were collected for all cases including anatomical site, histopathology, tumor volume, TNM stage, and ulceration, among other parameters. The study was approved by the PHSU IRB and informed consent was attained for all subjects.

Results/Outcome(s): A total of 138 specimens were collected, and 100% were adenocarcinoma. Men were the more common sex and represented 88/138 (64%) of the subjects. Mean age at diagnosis was 68.4 (SD=11.0), and subjects that were <50 years old represented 7/138 (5%) of the cases. The distribution by location was as follows: 1) proximal colon (i.e. cecum and ascending), 49 (36%),

2) transverse colon, 7 (5%), 3) descending and sigmoid, 35 (26%), 4) rectal, 29 (21%), and 5) colon not otherwise specified, 15 (11%). Overall, the most common pathologic stage was stage III CRC, which was found in 42% of the specimens. In patients that were <50 years old, the mean volume was 62.7 (cm³) vs. 26.6 (cm³) in ≥50 years old patients (p= 0.39), and 6/7 (86%) of the patients that were <50 years old had extension into peri-colonic/rectal tissue. Overall, 88/138 (64%) of the tumors were ulcerated.

Conclusions/Discussion: Our biobank suggests that most patients with CRC in Puerto Rico are presenting after 50 years old. However, patients that were <50 years old had a trend suggestive of larger and more aggressive tumors. The biobank demonstrates the importance of strict adherence to CRC cancer screening guidelines, and suggests that there is a population of younger patients that may benefit from earlier screening. Further investigation to better characterize the biologic mechanisms of CRC in Hispanics is merited.

APPENDICEAL CANCER IS COMMONLY MISDIAGNOSED AS APPENDICITIS IN THE ELDERLY.

P172

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Purpose/Background: Non-operative management of appendicitis is becoming more common, particularly in elderly patients as they may carry significant operative risk. A downside to non-operative management is the inability to diagnose an underlying appendiceal malignancy. We sought to determine how often elderly patients with appendiceal cancer are incorrectly diagnosed with appendicitis and therefore fail to receive appropriate treatment.

Methods/Interventions: Patients ≥ 65 years old with a diagnosis of appendiceal cancer or appendiceal carcinoid were identified in the Surveillance Epidemiology and End Results (SEER)-Medicare database from 2000-2014 using ICD-9-CM diagnosis codes. The ICD-9-CM diagnosis codes for appendicitis were also used to identify which patients with appendiceal cancer received an incorrect diagnosis of appendicitis either at the same admission as their appendiceal cancer diagnosis or an admission prior to their cancer diagnosis. Demographic, tumor-specific, and surgical data were analyzed and compared between the group of patients with an appendicitis misdiagnosis and the group of patients without an appendicitis diagnosis.

Results/Outcome(s): 1,937 patients with appendiceal cancer were identified over the study period. 554 patients (21.9%) received an incorrect initial diagnosis of appendicitis. Patients who were misdiagnosed were more likely to be older (mean age 75.8 years vs. 75.0 years, p=0.03) and male (56.3% vs. 47.4%, p<0.001). A higher proportion of

patients with an initial appendicitis misdiagnosis presented with early stage disease (stage I or II) than those without an appendicitis misdiagnosis (42% vs. 26%, $p < 0.001$). Sixty-four percent of tumors in the appendicitis cohort were adenocarcinomas and 30% were classified as cystic, serous, or mucinous neoplasms. Patients 65-74 years old were less likely to receive an appendicitis misdiagnosis than those ≥ 75 years old (RR 0.89, 95% CI: 0.80-0.99, $p = 0.02$). In the misdiagnosed appendicitis group, 23.5% of patients underwent appendectomy alone, 7.7% underwent cecectomy, 63.9% underwent right colectomy, and 3.2% underwent a more extensive resection.

Conclusions/Discussion: A significant proportion of patients ≥ 65 years old with appendiceal cancer were initially misdiagnosed with acute appendicitis. The patients at increased risk of receiving an incorrect appendicitis diagnosis were older, male, and had an earlier stage cancer. Caution should be used when considering a non-operative approach for appendicitis in the elderly, particularly in patients over 75 years old.

PROGNOSTIC IMPACT OF PRIMARY TUMOR RESECTION ON THE PATIENTS WITH INCURABLE STAGEIV COLORECTAL CANCER.

P173

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Purpose/Background: The prognostic impact of primary tumor resection is not well elucidated in patients with incurable StageIV colorectal cancer. The aim of this study was to evaluate the prognostic impact of surgical resection of primary tumor and to identify prognostic factors associated with improved survival in patients with incurable StageIV colorectal cancer.

Methods/Interventions: A retrospective review was conducted on 164 patients who underwent operation to remove the primary tumor among incurable StageIV colorectal cancer patients from January 2010 to December 2015. All information was carefully reviewed and collected, including patient demographics, operative details, and surgical outcome. Cox regression analysis was performed to identify prognostic factors associated with patient overall survival (OS).

Results/Outcome(s): StageIVA, StageIVB, and StageIVC were identified in 114, 14, and 36 patients, respectively. At a median follow-up of 25 months, the 3-year estimated OS of all patients was 38.4%. The 3-year OS of StageIVA patients (48.8%) was significantly better than StageIVB (13.5%) and StageIVC (14%) patients ($p < 0.001$). Cox regression analysis revealed that right-side colon cancer [hazard ratio (HR), 1.74; 95% confidence interval (CI), 1.07-2.85; $p = 0.03$], elevated preoperative CA19-9 level (> 37.7 U/mL; HR, 2.07; 95% CI, 1.27-3.38; $p = 0.004$), and no additional metastasectomy (HR, 2.84;

95% CI, 1.60-5.06; $p < 0.001$) were independent risk factors for OS.

Conclusions/Discussion: Our results suggest that right-side colon cancer, elevated preoperative CA19-9 level, and impossibility of metastasectomy are strong predictor of poor prognosis for incurable StageIV colorectal cancer after primary tumor resection. These patients should therefore be considered upfront chemotherapy if primary tumor is asymptomatic.

RECTAL CANCER BIOMARKERS AS PREDICTORS OF RESPONSE TO NEOADJUVANT THERAPY.

P174

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Purpose/Background: Treatment responses in rectal cancer vary in those who undergo neoadjuvant chemoradiation therapy (CRT). Molecular markers are currently being investigated to determine treatment responses for specific patients. The aim of this study was to investigate various mutations found in rectal cancers by analyzing samples of post-treatment specimens in those tumors that had a complete response (CR) to CRT and those that had no response (NR). Identification of specific markers in either group could help to tailor rectal cancer treatment in the future.

Methods/Interventions: Seventeen rectal cancer patients who were treated with CRT followed by radical surgical resection between June 2007 and March 2017 were identified that demonstrated a complete response (CR, no evidence of residual tumor) or no response (NR, $> 50\%$ of original tumor volume remaining) on final pathologic analysis. DNA was isolated from formalin-fixed paraffin-embedded tissue blocks of both the pre-treatment biopsy and the post-treatment surgical specimen. Libraries were then prepared using a comprehensive cancer panel, which analyzed 160 cancer-related genes. Libraries were sequenced, and an alignment was done using a genomics analysis software with subsequent biological interpretation and variant analysis. The data was filtered for confidence in sequencing, exclusion of common variants, and inclusion of deleterious variants.

Results/Outcome(s): Of the seventeen samples analyzed, one was excluded due to an inordinately large number of genetic variants, leaving 8 non-responders and 8 complete responders. Two genes, PTEN and NF1, had variants in the majority of the patients in both groups. Genetic variants that were found only in the NR group were ABL1, KDM6A, TERT3, and TSC1. Genetic variants that were unique to the CR group included ARID1A, ATRX, FLCN, and PRDM1.

Conclusions/Discussion: In comparing rectal cancer patients who were complete responders or non-responders to preoperative chemoradiation, we identified genetic mutations that were unique to each group. With continued investigation, we hope to create a biomarker panel that will identify which patients will most benefit from chemoradiation therapy.

COMPARATIVE ANALYSIS OF THE MRI TO PATHOLOGICAL FINDINGS IN THE RESECTED SPECIMEN OF MIDDLE-LOW RECTAL CANCER.

P175

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Purpose/Background: The aim of this study is to examine the diagnostic value of magnetic resonance imaging of the resected specimen (sMRI) of rectal cancer.

Methods/Interventions: Eight patients with middle to low rectal cancer underwent laparoscopic sphincter preserving surgery from March to June 2017 in our hospital were included. The resected specimen was placed in a semi-cylindrical tray and sMRI was performed. (GE 3.0T: FOV(mm)250x250, Read matrix 512x512, Slice thickness 3mm). Subsequently, immersion in 10% neutral buffered formalin was fixed for about 48 hours, specimens parallel to the MRI axial image were excised at 6 mm slices and stained with Hematoxylin and eosin staining. After pathological diagnosis, two radiologists blinding the pathological findings interpreted sMRI. 1) Correlation between specimen Circumferential Resection Margin (sCRM) of sMRI and pathological CRM (pCRM). 2) Diagnostic accuracy of the sMRI for the mesorectal lymph-nodes and EX (optimal categorization of extramural tumor deposits without lymph node structure for colorectal cancer staging). If any one of the following diagnostic criteria, the node was diagnosed as a metastatic lymph-node:LN(+) A. Maximum diameter was 10 mm or more, B. inhomogeneity, C. low signal intensity with T2W images: LN (+), and those not matched all are diagnosed negative: LN (-). Also, irrespective of the size, if the margin of the nodule was irregular and morphological abnormality was found to be EX.

Results/Outcome(s): Patient characteristics (median continuous variable): male 6, female 2, Age 68.5 years (52-79), BMI 20.7 kg / m² (16.8 - 30.2) Anal verge 7.0 cm (5.0 - 13.0), tumor location Ra 4, Rb 4, pT 1/2/3: 1/3/4, pStage I / II / III / IV: 3/1/3/1. 1) The correlation coefficient with sCRM and pCRM was positively correlated with 0.941 (p <0.001). 2) Thirty-three mesorectal nodules included: pLN (-) 23, pLN (+) 3, pEX 7, and positive predictive value of pLN(+) was 32.0, 33.3%, negative predictive value of pLN(-) was 75.0,72.2 % and diagnostic accuracy was 42.4,54.5% in each doctor. Interobserver agreement of two radiologists was $\kappa=0.042$.

Conclusions/Discussion: New MRI diagnostic criterion of the lymph-node metastasis is necessary for the preoperative staging of rectal cancer.

HIGH RISK OF PROXIMAL AND LOCAL MALIGNANCIES IN PATIENTS WITH ANAL AND GENITAL EXTRAMAMMARY PAGET'S DISEASE.

P176

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Purpose/Background: Extramammary Paget's disease (EMPD) is an uncommon intraepidermal lesion with poorly defined clinical implications. In this study, we identify risk of synchronous or subsequent malignancy in patients with anal and genital EMPD.

Methods/Interventions: We identified a cohort of patients with EMPD from the Surveillance, Epidemiology, and End Results (SEER) registry (1973-2014). Cases were categorized by primary EMPD location: anal, male genital, or female genital. Next, we recorded patient demographics, tumor location, and follow-up time. We then evaluated the risk of second primary development following EMPD diagnosis and by EMPD location.

Results/Outcome(s): We identified 108 patients with anal EMPD, 421 patients with male genital (scrotum or penis) EMPD, and 1,677 patients with female genital (vagina or vulva) EMPD. In our total cohort, 26.5% of patients manifested at least one other primary within a median follow-up time of 5.9 years (25-75 percentile of 2.5-11.1 years). The risk of developing colorectal adenocarcinoma (CRC) was 18.5% for patients with prior anal EMPD. Nearly all (80.0%) of CRC diagnoses were synchronous (within 2 months) to anal EMPD diagnoses, compared to metachronous tumors which occurred at a median time of 2.4 years (range 1.1-4.7 years). Of patients with anal EMPD, 9.3% later developed an anal carcinoma (adenocarcinoma or non-small cell cancer), and 0.9% developed an anal squamous intraepithelial lesion. Half (50.0%) of anal carcinomas and squamous lesions were synchronous with anal EMPD, while metachronous tumors occurred at a median time of 1.8 years (range 0.3-8.5 years). The risk of proximal genitourinary (GU) malignancy was 9.7% for male patients with prior genital EMPD. Only 0.7% of male patients with genital EMPD developed an incident scrotal or testicular adenocarcinoma, and 1.7% developed a penile or scrotal squamous lesion. The risk of a proximal GU malignancy was 2.9% for patients with female genital EMPD. Only 1.4% developed an incident vaginal or vulvar adenocarcinoma, and 0.5% a vaginal or vulvar squamous carcinoma.

Conclusions/Discussion: Patients with genital EMPD have a relatively high risk of incident proximal

malignancy but fairly low risk of genital skin adenocarcinoma. Interestingly, patients with anal EMPD had both high risk of proximal (colorectal) malignancy as well as substantial risk of non-squamous cell primary anal malignancy. Clinicians should be vigilant for malignant transformation of anal EMPD during evaluation and follow-up.

DO TUMOR GENETICS AFFECT ATTAINMENT OF THE 12 REGIONAL LYMPH NODE QUALITY BENCHMARK IN COLON CANCER?

P177

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Purpose/Background: Examination of 12 regional lymph nodes (LN) following colectomy for colon cancer is considered a quality benchmark and a marker for adequacy of surgical, pathological, and/or institutional care. We hypothesized that the tumor genetic factors of microsatellite instability, KRAS mutation, and/or loss of heterozygosity may impact attainment of the 12 regional LN quality benchmark.

Methods/Interventions: We analyzed data from the National Cancer Database from January 2004 through December 2013 on all patients who underwent primary resection for stage I-III adenocarcinoma of the colon and who had evaluation of their surgical specimens for genetic abnormalities (presence of microsatellite instability, KRAS mutation, and/or loss of heterozygosity). Next, we ascertained total LN examined and dichotomized patients into those who had examination and reporting of 12 regional LN versus those who had inadequate LN yields (under 12 lymph nodes examined). Last, we developed multivariable models to identify associations between the quality benchmark of 12 regional LN examined and tumor genetics while considering surgical, pathological, and facility level covariates.

Results/Outcome(s): A total of 42,753 colectomy specimens were tested for genetic abnormalities. From this group, 38,577 patients (90.2%) attained the quality benchmark of at least 12 LNs examined while 4,176 patients (9.8%) had inadequate LN yield. Younger patients (66.7+/-14.1 vs. 69.5+/-12.9; p<0.0001), female patients (91+/-0.4% vs. 89.6+/-0.5%; p<0.001), and patients with Charlson comorbidity score of 0 (91+/-0.4% vs. 87.4+/-1.0 for score of 2 or more; p<0.001) were more likely to have at least 12 LNs examined. In addition, patients with right-sided colon cancer (92.4+/-0.4%) were more likely to have at least 12 LNs examined as compared to left-sided cancers (86.4+/-0.3; p<0.001). Academic/research programs were much more likely to attain the 12 regional LN quality benchmark (91.7+/-0.4%) as compared to community programs (87.7+/-0.9; p<0.001). In our multivariable analyses, right-colon tumor location and advanced

tumor stage were all associated with greater likelihood of at least 12 LNs examined as was evidence of microsatellite instability (OR 1.3; 95% CI = 1.2-1.4). In contrast, the presence of a KRAS mutation (OR 0.8; 95% CI = 0.7-0.9) and evidence of "loss of heterozygosity" (OR 0.3; 95% CI = 0.2-0.7) were associated with a reduced likelihood of at least 12 LNs examined.

Conclusions/Discussion: Tumor genetics affect the attainment of the 12 regional LN quality benchmark in colon cancer resections. These data point to the important effect of immunological mechanisms in addition to surgical, pathological, and institutional factors on attainment of the quality benchmark of 12 regional LNs examined.

STAGE 3 MEDULLARY COLON CANCER: A WORSE PROGNOSIS.

P178

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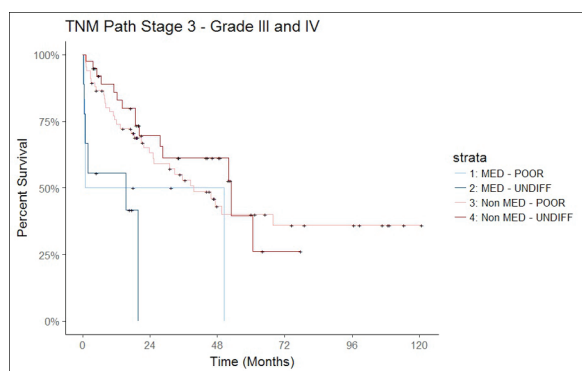
Purpose/Background: Medullary colon cancer (MCC) has been differentiated from non-medullary colon cancer (NMC) by the World Health Organization relatively recently. Prior studies showed MCC has a better prognosis than NMC, except for undifferentiated (UD) tumors. We aimed to retrospectively examine treatment and survival differences between MCC and NMC within the Geisinger Health System (GHS).

Methods/Interventions: The Cancer Registry was retrospectively queried for all colon cancers within GHS from January 2006 to January 2017. Primary rectal and rectosigmoid cancers were excluded. T-test and chi-squared analyses were used to examine demographics. Kaplan-Meier Curves and Log Rank Tests were used to analyze survivability.

Results/Outcome(s): 33 MCC and 1775 NMC patients were identified. Compared to NMC, MCC were older (79.3 vs 68.3 years old, p<0.001), predominantly female (78.8% vs 49%, p=0.001) had a higher Charlson/Deyo Index (p=0.013) and occurred more often in the ascending colon and cecum (p=0.0003). 31 MCC patients were treated with surgical resection. Pathologic staging per patient included: 2 with stage 1 disease (6.1%), 12 stage 2 (36.4%), 16 stage 3 (48.5%), and 1 stage 4 (3%). No MCC underwent radiation while 1.5% of patients with NMC underwent radiation. Only 6 (18.2%) MCC patients received chemotherapy, all adjuvantly. Thirteen (0.7%) NMC patients received neoadjuvant chemotherapy, 547 (30.8%) adjuvant, and 12 (0.7%) were treated before and after. No significant differences in treatments were seen for stages 1 and 2 MCC vs NMC (only 1 patient with MCC had stage 4 disease). Stage 3 patients were more likely to undergo chemotherapy if NMC (25.0 % vs. 72.4 %, p=0.004). The majority of stage 3 MCC patients did

not receive chemotherapy due to patient refusal, comorbidities, or death. Only stage 3 MCC patients were found to have a difference in survival compared to NMC, with a decreased survival for MCC. Median survival for stage 3 patients who underwent surgery was 15.3 months for MCC and 61.9 months for NMC, $P < 0.0001$. Of stage 3 patients undergoing surgical resection, median overall survival was 25.7 months ($n=6$) for PD MCC and 15.3 months for UD MCC ($n=9$) vs. 39.6 months for PD NMC ($n=67$) and 53 months for UD NMC ($n=40$), showing a worse prognosis for MCC ($p=0.0032$).

Conclusions/Discussion: Previous studies on MCC reported similar demographics findings. However, previous literature reported MCC to have a better prognosis than PD or UD NMC. However, we found stage 3 patients have a worse prognosis, despite differentiation. While this may be secondary to decreased administration of chemotherapy, patients also tended to have higher comorbidities and were not candidates for additional treatments.



THE READABILITY, QUALITY AND ACCURACY OF ONLINE HEALTH INFORMATION FOR PATIENTS WITH LOW ANTERIOR RESECTION SYNDROME.

P179

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Purpose/Background: Low Anterior Resection Syndrome (LARS) is a common sequelae following restorative proctectomy for rectal cancer, the treatment of which requires a high degree of patient engagement in self-management. With patients increasingly relying on the Internet for health-related information and education, it is important to direct them to the highest quality online resources available.

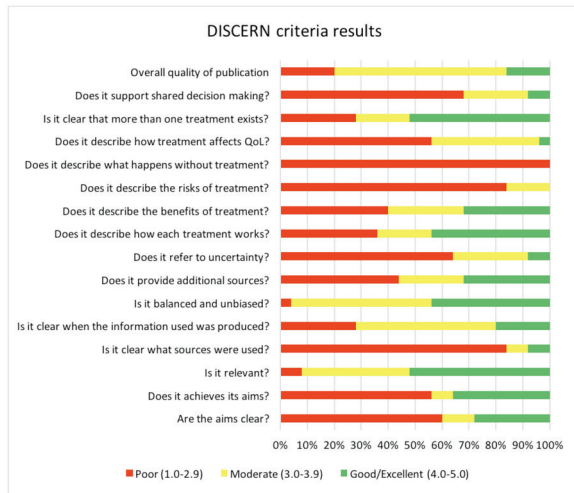
Methods/Interventions: An online search of Google, Yahoo and Bing using the search terms “low anterior/anterior resection syndrome” and “bowel function after rectal cancer surgery” was performed. Only English-language websites designed for patients were identified. The website’s affiliation was recorded. Readability was

assessed using 8 standardized tests, and median scores were obtained. The Suitability Assessment of Materials (SAM) instrument was used to assess comprehension, appropriateness, and learning stimulation, and website quality was measured using the DISCERN instrument. An expert panel consisting of 3 colorectal surgeons from different countries assessed each website for accuracy, and created a LARS-specific content checklist to measure website completeness. All other assessments were independently performed by 3 trained reviewers, and kappa or intraclass correlation (ICC) coefficients were recorded.

Results/Outcome(s): Twenty-five websites met inclusion criteria. Website affiliation was: 6 (24.0%) academic, 4 (16.0%) governmental, 11 (44.0%) non-profit, and 4 (16.0%) private. Only 9 (36.0%) websites were updated in the past 2 years. Median readability level was 10.4 (9.2-11.7), and no website was written at the American Medical Association recommended 6th-grade reading level. Using the SAM instrument, 11 (44.0%) websites were highly suitable, 13 (52.0%) were adequate, and 1 (4.0%) was not suitable (ICC=0.53). Using the DISCERN instrument, 7 (28.0%) websites had clear aims, 2 (8.0%) divulged the sources used, 8 (32.0%) provided additional resources, and 4 (16.0%) had overall high quality (Table 1) (ICC=0.66). With regards to content, only 8 (32.0%) websites defined LARS and 10 (40.0%) listed all five major symptoms associated with LARS. The number of websites varied in their discussion of diet modifications ($n=20$, 80.0%), self-help strategies ($n=18$, 72.0%), medication ($n=17$, 68.0%), pelvic floor rehabilitation ($n=15$, 60.0%), and neuromodulation ($n=2$, 8.0%), among other treatments. Median completeness for all checklist items was 57.1% (47.6%-71.4%) ($k=0.66$), while median accuracy of websites was 93.8% (88.2%-96.7%) (ICC=0.54).

Conclusions/Discussion: The current body of online information for patients with LARS is suboptimal. Reviewers had moderate agreement that websites are highly variable, important content is often lacking, and the material is written at too complex a reading level for patients. Creation of a comprehensive but easy to comprehend LARS website might fill an important patient need.

Figure 1 – DISCERN instrument measuring website quality



CAN WE MEASURE QUALITY OF CARE INDICATORS FOR COLORECTAL CANCER IN A DEVELOPING COUNTRY?

P180

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Purpose/Background: Surgical resection remains the main core of treatment for CRC. Adherence to published guidelines and recommendations has been evaluated recently as this has been proven to lead to better outcomes. The aim of our study is to assess quality of care in colorectal cancer in a public referral center in Mexico, and to determine if there has been improvement over time after the adoption of a set of quality of care indicators and a multidisciplinary team approach.

Methods/Interventions: We retrospectively analyzed patients who had surgery between January 2001 to December 2016, local resections, pelvic exenterations or derivative stoma for palliation without tumor resection cases were excluded. Information of 15 quality of care indicators regarding clinical presentation, preoperative evaluation, quality of surgery and pathology, postoperative complications, follow-up and long-term outcomes was collected (see table). The overall proportion of patients who fulfilled each indicator by year was determined and then compared by 2-year periods. For testing trends of increasing proportions of patients who met the indicators, we used the Cochran-Armitage trend test.

Results/Outcome(s): A total of 343 patients were included with a mean age of 62.5 years, 52.5% cases were male and 35.6% presented in the right colon, Stage 2 the most common clinical presentation (38.8%). Median follow up was 42.6 months with a 3-year overall survival of 83.4%, a 3-year cancer specific survival of 89.2%, and

a 2-year local recurrence rate of 6.7%. Thirteen out of the 15 indicators presented more than 60% of compliance rate; patients detected by screening, 30-day mortality, anastomotic leak and 2-year local recurrence rate obtained a 3.8%, 5.3%, 3.2% and 5.3% respectively. There was a statistically improvement of the proportion of patients detected by screening (0 to 7.4%, $p=0.03$), patients with preoperative liver imaging studies (73% to 97%, $p<0.00$), stages 2 and 3 rectal cancer patients who received neo-adjuvant radiotherapy (50% to 84%, $p=0.03$) and the proportion of pathology reports which described: the number of lymph nodes per specimen (80% to 98.5%, $p=0.00$), more than 12 lymph nodes identified (41.7% to 89.6%, $p=0.00$) and the distal margin status (40% to 91.2%, $p=0.00$).

Conclusions/Discussion: The implementation and improvement of quality of care indicators in colorectal cancer is possible and necessary. Consistently with published reports, there was an adequate fulfillment of the indicators; we noticed an improvement in the screening detection, LNs identified in pathology, reported distal resection margin resection. The evaluation of care performance has become an important practice. A growing number of groups have shown that implementation and adherence to guidelines is possible worldwide and in conjunction with the adoption of centers of excellence and multidisciplinary team approach an improvement in long-term outcomes in rectal cancer treatment can be obtained.

SURGICAL OUTCOMES OF TATME FOLLOWED BY REDUCED PORT SURGERY USING STOMA SITE FOR DISTAL RECTAL CANCER.

P181

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Purpose/Background: TransAnal total mesorectal excision (taTME) for distal rectal cancer facilitates dissection of the mesorectum regardless of the patient body habitus, and provides extensive rectal mobilization and safety surgical margin under good visibility. Furthermore in abdominal approach, we think that Reduced Port Surgery (RPS) using ileostoma site enable us less invasive surgery. We describe the surgical outcomes and surgical technique about taTME followed by RPS.

Methods/Interventions: Twenty patients underwent taTME-RPS by one experienced surgeon since October 2013. Patients with T4 tumor or those expected positive circumferential margins were excluded. The mean age was 65.9 years (range 41-82), gender: 4 females and 16 males. The mean body mass index was 22.9 kg/m² (range 17.4-37.3). The approach of taTME has been approved by the ethics committee in our hospital. Operative techniques: Transanal approach is started under direct vision

P180 Compliance of Quality of Care Indicators

Quality of Care Indicator	Overall	Percentage of Compliance								p*
		2001/02 n= 15	2003/04 n= 20	2005/06 n= 26	2007/08 n= 63	2009/10 n= 38	2011/12 n= 44	2013/14 n= 69	2015/16 n= 68	
Cases detected by screening	3.8%	0	0	0	3.2	2.6	4.5	4.3	7.4	0.03
Adequate colon evaluation before surgery	94.5%	93.3	100	92.3	92.1	89.5	93.2	97.1	97.1	0.33
Preoperative liver imaging	91.3%	73.3	75	84.6	90.5	86.6	93.2	98.6	97.1	<0.00
Preoperative pelvis imaging for RC	95.8%	100	87.5	100	87.5	92.3	100	100	100	0.14
Patients with Rectal Cancer Stage II/III who received NEOCT	62.7%	100	75	33.3	50	50	100	62.5	84.6	0.15
Patients with Rectal Cancer Stage II/III who received NEORT	60%	100	50	33.3	50	50	100	62.5	84.6	0.03
Completeness of the operative report, mean (SD) score	4	4 (4)	2 (0.9)	3.5 (0.9)	3.6 (0.8)	3.8 (0.7)	4 (1)	5 (0.6)	4.8 (0.6)	0.36
Completeness of pathology report										
Reported the Number of LNs examined	93.9%	80	85	88.5	90.5	94.7	95.5	98.6	98.5	0.00
Reported \geq 12 LNs examined	82.3%	41.7	58.8	60.9	82.5	86.1	88.1	89.7	89.6	0.00
Reported positive LNs	35.7%	33.3	53	30.4	35	39	35.7	29.4	38.8	0.67
Average LNs collected (SD)	18.3	10.5 (4)	16.5 (13)	15 (9)	17 (7)	23.6 (14)	18.5 (7)	20 (9)	20 (11)	0.00
Reported quantitative distal margin status	79%	40	45	46.2	82.5	86.8	86.4	85.5	91.2	0.00
Reported quantitative circumferential margin status	10.5%	13.3	5	3.8	9.5	28.9	9.1	5.8	10.3	0.87
Reported distal margin \geq 1 cm in patients with rectal cancer	97.1%	-	50	100	100	100	100	100	93.8	0.59
Anastomotic leak in patients with RC	5.3%	0	0	0	6.3	7.7	0	6.3	10.5	0.20
In-hospital 30-day mortality	3.2%	6.7	0	3.8	3.2	5.3	2.3	4.3	1.5	0.67
Local Recurrence within 2 years following surgery for colon and rectal cancer	6.7%	0	5	3.8	1.6	10.5	4.5	7.2	1.5	0.27
Local Recurrence within 2 years following surgery for rectal cancer only	7.4%	0	0	0	31.3	15.4	0	0	0	0.20
Surveillance colonoscopy within 1 year after surgery	59.2%	71.4	50	63.6	59.6	33.3	60.5	79.6	50	0.76

*Cochran Armitage Trend Test

to retain the space for the multiplatform followed by insulfation. Suprlevator space dissection follows loose connective tissue inside the endopelvic fascia, in males, dissection of the anterior rectal wall is considered difficult, but we dissect the midline of prostate first, after resection of rectourethral muscle, we could easily detect the right plane. After transanal phase, we move to abdominal phase by RPS using the future ileostoma site. Abdominal procedures: With easy anal side connection through the anterior and posterior walls of the rectum, lateral transection while avoiding neurovascular bundle injury achieves complete extirpation.

Results/Outcome(s): Median operative time was 437.5 min (324-906), and median blood loss 121.4 ml (10-617). R0 resection was completed in all patients. The requirements of intravenous analgesic were in 6 out of 20 patients (30%), median postoperative CRPmax was 8.5 mg/dl (1.6-22.1), median hospital stay was 19 days (11-29). Postoperative complications were seen in 25 % (4/16) including 2 urinary retention, 1 acute cholecystitis and 1 anastomotic leakage. However there was less than grade 2 classified by Clavien-Dindo.

Conclusions/Discussion: Trans anal TME followed by RPS is safe and less invasive surgery in postoperative pain and CRPmax in spite of longer operation time.

ANALYSIS OF RECURRENCE RISK FACTORS IN PATIENTS WITH STAGE II COLON CANCER.

P182

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Purpose/Background: Background: In patients with stage II colon cancer (CC), the occurrence of one or more of the following factors was classified as high-risk situation, such as pT4, poor differentiation, <12 evaluated lymph nodes, lympho-vascular or perineal invasion, bowel obstruction, and perforation.

Methods/Interventions: Materials and Methods: This study included 587 stage II CC patients who underwent curative resection in our institution between July 2004 and December 2013. The patients were divided into two groups based on the presence or absence of the risk factors, and the long-term outcomes were examined.

Results/Outcome(s): Result: 533 patients with one or more risk factors were included in the high-risk group (H group), and the residual 54 patients were included in the low-risk group (L group). In H group, 81 (15.2%) patients had received AC. AC were more often administered to patients with more risk factors (one: 10.3%, two:13.8%, three: 26.8%, four: 33.3%). The 5-year relapse-free survival (RFS) of H group was significantly lower than that of L group (83.5 vs. 96.3%, $p=0.05$). In H group, RFS was not significantly different between the patients

with AC and without AC (88.5 vs. 84.6%, $p=0.34$). On multivariate analysis for RFS, pT4 (HR 3.18, $p<0.01$) and <12 evaluated lymph nodes (HR 3.87, $p<0.01$) were independently associated with poor RFS. RFS of patients with pT4 and <12 evaluated lymph nodes was significantly lower than that of the rest of the patients in H group (73.3 vs. 92.2%, $p<0.01$). In patients with pT4 and <12 evaluated lymph nodes, RFS of patients with AC was not significantly different than that of patients without AC (76.0 vs. 75.0%, $p=0.52$).

Conclusions/Discussion: Conclusion: In patients with stage II CC, pT4 and <12 evaluated lymph nodes were the independent poor prognostic factors for RFS. AC did not improve the RFS in CC patients with high-risk stage II.

COLON CANCER STAGE II. VARIABLES ASSOCIATED WITH DISEASE RECURRENCE.

P183

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Purpose/Background: Stage of disease is the most important prognostic factor in colorectal cancer. Around 30 to 40% of patients are classified as stage II at onset. Reported survival rates for these patients vary around 72 to 84%. Within this group of patients, some individuals bear a higher risk of recurrence, probably due to more aggressive tumor biology. This biology could be reflected in the presence of pathological high-risk features found on the surgical specimen. The aim of this study is to identify pathological high-risk features associated with recurrence of disease in patients with stage II colon cancer.

Methods/Interventions: Retrospective study between 2003 and 2016 was performed. Patients with stage II colon cancer who underwent to laparoscopic curative resection with at least 6 months of follow up were included. Demographic and oncologic variables were analyzed and compared. The presence of high-risk pathological features such as T4 lesions; lymphovascular invasion; perineural invasion; perforation; poorly differentiated tumors; and less than 12 lymph nodes in the specimen were considered, as well as the use of adjuvant therapy. Main outcome was recurrence of disease. Logistic regression analysis was used to identify factors independently associated with recurrence.

Results/Outcome(s): Of a total of five hundred and forty-four patients registered, 154 (28.3%) were classified as stage II. Thirty four (22%) were lost during follow-up, thus, 120 patients were included to be analyzed. Average age was 66.5 (± 13.63) years. After a mean follow up of 46.7 (± 32) months, 16 patients developed recurrence of disease (13.3%). No statistically significant differences as regards recurrence were observed when considering age, sex, and adjuvant treatment. Perineural invasion ($p=0.034$) and

T4 lesions ($p=0.02$) were factors independently associated with recurrence after multivariate analysis. Also, a trend towards an association between lymphovascular invasion and recurrence was observed ($p=0.053$).

Conclusions/Discussion: Patients with colon cancer stage II with perineural invasion or T4 lesions were more likely to develop recurrence.

IMPACT OF PREOPERATIVE CHEMOTHERAPY ON DISTAL SPREAD OF LOW RECTAL CANCER LOCATED CLOSE TO THE ANUS.

P184

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Purpose/Background: The frequency of distal spread ≥ 10 mm in patients with and those without preoperative chemoradiotherapy has been reported to be approximately between 0 and 9.3% and 4.5 and 13%, respectively. However, currently, there are few reports on distal spread after chemotherapy for rectal cancer. The purpose of this study was to clarify the frequency of distal spread and the related clinical factors involved after preoperative chemotherapy for advanced low rectal cancer.

Methods/Interventions: A total of 71 patients with advanced low rectal cancer who had undergone surgery after preoperative chemotherapy between January 2012 and July 2015 were included in this study. The intramucosal distal tumor edge and the distal extent of tumor cells under the submucosal layer were investigated. The length of distal spread was measured using a micrometer scale. Univariate and multivariate regression analyses were performed to identify the independent clinical factors related to distal spread ≥ 10 mm.

Results/Outcome(s): Of the 71 patients, 41 (59.2%) showed distal spread. A distal spread of 1-9 mm was found in 27 patients, 10-19 mm in 11 patients and ≥ 20 mm in 4 patients. In a multivariate analysis, the difference of evaluated tumor regression after preoperative chemotherapy between colonoscopy and magnetic resonance imaging (MRI), which means tumor shrinkage was evident by colonoscopy but no therapeutic effect of tumor burden was found by MRI, and poorly differentiated or mucinous adenocarcinomas were independent factors associated with distal spread ≥ 10 mm after preoperative chemotherapy.

Conclusions/Discussion: Distal spread ≥ 10 mm was found in 21% of patients after preoperative chemotherapy for advanced low rectal cancer. Poorly differentiated or mucinous adenocarcinomas and the limited tumor response found only in the mucosal layer after chemotherapy are associated with a high frequency of distal spread ≥ 10 mm.

POSTOPERATIVE SERUM CEA LEVELS IN NODE-POSITIVE VERSUS NODE-NEGATIVE PATIENTS WITH NON-METASTATIC RECTAL CANCERS.

P185

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Purpose/Background: Carcinoembryonic antigen (CEA) is the most widely used tumor marker for postoperative follow up of patients with rectal cancer. The aim of this study was to compare mean postoperative CEA levels in two groups of rectal cancer patients with and without preoperative diagnosed lymph node involvement.

Methods/Interventions: In this analytic study, a total of 40 patients underwent low anterior rectal resection for their non-metastatic rectal cancers were included. According to their preoperative staging of the primary tumor using magnetic resonance imaging before neoadjuvant chemoradiation, patients were classified into node-negative (Group A) and node positive (Group B). Postoperative serum CEA levels were measured every three months for a minimum of two years. Patients with postoperative complete pathologic response to neoadjuvant chemoradiation were also considered in each group for further analysis.

Results/Outcome(s): A total of 10 patients in group A (4 males, 6 females) and 30 patients in Group B (18 males, 12 females) were studied. Mean ages of patients in the groups A and B were 48.78 ± 11.49 years and 50.27 ± 12.68 years, respectively. Mean postoperative CEA levels were 1.29 ± 0.74 ng/ml in Group A and 2.84 ± 2.49 ng/ml in Group B ($p=0.93$). Considering the gender, the level was statistically similar in both genders in Group A (male: 1.25 ± 0.76 ng/ml, female = 1.32 ± 0.80 ng/ml, $p=0.957$); However, it was significantly higher in females of Group B (male = 2.4 ± 1.25 ng/ml, female = 3.51 ± 3.61 ng/ml, $p=0.02$). The CEA levels in patients with complete pathologic response were 1.49 ± 0.93 ng/ml in node-negative (Group A) and 2.14 ± 1.18 ng/ml in node-positive (Group B) patients ($p=0.699$). The measured value for non-complete pathologic response patients were 1.21 ± 0.71 ng/ml and 3.31 ± 3.01 ng/ml, respectively ($p=0.67$).

Conclusions/Discussion: According to our findings, postoperative CEA level is not statistically related to the presence of lymph nodes in preoperative evaluation and staging of the patients with non-metastatic rectal cancers. This is true in patients with and without complete pathologic response to neoadjuvant chemoradiation as well. However, the CEA levels were significantly higher in node-positive female patients compared to the male patients.

INFLUENCE OF PELVIC DIMENSIONS ON ANASTOMOTIC LEAK AFTER ANTERIOR RESECTION FOR RECTAL CANCER.

P186

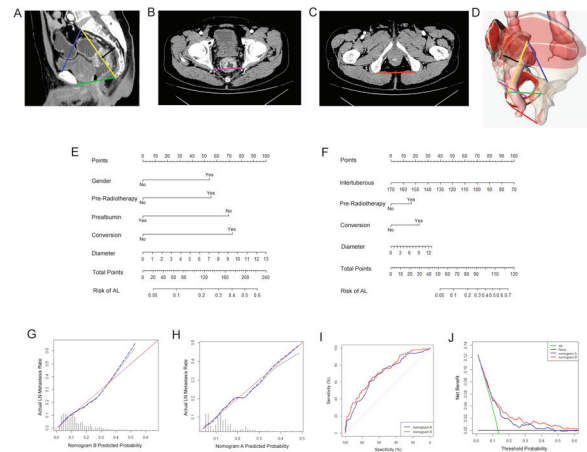
Y. Liang, Z. longjuan, L. Xuanhui, L. Huashan, K. Jia, L. Ping, W. Xianrui, W. Xiaojian
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Purpose/Background: Limited space of pelvis may affect the outcomes of anterior resection for rectal cancer. The aim of this study was to assess the impact of pelvic dimensions on anastomotic leak (AL) after anterior resection for rectal cancer.

Methods/Interventions: A total of 752 rectal cancer patients undergoing anterior resection between January 2013 and June 2015 was included. Pelvimetric parameters (pelvic inlet, interspinous distance, pelvic outlet, intertuberos distance, length of sacrum, depth of the sacral) were obtained using abdominopelvic computed tomography (CT) scans. Both univariate and multivariate analyses were performed. Nomogram prediction models were developed to further evaluate the predictability of pelvic dimensions on AL.

Results/Outcome(s): Univariate analyses showed that pelvic inlet, pelvic outlet, interspinous distance and intertuberos distance were associated with the risk for AL ($p < 0.05$). Independent factors derived from multivariate analysis were conversion, tumor diameter, preoperative radiotherapy and intertuberos distance ($p < 0.01$). Significantly factors from univariate analysis were all assembled into the nomogram A (without intertuberos distance) and nomogram B (with intertuberos distance). The calibration curve for the probability of recurrence showed that the nomogram-based predictions were in good agreement with actual observations. The C-index of nomogram B for predicting recurrence was 0.722, which was statistically higher than the C-index values for nomogram A (0.691). Both the decision curve and ROC curve all supported nomogram B was better than nomogram A.

Conclusions/Discussion: Pelvic dimensions may affect the outcomes of anterior resection of rectal cancer and intertuberos distance could be used as a predictor of AL.



EARLY URINARY CATHETER REMOVAL IN PATIENTS UNDERGOING COLORECTAL SURGERY WITH AN ENHANCED RECOVERY AFTER SURGERY PATHWAY.

P187

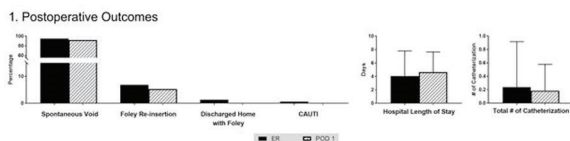
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Purpose/Background: Recent outcome studies have advocated for the removal of urinary catheters after elective colorectal procedures as early as postoperative day (POD) 1, but there is no evidence to warrant continuation of the catheters until then. In this study, we examined whether urinary catheters could safely be removed before POD1 after elective colorectal operations on our enhanced recovery after surgery (ERAS) pathway. We hypothesized that removing the urinary catheter within 6 hours of an elective colorectal operation would not confer any significant clinical disadvantage compared to removing it on POD 1.

Methods/Interventions: This is a single-institution, retrospective review of all patients who underwent elective laparoscopic colorectal procedures on our ERAS pathway that did not involving pelvic dissection between November 1, 2016 and November 1, 2017, designed in a non-inferiority fashion. In the early removal group (ER), the urinary catheter was removed within 6 hours after the operation, while in the control group (POD1) the catheter was removed on the first postoperative day. We compared rates of urinary retention, number of intermittent catheterizations, patients requiring urinary catheter replacement, and patients discharged with a urinary catheter catheter, as well as catheter associated urinary tract infections between the two groups.

Results/Outcome(s): One hundred and ninety-eight patients met inclusion criteria (ER: 160, POD 1: 38). There were no significant differences between the groups in preoperative characteristics. The two groups were also similar in perioperative management parameters. Sigmoid colectomy and partial colectomy (including ileocecectomy, right hemi-, transverse, and left hemicolectomy) were the most common operations performed in both groups. Most cases were performed laparoscopically with a conversion rate of 8.8% in the <6 hr group and 21.1% in the POD 1 group. Catheter related outcomes were similar between groups. Most patients in both groups had successful spontaneous voiding after catheter removal (ER: 95.0% vs. POD1: 92.1% POD1, p=0.445), and were discharged home without an indwelling catheter (ER: 98.7% vs. POD1: 100%, p>1.000). Patients requiring intermittent catheterization due to acute urinary retention were also comparable between groups, as were the mean number of catheterizations in both groups (ER: 0.24 vs. POD1: 0.18 POD 1, p=0.642). Hospital length of stay was similar between groups (ER: 4.0 days vs. POD1: 4.7 days, p=0.348). There was no difference in the rates of catheter associated urinary tract infection (ER: 0.6% vs. POD1: 0%, P>1.000).

Conclusions/Discussion: Early urinary catheter removal within 6 hours after a non-pelvic ERAS pathway, colorectal operation is safe and is not associated with increased rates of acute urinary retention. Colorectal surgeons should consider early urinary catheter removal after an uneventful elective operation.



IMPACT OF COLECTOMY COMPLICATIONS ON POST-ACUTE CARE UTILIZATION AND HEALTHCARE EXPENDITURES.

P188

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Purpose/Background: This study evaluated the impact of colectomy complications on post-acute care (PAC) utilization and healthcare expenditures. PAC is a rapidly growing component of U.S. healthcare spending, prompting a renewed focus on care coordination and consideration of episode-based care evaluation for colectomy and other procedures.

Methods/Interventions: Retrospective cohort study of inpatient open and minimally invasive colectomy patients from 1/1/2010 to 9/30/2015 identified from the Truven MarketScan Commercial and Medicare insurance

claims databases. The following in-hospital complications were determined from administrative diagnosis and procedure codes: infection (septicemia or surgical site), anastomotic leak (surrogate diagnoses), bleeding, and blood transfusions. Receipt of PAC was determined from hospital discharge status, classified as: home under self-care, in-home PAC (e.g., home health agency services), institutional PAC (e.g., skilled nursing facility, rehabilitation facility), transfer to another hospital, or deceased. Outcomes included: first/index hospitalization length of stay (LOS); healthcare expenditures (inflation-adjusted to 2015 U.S. \$) for the index hospitalization and 90d post-discharge; and 30d and 90d readmissions. Statistical significance was assessed with non-parametric bivariate tests.

Results/Outcome(s): 83,549 eligible patients underwent colorectal resection (33% for malignancy; 19% admitted from emergency department; 11% with ostomy; median age=58y; 52% female). In-hospital incidences of infection, anastomotic leak, bleeding, and blood transfusion were 15%, 12%, 11%, and 4%, respectively; 31% of patients experienced ≥1 of these complications. As shown in **Figure 1**, in-hospital complications were associated with a higher probability of discharge to institutional or in-home PAC (8.4% and 17.5%, respectively, compared to 2.4% and 7.9% in patients with no complication; p<0.001), significantly greater healthcare expenditures for the index hospitalization and 90d post-discharge (mean of \$70,217 vs. \$43,256 in patients with no complication; p<0.001), and higher risks of 30d and 90d readmission (12.2% and 20.2%, respectively, vs. 7.0% and 11.9% in patients with no complication; p<0.001).

Conclusions/Discussion: This large population-based study provides a more complete picture of the clinical and economic burden associated with key colectomy complications. Importantly, these complications were associated with significantly greater healthcare utilization and expenditures during both the index hospitalization and 90d post-discharge period. These findings reinforce the need for improvements in surgical care delivery and technology innovations to reduce the clinical and economic burden of surgical complications.

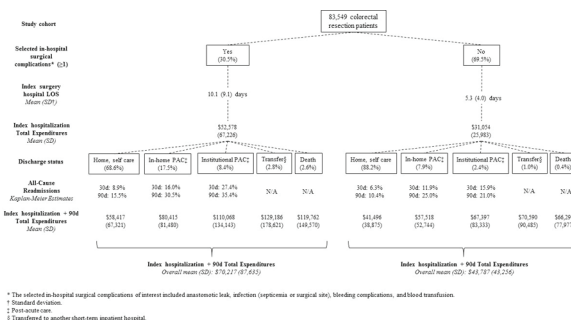


Figure 1. Healthcare utilization and expenditures associated with colectomy by occurrence of selected in-hospital surgical complications and discharge status.

EPIDURAL ANALGESIA DOES NOT IMPROVE AND MAY HAMPER RECOVERY AFTER LAPAROSCOPIC AND OPEN COLECTOMY.

P189

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Purpose/Background: Previous assessments of the impact of epidural analgesia (EA) on outcomes after colorectal surgery were related to the period before widespread implementation of the Enhanced Recovery After Surgery (ERAS) protocols. This study evaluates the impact of EA on postoperative recovery after colectomy using recent multicenter data.

Methods/Interventions: Patients who underwent elective colectomy from the American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) data (2014-2015) were identified. Demographics, co-morbidities, diagnosis, procedure type and approach, and postoperative complications associated with EA were assessed. Impact of EA on postoperative ileus, length of stay (LOS), and prolonged LOS (defined as LOS > 75 percentile) was evaluated for all, open, and laparoscopic cases using univariable and multivariable analyses.

Results/Outcome(s): Of 9,045 elective colectomy procedures, 3,081 (34.1%) received EA. Epidural analgesia was associated with underweight/normal body mass index and higher American Society of Anesthesiologists (IV: 3.7% vs. 3%, $p < 0.0001$) and wound (IV: 6.2% vs. 5.4%, $p = 0.01$) classes. Dyspnea, disseminated cancer, weight loss and chemotherapy were higher for EA. EA patients were less likely to receive oral antibiotic; mechanical and combined bowel preparation. Colorectal cancer (56.3% vs. 43.7%, $p < 0.0001$), inflammatory bowel disease (8.8% vs. 6.5%, $p < 0.0001$), total colectomy (5.9% vs. 4.1%, $p < 0.0001$) and open approach (49.5% vs. 16.9%, $p < 0.0001$) were associated with EA. Epidural analgesia was associated with greater postoperative ileus (15.9% vs. 10.8%, $p < 0.0001$), superficial (5.5% vs. 4%, $p = 0.001$) and deep (1.8% vs. 0.6%, $p < 0.0001$) wound infections, pulmonary embolism (0.8% vs. 0.4%, $p = 0.004$), deep vein thrombosis (1.3% vs. 0.7%, $p = 0.01$), sepsis/septic shock (4.6% vs. 3.1%, $p < 0.0001$) unplanned reintubation (1.5% vs. 0.8%, $p = 0.003$), cardiac complications (1.2% vs. 0.7%, $p = 0.03$) and transfusion (9.1% vs. 5.9%, $p < 0.0001$). Postoperative LOS (mean [SD]: 6.7[6.2] vs. 5[4.5], $p < 0.0001$) was greater for EA. On multivariable analysis, EA had no impact on postoperative ileus for all and laparoscopic cases (OR=1.1, CI=[0.9-1.3] and OR=1.0, CI=[0.8-1.3]) respectively. However, EA increased the likelihood for ileus (OR=1.34, CI=[1.02-1.78]) after open colectomy alone. Similarly, EA did not influence prolonged LOS for all (OR=1.1, CI=[0.9-1.3]) and laparoscopic (OR=1.0, CI=[0.9-1.2]) cases. EA was an independent predictor for prolonged LOS after open colectomy (OR=1.30, CI=[1.02-1.65]).

Conclusions/Discussion: Epidural analgesia does not improve, and may instead hamper ileus or length of stay, after laparoscopic and open colectomy in the era of ERAS.

PREDICTING 30-DAY UNPLANNED READMISSION FOLLOWING COLORECTAL SURGERY USING THE NATIONAL CANCER DATABASE.

P190

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Purpose/Background: Readmission rates have come under intense study as hospitals function in the pay-for-performance era. Colorectal readmissions alone are estimated to cost up to \$300 million dollars annually but are also increasingly recognized as a marker of health care quality. Our previous single institution study identified specific factors related to surgical specimens of cancer patients as predictive of readmission. The objective of this study was to identify risk factors associated with 30-day readmission following colorectal surgery for malignancy in order to better understand how to prevent them.

Methods/Interventions: This is a retrospective, national database review of individuals undergoing colorectal surgery for malignancy between 2004-2013 using the National Cancer Database (NCDB). Clinico-pathologic variables were analyzed using univariate and multivariate logistic regression models to predict readmission for patients.

Results/Outcome(s): Four hundred fourteen thousand and five hundred seventy-five patients were included in this study. Thirty-four thousand two hundred sixty-three (8%) were readmitted. Thirteen thousand four hundred eighty-eight (3%) were not insured. The median age was 67.1 and the gender distribution showed a slight female predominance (51.8%). The majority (95.5%) of the patients underwent a partial or subtotal colectomy. On univariate analysis, neoadjuvant radiation, adenocarcinoma, positive surgical margins and metastatic disease at time of diagnosis were significantly associated with a higher rate of readmission. Multivariate analysis showed that no insurance, younger age, male sex, black race, one or more co-morbid conditions, positive surgical margin, increasing tumor stage, positive lymph nodes and metastatic disease at time of diagnosis were all significantly associated with 30-day readmissions.

Conclusions/Discussion: Multiple variables were shown to be significantly associated with 30-day readmission in patients undergoing colorectal surgery for malignancy. A higher stage of cancer including increasing tumor stage, positive nodes, positive surgical margins and metastatic disease at diagnosis were associated with a significantly higher rate of readmission. Research into interventions

P189 Multivariable analyses of factors associated with ileus after all, open and laparoscopic colectomy procedures

Variable	All cases			Open cases only			Laparoscopic cases only		
	OR	CI	p-value	OR	CI	p-value	OR	CI	p-value
Anesthetic technique (Epidural vs. No Epidural)	1.1	0.9 – 1.3	0.5	1.34	1.02 – 1.78	0.04	1.0	0.8 – 1.3	0.9
Race (White)	1.0	0.8 – 1.3	0.8	1.2	0.8 – 1.8	0.5	1.0	0.7 – 1.3	0.8
BMI (over-weight+obese vs. underweight+normal), kg/m ²	1.1	0.9 – 1.4	0.2	-	-	-	-	-	-
ASA class (III-IV vs. I-II)	1.2	1.02 – 1.5	0.03	1.2	0.9 – 1.6	0.3	1.2	1.0 – 1.5	0.1
Primary diagnosis (malignant vs. benign)	1.1	0.9 – 1.4	0.2	1.0	0.7 – 1.3	0.9	1.2	0.9 – 1.5	0.2
Functional status (dependent vs. independent)	2.1	1.2 – 3.7	0.01	1.5	0.6 – 3.6	0.4	2.9	1.4 – 5.9	0.003
Preoperative hospitalization	0.8	0.5 – 1.3	0.3	1.1	0.7 – 1.9	0.7	0.6	0.3 – 1.2	0.1
Current smoker	1.6	1.3 – 1.9	<0.0001	-	-	-	1.7	1.3 – 2.2	<0.0001
Hypertension	1.1	0.9 – 1.3	0.5	-	-	-	1.2	1.0 – 1.5	0.1
Dyspnea	1.4	1.02 – 1.9	0.04	1.3	0.8 – 2.1	0.2	1.4	1.0 – 2.1	0.1
Congestive heart failure	1.0	0.3 – 2.9	0.9	-	-	-	-	-	-
Disseminated cancer	1.0	0.7 – 1.3	0.8	1.0	0.7 – 1.5	0.9	1.0	0.6 – 1.6	0.8
Systemic sepsis	-	-	-	1.3	0.6 – 2.8	0.6	-	-	-
Preoperative chronic steroid use	-	-	-	-	-	-	0.8	0.5 – 1.2	0.3
Bleeding disorder	0.8	0.5 – 1.5	0.6	0.8	0.4 – 1.9	0.6	-	-	-
Weight loss > 10%	1.3	0.9 – 1.9	0.1	-	-	-	1.4	0.8 – 2.3	0.2
Preoperative chemotherapy	1.7	1.3 – 2.3	<0.0001	1.3	0.9 – 2.1	0.2	2.3	1.5 – 3.3	<0.0001
Preoperative hematocrit level, %	0.99	0.98 – 1.01	0.3	-	-	-	-	-	-
Preoperative WBC level, × 10 ⁹ /L	-	-	-	1.03	0.99 – 1.07	0.2	-	-	-
Preoperative oral antibiotic	0.9	0.6 – 1.3	0.9	0.7	0.3 – 1.5	0.4	1.1	0.7 – 1.7	0.7
Preoperative mechanical bowel preparation	0.9	0.7 – 1.1	0.2	1.1	0.7 – 1.5	0.8	0.8	0.6 – 1.0	0.1
Preoperative (combined) bowel preparation	0.8	0.5 – 1.2	0.3	0.9	0.4 – 2.1	0.8	0.6	0.4 – 1.1	0.1
Wound class (III-IV vs. I-II)	1.1	0.9 – 1.4	0.4	1.2	0.9 – 1.7	0.2	-	-	-
Resection type (total vs. partial) colectomy	2.5	1.8 – 3.4	<0.0001	2.0	1.2 – 3.2	0.01	3.0	2.1 – 4.4	<0.0001
Surgical approach (Open vs. other)	1.9	1.6 – 2.3	<0.0001	-	-	-	-	-	-
Minimally invasive converted to open surgery	2.0	1.5 – 2.7	<0.0001	-	-	-	2.1	1.6 – 2.8	<0.0001
Operative duration (> 180 minutes)	1.6	1.4 – 1.9	<0.0001	1.4	1.1 – 1.9	0.01	1.7	1.3 – 2.0	<0.0001

- : the variable was not included in the model.

ASA: American Society of Anesthesiologists score, BMI: Body mass index, WBC: White blood count, OR: odds ratio, CI: Confidence interval

to reduce this patient population's rate of readmission is warranted. Also, patients with government subsidized insurance had the lowest rate of readmission even when compared to private insurance. Patients without insurance were at a significantly higher risk of readmission adding to the impetus to more widely provide insurance coverage in order to contain healthcare costs and reduce the financial burden of uninsured individuals.

POSTOPERATIVE GLUCOSE IS ASSOCIATED WITH INCREASED INFECTION RATE IN COLORECTAL SURGERY S.

P191

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Purpose/Background: Surgical site infection (SSI) reduction bundles have been implemented in elective colorectal surgery to reduce infections and improve outcomes. Our bundle includes measuring Hemoglobin A1c (HgA1c) and perioperative glucose. The goal of this study was to examine preoperative HgA1c and perioperative glucose to determine if a relationship exists between prediabetics or undiagnosed diabetics and SSIs.

Methods/Interventions: Starting in January 2015, a protocol was implemented at a single center for patients undergoing elective colorectal surgery. Patient variables and outcomes were monitored prospectively via an institutional national quality improvement database. Patient variables examined in this study included sex, BMI, preoperative diagnosis of diabetes, perioperative glucose and preoperative HgA1c. Outcomes obtained included perioperative glucose as well as superficial, deep and organ space SSIs. Patients were categorized as prediabetic or undiagnosed diabetics if their HgA1c was greater than 5.6, and as hyperglycemic if their postoperative glucose was higher than 130 mg/dl. Patients with a preoperative diagnosis of diabetes were excluded. Descriptive statistics were calculated on sex, BMI, preoperative and postoperative day 1 (POD1) glucose. Fisher exact tests were conducted to look at relationships between having a preoperative HgA1c above or below 5.6 and binary variables (sex, preoperative diabetes diagnosis, hyperglycemia status, SSIs), and Welch's t-tests were conducted to look at the relationship between having a HgA1c above or below 5.6 and continuous variables (BMI, POD1 glucose).

Results/Outcome(s): A total of 198 patients were identified. The mean and median preoperative HgA1c were 5.6 and 5.5, respectively. There was no significant difference in average HgA1c between the sexes ($p=0.20$). The mean BMI was 27.7, with a significantly higher BMI in patients with high HgA1c ($p=0.02$). There was a significant difference in preoperative glucose when patients were split into high (mean preoperative glucose = 124.2) and low (mean preoperative glucose = 102.3) HgA1c groups

($p < 0.001$). Patients in the high HgA1c group also had significantly higher mean POD 1 glucose (mean 120.9) when compared to patients in the low HgA1c group (mean 106.6, $p=0.001$). POD 1 glucose was associated with an increased risk of any SSI ($p<0.001$). Only 5.7% of patients with low POD1 glucose had a SSI, whereas 28.1% of patients with high POD1 glucose had a SSI. However, in this cohort there was no significant relationship between HgA1c and any type of SSI ($p = 0.70$).

Conclusions/Discussion: Elevated preoperative HgA1c is associated with elevated POD 1 glucose. Furthermore, POD 1 glucose may be associated with increased risk for SSIs in elective colorectal surgery.

SHORT-TERM CLINICAL AND ONCOLOGICAL OUTCOMES AFTER SINGLE-INCISION LAPAROSCOPIC SURGERY FOR COLORECTAL CANCER.

P192

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Purpose/Background: Conventional 5 incision laparoscopic surgery procedure for colorectal cancer is widely accepted as a successful alternative to laparotomy now, bestowing specific advantages without causing detriment to oncological outcome. Evolving from this, "scarless" surgery has become a focus, single-incision laparoscopic surgery (SILS) is attracting increasing attention. After nearly 10 years' development, SILS for colorectal cancer is still in early stage. In this study, we aim to evaluate the possibility and safety of single-incision laparoscopic surgery for colorectal cancer.

Methods/Interventions: From September 2013 to June 2017, a total of 122 patients underwent single-incision laparoscopic surgery for colorectal cancer. Data on short-term clinical and oncological outcomes were collected prospectively and reviewed.

Results/Outcome(s): In total, there were 122 patients (70 men and 52 women) with a mean age of 61.17 years (range, 33–83). 101 operations were accomplished successfully with single-incision laparoscopy surgery for colorectal cancer, 18 patients (14.8%) were converted to multiport approach, and 3(2.4%) was converted to laparotomy. 12 patients underwent low anterior resection, while 9 of them were converted to multiport approach. The average operative time was (133.37±44.26)min, with an average blood loss of (73.85±110.56) ml, the median postoperative hospital stay was (9.54±2.06)days. All patients received a R0 resection and the surgical margin were conformed negative in all 122 cases, the median number of harvested lymph node is (17.74±6.81), the proximal resection margin is (6.49±4.06)cm and the distal resection margin is (5.44±3.78)cm. There were 5 postoperational

complications(4%), no operation-related mortality or post-operative anastomotic leakage was observed.

Conclusions/Discussion: SILS for colorectal cancer is feasible and can be safely performed with acceptable short-term clinical and oncological outcome.

SURGEON DELIVERED LAPAROSCOPICALLY GUIDED TRANSVERSUS ABDOMINAL PLANE BLOCKS ARE NON-INFERIOR TO ANESTHESIOLOGIST ULTRASOUND GUIDED BLOCKS.

P193

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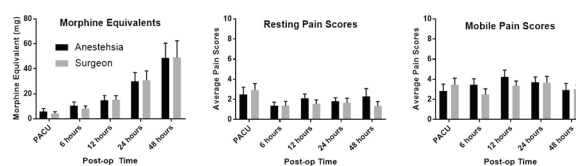
Purpose/Background: In the context of a comprehensive ERAS pathway, transversus abdominis plane (TAP) blocks reduce post-operative pain and opiate consumption following colorectal surgery. Methods for TAP block placement include anatomic landmarks, ultrasound guidance, and laparoscopic visualization. Currently most TAP blocks are performed by anesthesiologists under ultrasound guidance in the operating room following the operation or in the PACU after emergence. These blocks take additional time and incur a potentially avoidable professional fee. We evaluated whether TAP block by surgeons intra-operatively was non-inferior to ultrasound guided anesthesia placement.

Methods/Interventions: We conducted a single center prospective, randomized patient and observer blinded trial comparing surgeon administered TAP block using laparoscopic visualization at the end of a case versus anesthesia provided ultrasound guided TAP block performed after completion of surgery prior to emergence. In both arms, the block consisted of 30ml of 0.25% bupivacaine with 1:10000 epinephrine delivered into the transversus abdominis plane closely inferior to the ribs bilaterally. The primary outcome was post-operative narcotic usage. Non-inferiority was determined by the lower limit of 95% confidence interval of the difference of means falling within the equivalence margin of 15 mg of morphine. Secondary outcomes included pain scores gathered by independent blinded research nurses. Patient characteristics including pre-operative opiate usage, age, body mass index (BMI) as well as indications and details of operation were recorded and compared.

Results/Outcome(s): 19 patients were randomized to anesthesia block and 18 to surgeon block. There were no significant differences in age, BMI, surgical indication, estimated blood loss, conversion to open surgery, type of resection, or pre-operative opiate use. There were no significant differences in cumulative opiate usage, resting or motion pain scores assessed in the post anesthesia care unit (PACU), 6, 12, 24, or 48 hrs. after the operation. Cumulative opiate usage (reported as mg morphine

equivalents \pm standard deviation) for the surgeon administered and anesthesia administered TAP group was 4.4 ± 5.6 vs 5.7 ± 10.9 respectively, in the PACU, 8.2 ± 8.8 vs 10.4 ± 13.6 at 6 hours post operatively, 15.1 ± 14.7 vs 14.9 ± 16.2 at 12 hours, 30.11 ± 30.14 vs 30.8 ± 31.9 at 24 hours, and 49.0 ± 57.2 and 48.8 ± 51.4 at 48hrs. Non inferiority in morphine usage was established in the PACU and at 6 and 12 hours post-op. There was no difference in post-operative nausea or vomiting between groups.

Conclusions/Discussion: Surgeon delivered laparoscopically guided intra-operative TAP blocks were non-inferior to ultrasound guided TAP blocks delivered by anesthesia in the early post-operative period and are an efficient, effective, and potentially cost-saving adjunct to laparoscopic colorectal surgery.



RISK FACTORS TO PREDICT EARLY FAILURE OF FOLEY CATHETER REMOVAL: A PROSPECTIVE STUDY OF POSTOPERATIVE URINARY RETENTION AFTER NON-PROCTECTOMY ABDOMINAL SURGERY.

P194

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Purpose/Background: As part of our ERAS protocol we encourage early foley removal to avoid catheter associated urinary tract infection (CAUTI). There are a number of studies examining postoperative urinary retention (POUR) in patients who have undergone proctectomy (operative intervention below the anterior peritoneal reflection). There are also a variety of studies examining POUR in general surgery patients. Using similar risk factor analysis, our study was designed to determine if these variables contribute to this cohort of patients.

Methods/Interventions: Prospective data was collected from May through November 2017. A total of 69 consecutive patients (38 female and 31 male) undergoing colon surgery above the peritoneal reflection for both benign and malignant pathology were included. The association between dependent and independent variables was analyzed using Student t-test, odds ratio, chi-squared test or Fisher's exact test, as appropriate.

Results/Outcome(s): There were 11 patients (6 male and 5 female) who experienced urinary retention post operatively requiring either straight catheterization or foley replacement, for an overall urinary retention rate of 19%. Of the variables analyzed, age, open surgery and presence

of diabetes were statistically significant for the urinary retention group. Mean age for those with retention was 75 years compared to 61 years without ($p < 0.007$). Patients with retention underwent open operations 73% of the time compared with 45% in the non-retaining group ($p < 0.04$). Finally the presence of diabetes was seen in 36% of the retaining group compared with 14% ($p < 0.05$). BMI, length of procedure, intraoperative fluid volume, intraoperative urinary output, and sex were not statistically significant. Of the patients with urinary retention, 2 developed UTIs (18%) requiring treatment, compared with 3% in the non-retaining group ($p < 0.005$).

Conclusions/Discussion: Early foley removal is a standard measure as part of our ERAS initiative, with the goal of reducing CAUTIs. However, these measures come with the possible unforeseen consequence of an increased POUR rate. The overall retention rate seen in our study was 19%, with identifying risk factors including age, open operation and diabetes. Patients with these risk factors should be considered high risk for retention and subsequent CAUTI. These findings are of particular interest to develop treatment strategies to avoid the dreaded CAUTI complications.

ELECTIVE COLONIC RESECTION IN THE ELDERLY: IS AGE AN EFFECTIVE WAY TO PREDICT PERFORMANCE IN ENHANCED RECOVERY PROGRAMS? A RETROSPECTIVE COHORT STUDY.

P195

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Purpose/Background: Enhanced recovery pathways after colon surgery are used in most high-volume colorectal surgery units. These include a variable number of interventions that aim to minimize surgical stress. Studies have reported a reduction in complication rate and shorter length of stay with the use of fast track protocols. Some question the applicability of these protocols to frail or elderly patients. We decided to investigate the effect of age

on patient's performance after elective colon resection in the setting of enhanced recovery protocol.

Methods/Interventions: We performed a retrospective cohort study based on the STROBE model to investigate the effect of age on patient's performance after elective colon resection. All consecutive patients having an elective colon resection from July 2013 to July 2016 were included. Patients having emergency surgery, rectal resections and patients having non-ERAS pathways were excluded. Patients were divided into two groups according to their age (< 70 or ≥ 70 years old). Outcomes included length of stay (LOS) and 30-days rates of readmission, complications and mortality. Baseline comorbidities were evaluated using Charlson Comorbidity Index and Clavien-Dindo surgical complications scale was used to grade complications.

Results/Outcome(s): A total of 517 patients underwent colon resection between 2013-2016. After chart review 207 were excluded for emergency surgery ($n = 105$), rectal resection ($n = 33$), not enhanced recovery pathways ($n = 12$), missing data ($n = 39$) and other reasons ($n = 18$). The 310 patients included in the study were divided into 2 groups < 70 years old ($n = 178$) and ≥ 70 years old ($n = 132$). Groups did not differ significantly for sex, BMI, laparoscopic approach, conversion rates, duration of surgery and estimated blood loss. The older group had statistically more malignant pathology, right colon surgery, higher Charlson Comorbidity Index and higher ASA score. The younger group had more total colectomy, left colon surgery, stomas and used more patient controlled anesthesia device. The group < 70 yo was associated with a reduced LOS (4.28 vs. 5.84; $p = 0.0008$) and severe complication rates (3.9 vs. 10.6; $p = 0.0236$) compared to the elderly group. However, after adjustments for comorbidities there was no difference in these outcomes between the two groups. Mortality and readmission were equivalent in both groups.

Conclusions/Discussion: Our results suggest that elderly patients could be included safely in enhanced recovery pathways after elective colon resection. Age alone doesn't seem to be a strong predictor of the length of stay, the incidence of severe complications or the rates of readmission and mortality.

P194 Post Operative Urinary Retention Risk Factors

	Yes	No	p
Patient (N)	11	58	
Age	74.6	61.4	0.007
BMI	27.6	27.8	0.66
Length of OR (hh:mm)	2:56	3:16	0.73
IV Fluids (mL)	2635	2408	0.56
Intraop Urine Output (mL)	303	249	0.49
Open (%)	8/11 (73%)	26/58 (45%)	0.04
Diabetic (%)	4/11 (36%)	8/58 (14%)	0.05

IMPROVING PROCESSES OF CARE FOR RECTAL CANCER: RESULTS OF A PAN-CANADIAN MULTIDISCIPLINARY QUALITY IMPROVEMENT PROJECT.

P196

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Purpose/Background: There is strong evidence showing that processes of care including: (1) MRI, (2) multidisciplinary cancer conference (MCC), (3) TME surgery, (4) Quirke method for pathologic assessment and (5) appropriate use of pre-operative chemoradiotherapy (preCRT) have led to significant improvements in local recurrence, survival and permanent stoma rates for patients with rectal cancer. The Canadian Partnership Against Cancer (CPAC) Rectal Cancer Project was a pan-Canadian quality initiative project to evaluate the use of these processes across high volume rectal cancer centres in Canada over a two-year time period.

Methods/Interventions: Prior to the start of the study, process indicators pertaining to MRI, MCC, TME surgery, Quirke method and preCRT were selected at an in person meeting with the 32 site leads for the study representing

radiology, radiation oncology, surgery and pathology at 9 high volume centres across Canada. During the study, the process indicators were collected prospectively for all patients undergoing TME surgery for Stage I-III rectal cancer. Audit and feedback was used to provide results for overall uptake as well as uptake of the process indicators at each individual centre every 3 months for a total of 7 reports. After each report, centres were encouraged to review their results in order to identify gaps in care and work together to develop local strategies to close these gaps with the overall goal to increase the uptake of the process indicators.

Results/Outcome(s): Between April 2015 and December 2016, 649 patients with primary Stage I-III rectal cancer undergoing TME surgery were included in the study. Table 1 shows the overall uptake of the process indicators over the two year period. There was a significant trend in increasing uptake of each process indicator over time, with the exception of RT peer review. In adjusted analyses, synoptic MRI report and MCC remained significantly associated with time, after adjusting for other clinical factors. As expected, overall achievement of each process indicator varied significantly across centres ($p < 0.0001$).

Conclusions/Discussion: The results of this project show that use of a multidisciplinary community of practice as well as audit and feedback led to increased uptake and standardization of process indicators for rectal cancer at high volume centres across Canada. Further analyses to determine the effect of increased uptake of these process indicators on long term outcomes is planned.

P196 Process indicators over time

Process Indicator	Report number							p-value
	1	2	3	4	5	6	7	
MRI Performed	79.8	83.0	89.4	96.1	93.0	92.3	89.2	<0.0001
Synoptic MRI Report	44.3	42.4	48.6	54.4	59.8	51.9	80.3	<0.0001
MCC Presentation	29.8	42.1	63.5	56.3	67.0	71.4	83.1	<0.0001
MCC Synoptic Report	13.1	25.0	42.4	35.9	38.0	45.1	65.1	<0.0001
Radiation Oncology Peer Review	30.8	36.6	29.2	32.2	28.8	16.7	30.0	NS
Synoptic OR Report	41.7	51.1	50.6	56.3	60.0	73.6	75.9	<0.0001
Quirke Method	65.5	81.8	80.0	72.8	63.0	73.6	88.0	<0.0001
CAP Checklist	83.3	95.5	98.9	96.1	93.0	96.7	96.4	<0.0001

Data are % completed; MRI = Magnetic Resonance Imaging; MCC = Multidisciplinary Cancer Conference; CAP = College of American Pathologists

TELL ME WHAT I NEED TO KNOW: A COLLABORATIVE APPROACH TO IMPROVING MRI REPORT QUALITY FOR RECTAL CANCER STAGING.

P197

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Purpose/Background: The value of the MRI report for rectal cancer staging depends on inclusion of key quality parameters to guide optimal clinical decision making. However, previous studies indicate only 40% of reports contain the necessary data needed for adequate preoperative staging, prompting radiological societies to advocate for standardizing these MRI reports. Utilization of high-resolution rectal magnetic resonance imaging (MRI) identified similar deficiencies at our institution. In November 2015, to enhance the quality of MRI reports, a team of colorectal surgeons and dedicated radiologists collaborated to develop a standardized report format with inclusion of key parameters and establish a quarterly rectal cancer MRI educational conference. We sought to examine the impact of these efforts.

Methods/Interventions: We reviewed the MRI reports of patients with biopsy proven rectal cancers imaged from 2011–2017. A single standardized rectal cancer MRI protocol designed by the radiologists was used throughout the study period. Starting in 2016 most MRI's were read by 3 dedicated radiologists. The new report template elicited documentation of: T- and N- stage, location, size, extramural vascular invasion (EMVI), mesorectal fascia (MRF) involvement and circumferential resection margin (CRM). A score of 1 was assigned for each parameter reported, with a sum total of up to 7. Scores were classified into unsatisfactory (0-3), satisfactory (4-5), and optimal (6-7) on the basis of the documentation per Sahni, et al. Fisher's exact and Wilcoxon rank sum tests evaluated changes between the two time periods (2011-2015 vs. 2016-2017).

Results/Outcome(s): 65 reports were available for analysis, 22 (34%) pre-intervention and 43 (66%) post-intervention. The dedicated radiologists represented 36.4% of the MRI reports prior to intervention and 79.1% after intervention ($p=0.001$). All parameters, except tumor location, had a statistically significant improvement in reporting. The largest improvements were seen for N-stage, EMVI, and CRM reporting: 23%-74% ($p<0.001$),

0%-37% ($p<0.001$) and 18%-61% ($p=0.002$), respectively. The quality of reports classified as satisfactory or optimal increased from 59% to 93% ($p<0.001$). Mean (SD) number of parameters reported increased from 3.7 (1.3) to 5.6 (1.1) ($p<0.001$).

Conclusions/Discussion: Implementation of a standardized report protocol and a structured reporting system favorably impacted the quality of MRI reports for rectal cancer staging. Potential areas for continual improvement include N-stage, CRM, and EMVI reporting. With the adoption of MRI for rectal cancer staging it is critical to ensure key information is obtained to target patients most likely to benefit from neoadjuvant chemoradiation while avoiding overtreatment of those with earlier stage cancer.

USE OF A DISCHARGE READINESS ASSESSMENT TO IDENTIFY BARRIERS TO DISCHARGE IN A SAFETY NET HOSPITAL.

P198

S. Talutis, A. Kuhnen, J. Hall
Boston, MA

Purpose/Background: Safety net hospitals report longer lengths of stay for routine operations due to socioeconomic influences. We instituted a Discharge Readiness Assessment (DRA) tool to better understand the circumstances of delayed discharge.

Methods/Interventions: Beginning in July 2017, the colorectal surgery inpatient team prospectively completed the DRA as part of the daily progress note. The DRA includes 3 readiness criteria: pain controlled on oral medications, tolerating solid diet, and ambulating independently. The DRA also outlines 5 potential barriers to discharge: abdominal distension, nursing teaching needed, physical/occupational therapy clearance, rehabilitation/nursing facility acceptance, and social barriers. Retrospective chart review was conducted from July-September 2017. Date of discharge readiness was recorded on the day when the 3 readiness criteria were achieved. The time difference between discharge readiness to actual hospital discharge was evaluated, along with all identified barriers to discharge.

Results/Outcome(s): The charts of 57 patients were reviewed. In total, 73.7% of eligible patients had a completed DRA. Mean time from discharge readiness to

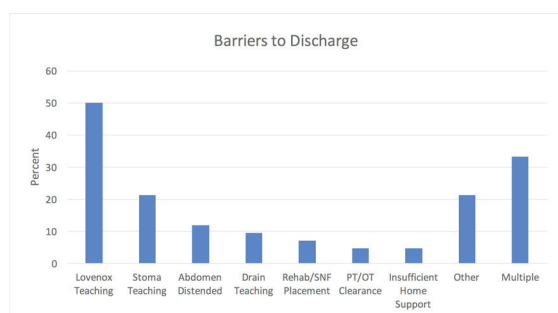
P197 Table 3. Reports Grouped by Unsatisfactory/Satisfactory/Optimal, by Time Period

Report Grade	Before Nov 2015 n (%)	Nov 2015 and later n (%)	p-value*
Unsatisfactory (<4)	9 (40.9%)	3 (7.0%)	<0.0001
Satisfactory (4-5)	11 (50.0%)	12 (27.9%)	
Optimal (6-7)	2 (9.1%)	28 (65.1%)	

*Fisher's exact test

hospital discharge was 0.5 days. Mean number of barriers identified were 1 per patient. Lovenox (50.0%) and stoma (21.4%) teaching were the most commonly selected barriers to discharge among patients. Miscellaneous other barriers (21.4%) not accounted for in the DRA included surgical site infection, medication titration for stoma output, urinary retention, and awaiting radiology procedures. Additionally, 33.3% of patients had multiple barriers to discharge.

Conclusions/Discussion: Patient education is a major barrier to discharge after colorectal surgery. This study found that when patients met discharge criteria there was little delay to discharge from the hospital. A DRA tool may help focus early nursing-driven education, social work consultation, or rehabilitation screening for at risk patients. Future analysis will focus the impact of the DRA on patient care interventions.



IS IT THE STOMA OR THE DAY OF THE WEEK? EVALUATION OF PERIOPERATIVE FACTORS ON LENGTH OF STAY IN COLORECTAL SURGERY PATIENTS.

P199

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Purpose/Background: The aim of this study was to evaluate the influence of both stoma creation and the operative day of the week on inpatient length of stay. We hypothesized that patients undergoing operations on Thursday and Friday had longer lengths of stay.

Methods/Interventions: We retrospectively reviewed colorectal surgery patients undergoing surgery between 1/1/2014 – 5/31/17. Demographic and perioperative variables were collected along with outcomes. Complications were classified according to the Clavien Dindo classification system. We compared outcomes of 3 groups; day of week was classified as early (Monday-Wednesday), late (Thursday-Friday), or weekend (Saturday-Sunday). Our primary outcome was prolonged length of stay (LOS). Prolonged LOS was defined as length of stay ≥ 6 days. Statistical analyses consisted of Chi Square for categorical variables and ANOVA for continuous variables. Logistic regression was used to determine odds ratio of prolonged length of stay accounting for confounders, including day of the week, age, Charlson Comorbidity Index, operative time, stoma creation, and emergency operation. Significance was defined as 2-sided $p < 0.05$.

Results/Outcome(s): 592 subjects were eligible for inclusion, 58.1% early week, 39.7% late week, 1.7% weekend. Stoma creation was performed in 27.6% early week, 31.9% late week, and 50% weekend patients ($p = 0.198$). There were no differences in age, sex, BMI, race, ethnicity, or Charlson Comorbidity across the 3 groups. Additionally, operative time and operative approach was similar across groups. Percent emergency operations were similar in early and late week groups (12.1% and 12.8%, respectively) and

P199 Logistic Regression - Prolonged Length of Stay

Variable	Odds Ratio	95% Confidence Interval - Low	95% Confidence Interval - High	p Value
Operative Day - Late Week	0.588	0.381	0.907	0.016*
Operative Day - Weekend	0.750	0.146	3.860	0.731
Age	1.016	0.997	1.036	0.105
Charlson Comorbidity Index	1.066	0.951	1.195	0.274
Operative Time	1.387	1.250	1.538	<0.001*
Stoma Creation	3.033	1.849	4.975	<0.001*
Emergency Operation	4.116	2.140	7.916	<0.001*

* Significance defined as $p < 0.05$

was significantly higher on the weekend (60.0%, $p < 0.001$). On univariate analysis, length of stay was highest in the weekend population (6.12 vs 5.6 vs 15.1 days, $p < 0.001$), however percentage of patients with prolonged length of stay was not significantly different between groups (37.8% vs 30.6% vs 60.0%, $p = 0.054$). There were no differences in discharge disposition, readmission, or high-grade complications (Clavien Dindo Grade III-V). After adjusting for confounders, operative time (OR 1.287, CI[1.250, 1.538], $p < 0.001$), stoma creation (OR 3.033, CI[1.849, 4.975], $p < 0.001$), and emergency operations (OR 4.116, CI[2.140, 7.916], $p < 0.001$) were associated with increased odds of prolonged length of stay. Compared with surgery early week, surgery late in the week was associated with decreased odds of prolonged LOS (OR 0.588, CI[0.381, 0.907], $p = 0.0167$), however the influence of weekend surgery was lost (OR 0.750, CI[0.146, 3.860], $p = 0.731$) (Table).

Conclusions/Discussion: We did not find that the day of the week on which an operation is performed has an influence on length of stay. Operative time, stoma creation, and emergency operation are predictors of prolonged length of stay. Efforts to reduce LOS should focus on reducing case complexity and stoma management.

EFFECT OF PRIMARY LANGUAGE ON READMISSION AFTER COLORECTAL SURGERY.

P200

S. Talutis, A. Kuhnen, C. Zhu, K. Pearlman, J. Hall
Boston, MA

Purpose/Background: The aim of this study is to evaluate the influence of primary language on readmission following colorectal surgery. We hypothesized that patients

whose primary language was not English speakers were readmitted more frequently.

Methods/Interventions: We retrospectively reviewed patients undergoing colorectal surgery between 1/1/2014 – 5/31/17. Demographic variables, including self-identified primary language, insurance status, and documentation of interpreter use, were collected along with perioperative variables and outcomes. We compared outcomes in English and Non-English speaking groups. Our primary outcome was readmission. We also evaluated the effect of primary language on emergency room visits. Statistical analyses consisted of Chi Square for categorical variables and Kruskal Wallis for continuous variables. Binary logistic regression was used to adjust for confounders, including language, insurance, age, Charlson Comorbidity Index, preoperative diagnosis, stoma status, and complications. Significance was defined as 2-sided $p < 0.05$.

Results/Outcome(s): 592 patients were included in analysis, with 446 (75.3%) English-speakers and 146 (24.7%) non-English-speakers. The most common foreign languages spoken were Spanish (13.2%), Haitian Creole (3.7%), and Cape Verdean Creole (2.0%). Non-English speakers were more likely to be female ($p < 0.001$), non-white ($p < 0.001$), and Medicaid or free care enrollees ($p < 0.001$). Non-English speakers more frequently had a primary diagnosis of cancer/mass (38.6% vs 60.0%, $p < 0.001$) and a higher average Charlson Comorbidity Index (2.8 vs 3.6, $p = 0.001$). On univariate analysis, readmission rates were similar in both language groups (14.6% vs 15.1%, $p = 0.893$). Frequency of preoperative visits to colorectal surgeons (92.6% vs 91.7%, $p = 0.720$), stoma nurses (39.9% vs 24.7%, $p = 0.280$), and pre-procedure clinic (91.4% vs 89.6%, $p = 0.505$) were comparable. Length of stay (6.2d vs 5.4d, $p = 0.260$) and post-operative ER visits (9.0% vs 6.2%, $p = 0.387$) did not differ between the groups. Among

P200 Logistic Regression - Readmission

Variable	Odds Ratio	95% Confidence Interval - Low	95% Confidence Interval - High	p Value
Non-English Primary Language	1.396	0.782	2.491	0.259
Non-Private Insurance	1.278	0.728	2.246	0.393
Age	0.980	0.960	1.001	0.063
Charlson Comorbidity Index	1.272	1.112	1.456	<0.001*
Preoperative Diagnosis - Cancer/Mass	0.357	0.118	1.082	0.069
Preoperative Diagnosis - IBD	1.049	0.306	3.599	0.939
Preoperative Diagnosis - Diverticular Disease	0.887	0.263	2.989	0.846
Preoperative Diagnosis - Rectal Prolapse	0.406	0.106	1.561	0.190
Stoma Creation	2.103	1.260	3.511	0.004*
Clavien Dindo Grade III-V	3.085	1.847	5.153	<0.001*

* Significance defined as $p < 0.05$

those who were readmitted, non-English speakers were readmitted earlier (12.4d vs 6.6d, $p=0.016$) and more frequently before their first post-operative visit (49.1% vs 83.3%, $p=0.014$). After adjusting for confounders, Charlson Comorbidity Index (OR 1.272 CI[1.112, 1.456], $p<0.001$), presence of an ostomy (2.103 [1.260, 3.511], $p=0.004$), and severe complications (3.085, [1.847, 5.153], $p<0.001$) were associated with increased odds of readmission (Table).

Conclusions/Discussion: Non-English speaking patients do not have an increased readmission rate compared to English speakers but do present for emergency room visits and readmission sooner after surgery. Disease severity and operative complexity continue to be the primary determinants of readmission. Robust translation services in our safety net hospital may influence these results and limit application of these results to hospital settings.

ROBOTIC RIGHT HEMICOLECTOMY WITH EXTRACORPOREAL ANASTOMOSIS VERSUS INTRACORPOREAL ANASTOMOSIS: IS THERE A DIFFERENCE?

P201

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Purpose/Background: Right hemicolectomies (RHC) are performed less frequently than left hemicolectomies. A benefit in postoperative length of stay has been shown in comparing patients who have undergone laparoscopic versus robotic left hemicolectomy(1). There is less literature on robotic RHCs. However, laparoscopic RHCs with an intracorporeal anastomosis may convey advantage over anastomoses performed extracorporeally(2). While a study comparing robotic RHC with intracorporeal anastomoses versus laparoscopic RHC with extracorporeal anastomoses has been published(2), no study has compared the type of anastomosis in strictly robotic RHCs. This study aims to compare outcomes of robotic RHCs with an intracorporeal anastomosis versus those with an extracorporeal anastomosis. We hypothesize that robotic RHCs with intracorporeal anastomoses will have a shorter length of stay compared to those with an extracorporeal anastomosis. 1.

Cirocchi et al Surg Onc 2013; 22:1 2. Trastulli et al Surg Endosc 2015; 29:1512

Methods/Interventions: A retrospective chart review was performed on patients that underwent a robotic RHC performed in Houston, Texas for either adenocarcinoma or adenoma. Patients were divided into those who had intra vs. extracorporeal anastomoses. Age, sex, BMI, indication for operation, time to return of bowel function, length of stay, intraoperative blood loss, immediate postsurgical narcotic administration, use of regional analgesia for postoperative pain management, and complications were obtained. Means and confidence intervals were calculated for continuous data and medians and interquartile ranges for discrete data.

Results/Outcome(s): 224 patients have undergone robotic colectomy during this ongoing study. Nine patients underwent RHC. Eight patients had intracorporeal anastomoses and one had an extracorporeal anastomosis. One patient in the intracorporeal group had both a right and left colectomy; that patient was discarded. Ages, BMI, length of stay, time to flatus, time to first bowel movement, were similar between the patients with extracorporeal vs intracorporeal anastomoses. Intraoperative time and blood loss for the extracorporeal patient was below the 95% confidence interval for the intracorporeal patients. Length of stay for the extracorporeal patient was above the 95% confidence interval for the intracorporeal patients. Narcotic use for the extracorporeal patient was below the 95% confidence interval for the intracorporeal group. Only a total of 3 patients required immediate post-surgical narcotics. All patients received abdominal wall blocks. No patient died and one patient in the intracorporeal group was readmitted for an ileus.

Conclusions/Discussion: This study suggests that extracorporeal anastomosis is associated with a shorter intraoperative time but longer length of stay compared to intracorporeal anastomosis in patients when a robotic RHC is performed. Other important outcomes are likely similar.

P201 Results

Group (N)	Age (yrs)*	BMI (kg/m2)*	Indication	OR Time (min)*	LOS (min)*	Complications	Time to 1st flatus (days)#	Time to 1st Bowel Movement(days)#	Intraoperative Blood Loss (mL)*	Morphine Equivalents (mg)*
Intracorporeal (7)	64 (54; 77)	30.5 (24.8; 36.2)	4 Cancer 3 Adenoma	282 (259;305)	2334 (1724;2944)	1	1(1,1)	1 (1,3)	157 (49; 265)	4.5 (3; 6)
Extracorporeal (1)	65	26	Adenoma	195	3064	0	1	1	20	2

* data reported as mean with 95% confidence interval

data reported as median with interquartile range

ACS-NSQIP OUTCOMES COMPARISON OF OPEN, LAPAROSCOPIC AND ROBOTIC ABDOMINOPERINEAL RESECTION FOR RECTAL CANCER.

P202

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Purpose/Background: The comparative effectiveness of minimally invasive and open approaches in rectal cancer surgery is inconclusive. We sought to compare the outcomes of laparoscopic and robotic to open abdominoperineal resections in patients with rectal cancer.

Methods/Interventions: In this retrospective cohort study, the 2016 NSQIP database was queried to identify eligible adult patients who underwent elective abdominoperineal resections with ASA class below 5. We used propensity score-based inverse probability weighting method to estimate the associations between different surgical approaches and 30-day post-operative outcomes. This statistical method accounted for differences in a number of demographic, preoperative and tumor characteristics, and resulted in 3 comparable populations for comparison. Primary outcomes included overall morbidity and hospital length of stay while secondary outcomes consist of each complication, readmission and reoperation.

Results/Outcome(s): 1,151 patients met inclusion criteria in the final analysis: 578 (50%) open, 338 (29%) laparoscopic and 235 (21%) robotic cases. Compared to the open approach, laparoscopic abdominoperineal resections had lower overall morbidity (odds ratio (OR)=0.64; 95% CI, 0.47, 0.87; p=0.005) whereas there is no statistically significant difference for the robotic approach (OR=0.78; 95% CI, 0.54, 1.14; p=0.20). The adjusted length of stay comparing laparoscopic to open was -2.0 days (95% CI, -2.8, -1.1; p<0.001) whereas comparing robotic to open the difference was -2.7 days (95% CI, -3.7, -1.8; p<0.001). The conversion to open rate was 13.3% for laparoscopic and 5.6% for robotic approach. The robotic approach had a lower risk-adjusted conversion to open risk when compared to the laparoscopic approach (OR=0.36; 95% CI, 0.19-0.68; p=0.002).

Conclusions/Discussion: This national database study supports the benefits of minimally invasive approaches for abdominoperineal resection for rectal cancer. In light of the steady rise in the use of minimally invasive approaches to rectal cancer, more comparative research is needed to assist surgeons with minimally invasive choices.

EXCISIONAL BIOPSY, NOT POLYPECTOMY SHOULD BE PERFORMED FOR RESECTION OF SMALL CARCINOID TUMORS OF THE RECTUM.

P203

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Purpose/Background: Carcinoid tumors of the rectum have an age-adjusted incidence of 0.31-1.22/100,000 and are more metabolically active compared to their fore and midgut counterparts. Most rectal carcinoids are diagnosed on routine endoscopic surveillance at an early stage and approximately 88% are locally limited. This analysis evaluates the efficacy of endoscopic resection versus excisional biopsy and the effect on disease recurrence and overall survival following diagnosis.

Methods/Interventions: The National Cancer Database (NCDB) from 2010 to 2015 was reviewed for all cases of stage I invasive carcinoid tumor of the rectum (SEER Histology Codes 824X) based on NCDB Analytic Group. Groups were separated based on whether patients underwent polypectomy or excisional biopsy. Multivariate regression analysis was used to account for the differences in preoperative characteristics and completeness of carcinoid resection. The primary outcome was margin positivity, need for re-intervention and survival following diagnosis of carcinoid of the rectum.

Results/Outcome(s): The inclusion criteria identified 2646 cases of stage I carcinoid of the rectum that underwent polypectomy (1690) or excisional biopsy (956). Patient age, preoperative stage, Charlson-Deyo score and socio-demographics were equally matched across intervention groups. Patients who underwent excisional biopsy had statistically larger tumors vs. polypectomy (6.27mm vs. 5.71mm, p=0.001) and had a longer delay to their procedure (27.24 days vs. 5.71 days, p<0.001). Resection margins were positive in 14.97% of polypectomy, 6.07% of excisional biopsy (p<0.001). There were no reported 30-day or 90-day mortalities in either group and 30-day readmission rates were similar between groups (p=0.451). After controlling for differences in the cohorts, overall survival following diagnosis was excellent for both polypectomy (79.11 months) versus excisional biopsy (80.36 months, p=0.014) with excisional biopsy showing a protective effect on mortality (HR 0.474, CI 0.285 to 0.788, p=0.004) (Figure 1).

Conclusions/Discussion: Negative margins are very important in the treatment of stage I carcinoid tumors of the rectum and excisional biopsy provides better margin clearance. Excisional biopsy should be considered over polypectomy for stage I carcinoid tumors of the rectum.

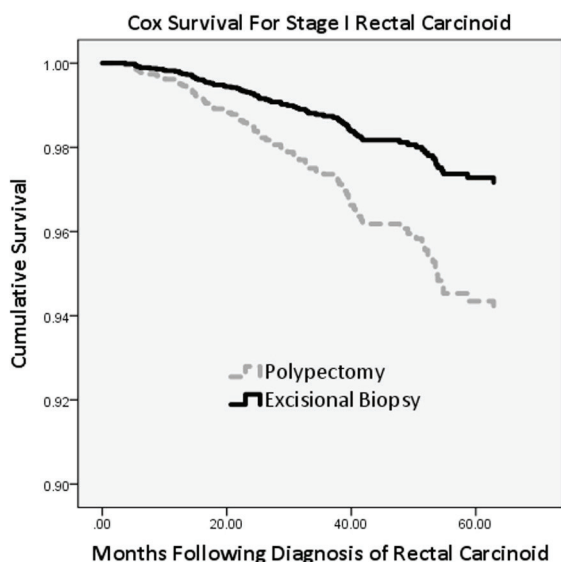


Figure 1: Cox regression analysis for survival following diagnosis of stage I rectal carcinoid based on polypectomy versus excisional biopsy.

SUPERFICIAL CLOSURE OF STOMA SITE FOLLOWING REVERSAL LEADS TO HIGHER RATES SUPERFICIAL SURGICAL SITE INFECTIONS, AN ANALYSIS USING THE NSQIP DATABASE.

P204

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Purpose/Background: Over half a million individuals in the United States currently live with either an ileostomy or colostomy and over 100,000 new stomas are placed annually. On average, only half are reversed. This analysis focuses on the impact of the method of primary stoma wound closure on the incidence of superficial surgical site infections.

Methods/Interventions: The 2014-2016 ACS-NSQIP database was queried for elective colostomy and ileostomy reversal defined by primary CPT code (44227, 44620, 44625, 44626) and by ICD code (V44.2, V44.3, V55.2, V55.3, Z43.2, Z43.4, Z93.2, Z93.3). This dataset was grouped by ileostomy versus colostomy and by method of closure of the surgical wound, superficial and deep versus deep closure only. Multivariate modeling was used to determine the impact of wound closure method on the incidence of postoperative wound infections.

Results/Outcome(s): The inclusion criteria identified 13513 cases, 5787 colostomy and 8331 ileostomy reversals between 2014 and 2016. In aggregate, 93.45% of surgical sites were closed at deep and superficial levels. Patients who had a superficial and deep level closure had a higher incidence of superficial surgical site infections (Ileostomy: 3.65% vs. 0.8%, $p < 0.001$; Colostomy: 6.45% vs. 2.51%, $p = 0.014$) versus deep closure only. After controlling for

differences in the cohorts, regression analysis indicated that superficial and deep layer wound closure was associated with an increased incidence in superficial surgical site infections (Ileostomy: HR 4.816, CI 1.979 to 11.717, $p = 0.001$; Colostomy: HR 2.782, CI 1.224 to 6.325, $p = 0.015$). In aggregate, patients who developed a superficial surgical site infection had a longer postoperative length of stay (7.37 days vs. 5.12 days, $p < 0.001$), higher rates of reoperation (7.4% vs. 4.3%, $p < 0.001$), and higher rates of readmission (24% vs. 9%, $p < 0.001$).

Conclusions/Discussion: Superficial closure of the primary surgical site following colostomy or ileostomy reversal is associated with increased superficial surgical site infections and subsequent increases in postoperative hospital length of stay, reoperative and readmission.

Superficial Surgical Site Infection Multivariate Regression Modeling Ileostomy Reversal			
	OR	95% CI	P
Age (Years, Continuous)	1.001	0.992 to 1.009	0.872
Body Mass Index Greater than 30kg/m ²	1.686	1.305 to 2.178	0.000
Diabetes	1.241	0.874 to 1.763	0.228
Dyspnea	1.162	0.667 to 2.026	0.596
Smoking	0.955	0.694 to 1.314	0.776
Weight Loss	0.889	0.452 to 1.75	0.734
Superficial and Deep Wound Closure (vs. Deep Only)	4.816	1.979 to 11.717	0.001

Colostomy Reversal			
	OR	95% CI	P
Age (Years, Continuous)	1.002	0.994 to 1.01	0.687
Body Mass Index Greater than 30kg/m ²	1.843	1.471 to 2.309	0.000
Diabetes	1.255	0.922 to 1.706	0.148
Dyspnea	1.475	0.976 to 2.228	0.065
Smoking	1.330	1.041 to 1.699	0.023
Weight Loss	1.487	0.712 to 3.107	0.291
Superficial and Deep Wound Closure (vs. Deep Only)	2.782	1.224 to 6.325	0.015

Table 1: Multivariate regression modeling for superficial surgical site infections based on preoperative demographics and method of wound closure. Superficial and deep closure was associated with an increased risk of postoperative superficial surgical site infection for both ileostomy and colostomy reversal.

MORBID OBESITY ASSOCIATED WITH INCREASED INTRAOPERATIVE BLOOD LOSS AND INCREASED READMISSION FOLLOWING ROBOTIC COLORECTAL SURGERY.

P205

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Purpose/Background: Morbid obesity is a global health emergency associated with many comorbid conditions and increased morbidity following surgery. This analysis evaluates the efficacy of robotic surgery managing colorectal disease in the morbidly obese (body mass index greater than 40) population at a single institution.

Methods/Interventions: Clinical data from a single institution between 2009 and 2016 was reviewed for robotic assisted cases performed by single colorectal surgeon proficient in robotic surgery. Patients were stratified whether their body mass index exceeded 40. Univariate analysis was used to identify differences in intra and postoperative outcomes.

Results/Outcome(s): The inclusion criteria identified 450 cases during the time of review, of which 34 (7.56%) had a body mass index greater than 40 at the time of surgery. These patients were statistically younger (52 vs 59 years, $p = 0.006$), had more hypertension (62% vs.

47%, $p=0.09$), and were more likely to need insulin for their diabetes (9% vs. 2%, $p=0.012$). Total operative time was similar between groups (250.41 vs. 265.47, $p=0.428$) however average blood loss was almost twice as high for the morbidly obese group (200cc vs. 380cc, $p=0.005$). The incidence of postoperative complication was 3% for both groups ($p=0.958$) as was time to return of flatus (2.5 days, $p=0.941$) and postoperative length of stay (4.8 days, $p=0.685$). Comparatively, the rate of readmission was three times higher in the morbidly obese group (15% vs. 4%, $p=0.008$) however there was no difference in the rate of re-intervention (1%, $p=0.463$) or re-operation (<1%, $p=0.567$).

Conclusions/Discussion: Robotic surgery does not have a significantly higher rate of postoperative complication for the morbidly obese and while readmission rates may be higher in this subgroup, the rate of re-intervention and re-operation following readmission is the same.

EVALUATING OUTCOMES OF ELECTIVE ROBOTIC-ASSISTED COLONIC RESECTION FOR COMPLICATED AND NON-COMPLICATED DIVERTICULITIS AT A SINGLE INSTITUTION.

P206

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Purpose/Background: With the incidence of diverticulitis rising, an increasing number of patients are presenting with complicated disease. This analysis compares the outcomes of robotic surgery for elective colonic resection for uncomplicated and complicated diverticulitis at a single institution.

Methods/Interventions: Clinical data from a single institution between 2009 and 2016 was reviewed for robotic assisted cases performed by single colorectal surgeon proficient in robotic surgery. Patients were stratified whether they were diagnosed with diverticulitis versus diverticulitis with stricture, abscess or fistula. Univariate analysis was used to identify differences in intra and post-operative outcomes.

Results/Outcome(s): The inclusion criteria identified 97 cases during the time of review, of which 27 (27.8%) had a concomitant stricture, fistula or prior abscess. Patients in both cohorts were equally matched regarding preoperative demographics (age, gender, body mass index) and comorbidities (diabetes, hypertension, COPD, heart disease). Total operative time was significantly longer for patients with complicated diverticulitis (325 vs. 227 minutes, $p<0.001$) as was intraoperative blood loss (390cc vs. 176cc, $p=0.013$). While the rate of intraoperative conversion (33% vs. 24%, $p=0.372$) and postoperative complications (7% vs. 3%, $p=0.317$) was higher for the complicated group, the differences were not significant. Postoperative length of stay was higher for patients with complicated

diverticulitis (5.26 days vs. 4.11 days, $p=0.018$) but there were no significant differences in the rates of readmission or re-intervention following robotic surgery.

Conclusions/Discussion: Robotic surgery does not have a significantly higher rate of postoperative complication for advanced diverticular disease and should be considered when patients present with prior attacks complicated by abscess, stricture or fistula.

DECREASING THE NUMBER OF OPIOIDS GIVEN AFTER COLORECTAL SURGERY.

P207

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Purpose/Background: An unintended consequence of heightened pain assessment and treatment over the past decades is the increased reliance on narcotics for postoperative pain control. To engage surgeons against the opioid epidemic, recent guidelines have suggested that limiting discharge amounts of narcotics is sufficient for at least 75% of patients (i.e. 35 tablets of 5mg hydrocodone after laparoscopic colectomy).

Methods/Interventions: In the setting of an enhanced recovery protocol using non-narcotic pain adjuncts, we collected baseline data regarding discharge prescribing among a colorectal surgery practice at a single institution. We then instituted a standardized plan of prescribing 20 tablets of opioids at the time of discharge. Consecutive patients over a 2-month period were compared to the earlier cohort in terms of pain assessments at 1 week post-discharge and need for refills post surgery.

Results/Outcome(s): Seventy-six pre-intervention patients were discharged with a median of 42 tablets (range 8-84) of opioids (5mg oxycodone or 5mg hydrocodone). Out of 96 post-intervention patients, 76 were discharged with opioids (median 20 tablets, range 12-72). The percentage of patients that had not used the majority of their medication did not differ between groups (22% vs. 17%, $p=0.42$). Post discharge pain scores were higher (mean 3.1 vs. 1.6, $p=0.001$) and more refills (29% vs. 9%, $p=.002$) were given in the post-intervention cohort.

Conclusions/Discussion: Reducing the number of opioids administered at discharge to below recommended guidelines may result in more refills given overall, but will reduce overall number of opioids prescribed. Further follow-up will be required to understand if this tailored approach can better identifying those at risk for long-term opioid related complications.

HOSPITAL VARIATION IN READMISSIONS AND VISITS TO THE EMERGENCY DEPARTMENT FOLLOWING ILEOSTOMY CREATION.

P208

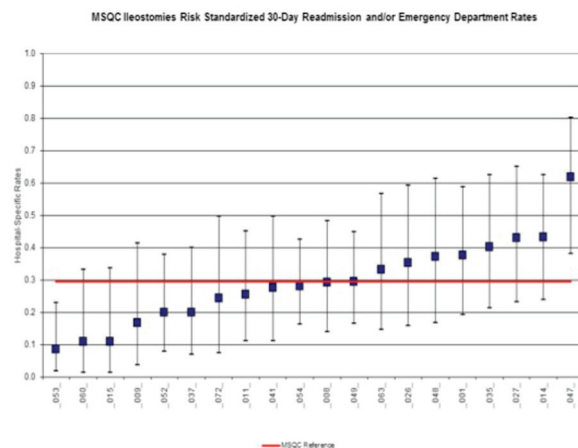
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Purpose/Background: Ileostomy surgery is associated with a high readmission rate, and care pathways to prevent such readmissions have been proposed. However, the extent to which these improvement efforts have been implemented is unknown. The purpose of this study was to examine rates of readmission and emergency department (ED) visits across hospitals in Michigan, and to determine whether there was significant variation between hospitals in a statewide surgical collaborative.

Methods/Interventions: This was a retrospective cohort study of patients who underwent Ileostomy surgery from October 2015 to July 2017 in Michigan Surgical Quality Collaborative (MSQC) hospitals. MSQC collects patient, surgical, and 30 day outcome information for a sample of surgery patients in participating hospitals in Michigan and abstracts whether the patient's operation included an ileostomy. A multivariable logistic regression model including age, urgent/emergent status, complications, primary diagnosis (e.g., inflammatory bowel disease, cancer, diverticulitis, or "other"), insurance, and surgical approach was fit to show independent factors associated with a composite outcome indicating readmission and/or ED visit which was the primary outcome variable. Risk adjusted rates of the composite outcome were compared between hospitals with at least 15 ileostomies during the study time period (n = 20).

Results/Outcome(s): Our cohort included 754 patients who underwent ileostomy surgery. Independent risk factors for readmission and/or ED visit were younger age, complication within 30 days, "other" diagnosis, and Medicaid insurance. Adjusted rates of the composite outcome range from 8.6% (best performing hospital) to 61.8% (worst performing hospital). The caterpillar plot (figure 1) shows substantial variation between hospitals.

Conclusions/Discussion: Rates of readmission and/or ED visit following ileostomy surgery vary between hospitals, suggesting inconsistent implementation of pathways to prevent these events and potential for improvement. There is clear opportunity to standardize care to prevent adverse events after ileostomy surgery.



PATIENTS THAT REQUIRE, BUT DO NOT UNDERGO EMERGENCY LAPAROTOMY: AN INITIAL ANALYSIS INTO DEFINING THE NOLAP POPULATION.

P209

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Purpose/Background: With 30-day mortality ranging between 5% - 17% in emergency laparotomy patients, interventions and quality improvement initiatives are being developed to improve outcomes^{1;2;3}. However, these audits lack data regarding those patients who require but do not undergo emergency laparotomy. This subset of patients still remains an unknown and undefined population. This prospective cohort study aimed to define the characteristics and outcomes of non-operatively managed patients to allow meaningful comparison between these two groups.

Methods/Interventions: From August 2015 - October 2016, consecutive patients requiring emergency laparotomy in one surgical unit were prospectively identified. Patients undergoing emergency laparotomy (ELAP) were compared to those that did not undergo surgery (NOLAP) using the following parameters: demographics, surgery indication, prognostic indicators, process pathway factors and 30-day mortality.

Results/Outcome(s): 314 patients required and were considered for emergency laparotomy during the time period: 214 (68%) ELAP and 100 (32%) NOLAP. NOLAP patients were significantly older (mean 78.0 versus 63.7 years; p<0.001), had higher ASA grades (p<0.001), higher pre-operative creatinine and lactate levels (p<0.001) and were more likely to present with ischaemia (25.0% versus 9.4%). There were no differences between groups regarding gender (p=0.550) or socioeconomic status (p = 0.75). NOLAP patients were significantly less likely to have: a documented consultant decision (66.0% versus 83.6%, p<0.001); a CT scan (67.0% versus 82.9%, p=0.002)

or a documented risk assessment (4% versus 14.6%, $p < 0.001$). Only 16% of NOLAP patients underwent anaesthetic review prior to the decision not to operate. The commonest reasons for NOLAP were 'poor fitness' (74.0%), advanced malignancy (6.0%) and patient refusal (4%). The actual mortality at 30 days was 65.0% NOLAP versus 12.7% ELAP ($p < 0.001$).

Conclusions/Discussion: This is one of the first studies to define NOLAP patients. It finds them to account for a third of all patients requiring an emergency laparotomy. NOLAP patients were older, less likely to have a CT scan and had a poorer 30-day mortality. However, despite NOLAP, a third of these patients were alive at 30 days with normal creatinine and lactate levels increasing the likelihood of survival. Decision-making surrounding emergency laparotomy is complex, should be performed at senior level and requires further research. Inclusion of this currently overlooked cohort of patients in large emergency laparotomy databases may allow more meaningful comparison between units.

ONCOLOGIC AND PERIOPERATIVE OUTCOMES OF LAPAROSCOPIC, OPEN AND ROBOTIC APPROACHES FOR RECTAL CANCER RESECTION.

P210

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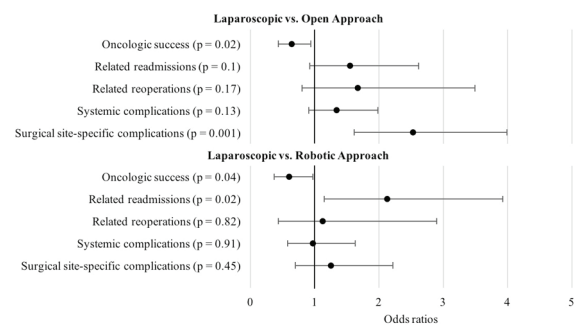
Purpose/Background: Minimally invasive surgical approaches have been shown to reduce surgical site complications without compromising oncologic outcomes for many types of malignancies. This study compared successful oncologic resection and postoperative outcomes among laparoscopic, open, and robotic approaches to rectal cancer.

Methods/Interventions: The 2016 ACS-NSQIP Proctectomy targeted and general datasets were merged and queried for all adults undergoing rectal cancer operations. We compared successful oncologic resection and postoperative outcomes by surgical approach using propensity score-weighted logistic and linear regression models. Successful oncologic resection was defined as negative distal and radial margins with >12 evaluated lymph nodes.

Results/Outcome(s): Among 1,028 rectal cancer operations, 206 (20%) were laparoscopic, 630 (61.3%) were open, and 192 (18.7%) were robotic. After propensity score-weighting, there were no statistically significant differences among the three cohorts for 19 pre-operative variables (e.g., body mass index, age, pre-operative T staging, tumor level from anal verge, pre-operative chemoradiation status, and steroid use). Compared to the laparoscopic approach, open and robotic approaches were associated with decreased likelihood of successful

oncologic resection ($OR_{adj} = 0.64$, 95% C.I. 0.43, 0.94 and $OR_{adj} = 0.6$, 95% C.I. 0.37, 0.97), and open approach was associated with increased likelihood of surgical site complications ($OR_{adj} = 1.61$, 95% C.I. 1.61, 3.959). There was no difference in operative time among laparoscopic vs. open vs. robotic approaches (306 vs. 310 vs. 300 min, $p = 0.67$ and $p = 0.64$). The open approach was associated with longer length of stay (6.7 vs. 8.4 days, $p = 0.005$).

Conclusions/Discussion: We found that minimally invasive approaches did not lengthen operative times and provided benefits of reduced surgical site complications and decreased length of stay post-operatively. Compared to those performed open or robotically, rectal cancer resections performed laparoscopically were more likely to achieve successful oncologic resections, which have been associated with better cancer outcomes. Selection bias may contribute to the poorer outcomes associated with an open surgical approach. The robotic approach has more recently been applied to rectal cancer resections, so the outcomes may be reflective of an ongoing learning curve. Randomized prospective studies are needed to clarify patient- and surgeon-specific factors that influence successful resections as well as clinical outcomes.



POSTOPERATIVE ILEUS AFTER COLECTOMY AND PROCTECTOMY MAY HAVE DIFFERENT RISK FACTORS.

P211

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Purpose/Background: Post-operative ileus is a common complication after elective colorectal surgery with significant morbidity and financial burden. Certain factors are protective, such as enhanced recovery protocols (ERAS), intravenous fluid restriction, limited opioid use, early enteral feeding and ambulation. Financial costs of post-operative ileus are as high as \$750 million annually. The purpose of this study is to investigate the clinical risk factors associated with ileus in colectomy versus proctectomy patients.

Methods/Interventions: 281 elective colorectal cases were analyzed from January 2015 to January 2016. All cases were performed at a tertiary care academic center by

colorectal surgeons using a standardized ERAS protocol. Of these, 200 patients underwent colectomy and 81 patients underwent proctectomy. Data on all patients was gathered prospectively in the framework of NSQIP database. Gender, age, BMI, ethnicity, indication for surgery, co-morbidities and ASA class, postoperative complications, length of stay, length of surgery, surgical approach, presence of preoperative opioid and benzodiazepine use, IV lidocaine use, total IV fluids given in the operating room and within 72 hours of surgery were recorded. The study was exempt from institutional IRB protocol. Postoperative ileus was defined as inability to tolerate oral intake or presence of nasogastric tube at 3 days postoperatively. Logistic regression analysis was performed on recorded variables to determine association with recorded cases of ileus.

Results/Outcome(s): Overall rate of ileus was 19.9% for all elective colorectal cases. Rates of ileus were significantly different between the two subgroups: 23% in proctectomy group and 13% in colectomy group. A linear regression model for post-colectomy ileus demonstrated increased risk of ileus in patients who underwent surgery via planned open approach ($p < 0.001$), and had preoperative benzodiazepine or opioid use ($p < 0.01$). On the other hand, in proctectomy patients, surgical approach had no bearing, but receiving greater than 4 liters of IV fluids in the first 72 hours ($p < 0.001$) and male gender ($p < 0.01$) were significantly associated with higher rates of ileus. IV lidocaine use was a protective factor with trend for significance ($p = 0.08$) after proctectomy.

Conclusions/Discussion: Postoperative ileus has a complicated and variable etiology. This work helps refine our understanding of ileus in colectomy and proctectomy and develop ways to prevent it. Specifically, this work can be used in existing ERAS programs to enhance patient outcomes after colectomy and proctectomy.

DIFFERENT STROKES FOR DIFFERENT FOLKS: TRENDS IN ELECTIVE SURGERY FOR DIVERTICULAR DISEASE.

P212

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Purpose/Background: The approach to patients with sigmoid diverticulitis has evolved towards more conservative management regardless of initial presentation or number of episodes. Despite this trend, approximately 20% of patients with diverticulitis will still require surgical intervention. Modern surgeons have many tools at their disposal, and it is unknown how the approach for diverticular disease has changed with the increasing popularity of new operative platforms. The purpose of this study was to evaluate recent trends in elective surgery for diverticulitis, including patient demographics, and outcomes.

Methods/Interventions: The American College of Surgeons National Surgical Quality Improvement Program Colectomy (NSQIP) Procedure-Targeted Database was queried from 2012 to 2016. This clinical database allows for direct identification of different minimally invasive techniques (laparoscopic/LAP, laparoscopic hand-assist/LHA, robotic/RC, single-incision/SILS). Patients with ICD-9/ICD-10 diagnoses codes for diverticular disease of the large intestine were identified and stratified by operative approach. Emergent and non-elective cases were excluded. Similarly, those who received diverting ostomies or had concurrent pathology (e.g. colon cancer) were also excluded. Variables were analyzed by Chi-squared, Fisher exact test, or ANOVA with Tukey's adjustment for multiple comparisons.

Results/Outcome(s): 14,420 cases were identified. Patients undergoing open colectomy were older, had higher ASA class, and had higher rates of comorbidities. BMI and race were similar except for SILS. Robotic colectomies increased yearly from 2012–2016 ($P < 0.0001$), while LAP cases declined. However, there was not an increase in the overall use of minimally invasive techniques (LAP/LHA/RC/SILS) over time. Robotic-assisted operations took significantly more time compared to all other approaches ($P < 0.001$), but had a lower conversion rate when compared to LAP. LHA colectomy was the only approach where operative time did not significantly vary compared to open ($P = 0.35$). There was an increase in the utilization of combined mechanical and oral antibiotic bowel preparation over time ($P < 0.001$). Splenic flexure mobilization was performed in 47.4% of cases and ureteral stents were placed in 28.6%. Rate of and treatment for anastomotic leaks were similar between the different approaches ($P = 0.1320$). Patients undergoing open operations stayed significantly longer compared to other approaches ($P < 0.001$) and were more likely to be discharged to a skilled or rehabilitation facility.

Conclusions/Discussion: Overall, utilization of minimally invasive techniques for diverticular disease remains unchanged over the last five years, but robotic-assisted surgery has become more prevalent. Baseline patient demographics and overall outcomes are similar for minimally invasive colectomy regardless of the chosen platform.

IMPROVING SLEEP IN POSTOPERATIVE COLORECTAL SURGERY PATIENTS.

P213

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Purpose/Background: Hospitalization may severely disrupt sleep, which can worsen pain and the physiological and psychiatric health of acutely ill patients. Multiple factors lead to sleep disturbances in hospitalized surgical

patients. Our aim was to measure the quality and perception of sleep on a single surgical ward, and then evaluate the efficacy of a dedicated “sleep bundle” on improving the patients’ experiences and sleep.

Methods/Interventions: We surveyed postoperative colorectal surgery patients at a single institution at the conclusion of their hospitalization. The St. Mary’s Hospital and Leeds Sleep Evaluation Questionnaires were used

P212 Trends in Elective Surgery for Diverticular Disease: A Procedure-Targeted NSQIP Analysis (2012-2016)

	Total	Open	Laparoscopic	Laparoscopic Hand-Assist	Robotic	SILS
Utilization N (%)	14420	1973 (13.7%)	5833 (40.5%)	4973 (34.5%)	1585 (11.0%)	56 (0.4%)
2012	649	221 (34.1%)	241 (37.1%)	187 (28.8%)	0 (0.0%)	0 (0.0%)
2013	2849	397 (13.9%)	1278 (44.9%)	1000 (35.1%)	162 (5.7%)	12 (0.4%)
2014	3239	418 (12.9%)	1390 (42.9%)	1132 (35.0%)	283 (8.7%)	16 (0.5%)
2015	2939	342 (11.6%)	1141 (38.8%)	1051 (35.8%)	393 (13.4%)	12 (0.4%)
2016	4744	595 (12.5%)	1783 (37.6%)	1603 (33.8%)	747 (15.8%)‡	16 (0.4%)
Age - Years (± sd)	58 (± 12)	60 (± 12)*	57 (± 12)	57 (± 12)	57 (± 11)	57 (± 12)
Caucasian	12502 (86.7%)	1676 (84.9%)	4919 (84.3%)	4440 (89.3%)	1413 (89.1%)	54 (96.4%)
African-American	872 (6.1%)	149 (7.6%)	412 (7.1%)	224 (4.5%)	86 (5.4%)	1 (1.8%)
Asian-American	120 (0.7%)	8 (0.04%)	61 (1.0%)	41 (0.08%)	10 (0.06%)	0 (0.0%)
ASA 1	454 (3.1%)	43 (2.2%)	195 (3.3%)	177 (3.6%)	39 (2.5%)	0 (0.0%)
ASA 2	9027 (62.6%)	1003 (50.8%)*	3750 (64.3%)	3228 (64.9%)	1020 (64.4%)	29 (51.8%)
ASA 3	4775 (33.1%)	887 (45.0%)*	1819 (31.2%)	1524 (30.6%)	518 (32.7%)	27 (48.2%)
ASA 4	146 (1.0%)	38 (1.9%)	59 (1.0%)	44 (0.8%)	5 (0.3%)	0 (0.0%)
BMI - Kg/M2 (± sd)	29.7 (± 6.3)	29.8 (± 6.7)	29.6 (± 6.2)	29.7 (± 6.3)	29.7 (± 6.3)	29.8 (± 6.7)
No Bowel Preparation N (%)	2510 (17.4%)	450 (22.8%)	945 (16.2%)	872 (17.5%)	239 (15.1%)	4 (7.1%)
Mechanical Bowel Preparation N (%)	4042 (28.0%)	481 (24.4%)	1745 (29.9%)	1408 (28.3%)	404 (25.5%)	4 (7.1%)
Oral Antibiotic and Mechanical Bowel Preparation N (%)	5443 (37.7%)	720 (36.5%)	2121 (36.4%)	1900 (38.2%)	663 (41.8%)	39 (69.6%)
Operative Time - Minutes (± sd)	192 (± 83)	184 (± 92)	192 (± 82)	188 (± 79)	215 (± 82)‡	171 (± 60)
Mobilization of Splenic Flexure N (%)	6835 (47.4%)	765 (38.8%)	2728 (46.8%)	2707 (54.4%)	606 (38.2%)	29 (51.8%)
Insertion of Ureteral Stents N (%)	4122 (28.6%)	585 (29.7%)	1513 (25.9%)	1677 (33.7%)	349 (22.0%)	1 (1.8%)
Rate of Conversion to Open - N (%)	xxx	xxx	1037 (9.6%)	xxx	92 (5.8%)	4 (7.1%)
Total Length of Stay - Days (± sd)	4.5 (± 4.3%)	6.6 (± 5.6)*	4.9 (± 4.0)	4.5 (± 4.3)	3.9 (± 2.6)	4.1 (± 3.1)
30-Day Readmission - N (%)	1054 (7.3%)	225 (21.4%)‡	381 (6.5%)	352 (7.1%)	94 (5.9%)	2 (3.6%)
Overall Return to OR - N (%)	532 (3.7%)	93 (4.7%)	207 (3.6%)	172 (1.2%)	59 (3.7%)	0 (0.0%)
Anastomotic Leak - N (%)	388 (2.7%)	67 (3.5%)	153 (3.4%)	138 (2.7%)	29 (1.8%)	1 (1.8%)
Leak - No Intervention N (%)	93 (24.0%)	15 (22.4%)	36 (23.5%)	37 (26.8%)	5 (17.2%)	0 (0.0%)
Leak - Percutaneous Intervention N (%)	78 (20.1%)	19 (28.4%)	33 (21.6%)	21 (15.2%)	4 (13.8%)	1 (100%)
Leak - Repeat Operation N (%)	217 (55.9%)	33 (49.2%)	84 (54.9%)	80 (57.9%)	20 (69.0%)	0 (0.0%)

* = P < 0.001 ‡ = P < 0.0001

to assess sleep before and after the intervention. During institution of the bundle we surveyed patients on an adjacent surgical ward that did not use the bundle and hence served as a control. The sleep bundle was instituted on the evening of postoperative day #1 among consecutive patients. It consisted of dayshift nurse education, a sleep package offered to all patients (sleep mask, sound machine, and ear plugs), medication for sleep (melatonin or diphenhydramine), checking telemetry batteries, ensuring sufficient intravenous fluids to last the night, providing pain medication, bathroom use prior to sleep, and closing but not latching the room door.

Results/Outcome(s): Of the pre-intervention cohort (n=51), most (76.5%) reported sleeping at least fairly well during their hospitalization and 62.7% were fairly to completely satisfied with their sleep (table 1). This was similar to the post-intervention cohort (n=26). Implementation of the sleep bundle resulted in a non-significant improvement in the domain of wakefulness after sleep (6.2 vs 5.3, p=0.11), but not in the getting to sleep (4.6 vs 4.9, p=0.65) or quality of sleep (4.7 vs. 4.1, p=0.32) domains. Patients reported similar times being awoken in both cohorts (4.6 vs. 4.9, p=0.52) and overall there was no difference in satisfaction related to sleep while in the hospital (3.5 of 5 for both groups, p=0.87).

Conclusions/Discussion: The implementation of a simple bundle focused on minimizing overnight interruptions failed to significantly impact sleep quality and satisfaction on a dedicated colorectal surgery unit. These data suggest that the patient's overall medical condition and not the interruptions of staff may be the main contributor to the quality of postoperative sleep.

MANAGING THE WOUND AFTER COLECTOMY FOR INTRAABOMINAL SEPSIS: STILL AN OPEN QUESTION?

P214

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Purpose/Background: Background: There is currently little evidence to inform the optimal abdominal closure technique following colectomy for dirty or contaminated wounds. Because of the high rate of wound infection (SSI) in these cases, the skin is frequently left open to heal by secondary intention. While minimizing the morbidity of an SSI, this technique potentially places patients at an increased risk for fascial dehiscence with exposed viscera. This study aimed to investigate the outcomes after deep layer only closure versus deep and superficial closure of contaminated wounds after open colectomy procedures.

Methods/Interventions: Methods: We used the ACS-NSQIP database to retrospectively review patients undergoing an open colectomy between 2012-2015. Patients who underwent laparoscopic procedures and those with wound class I and II procedures were excluded. There were a total of 10,125 cases, of which 8,574 (84.7%) patients had all layers of their incision closed, while 1,551 (15.3%) had only the deep layer closed. Propensity score matching for age, sex, BMI, albumin, diabetes, smoking status, and steroid use, and preoperative sepsis, with the nearest neighbor method resulted in two groups of 918 patients with equal preoperative characteristics. Comparisons between perioperative and postoperative outcomes were determined using Fisher's exact test and Student's t-test. Multivariable logistic regression was used to determine predictors of wound dehiscence using age, ASA score, steroid use, smoking, and preoperative sepsis as covariates.

Results/Outcome(s): Results: The deep layer only group experienced a higher rate of discharge to a rehabilitation or skilled nursing facility (50.7% vs 42.8%, p<0.0001). The rate of superficial surgical site infection was higher in patients who had deep and superficial layers closed (8.6% vs 1.5%, p<0.001), as was the rate of deep surgical site infection (3.2% vs 1.4%, p-value 0.018).

P213 Table 1

	Pre (N=51)	Post (N=26)	Control (N=23)
Falling asleep	4.6 ± 1.3	4.9 ± 2.3	4.9 ± 2.1
Sleep quality	4.7 ± 1.9	4.1 ± 2.6	4.3 ± 2.4
Awakening	5.3 ± 2.2	6.2 ± 2.3	5.3 ± 1.9
Slept fairly well to very well	39/51 (76.5%)	19/26 (73.1%)	13/21 (61.9%)*
Awakened >1x>1 3x/night	27/51 (52.9%)	11/26 (42.3%)	6/21 (61.9%)*
Fairly or completely satisfied with sleep	32/51 (62.7%)	16/26 (61.6%)	9/21 (42.9%)*

* missing data in 2 patients

There was no statistically significant difference in length of stay, reoperation, or readmission. On multivariable analysis, type of wound closure was not predictive of wound dehiscence.

Conclusions/Discussion: Conclusions: Deep layer only closure following colectomy in contaminated wounds is associated with decreased risk of superficial and deep surgical site infections, and is not associated with an increased rate of fascial dehiscence. However, patients with only deep layer closures were more likely to be discharged to a rehabilitation or skilled nursing facility, potentially due to increased wound care needs.

WHAT IS THE MORBIDITY AND MORTALITY FOR LAPAROSCOPIC CONVERSION TO OPEN SURGERY DURING COLORECTAL SURGERY?

P215

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Purpose/Background: We analyzed the risk of morbidity and mortality in laparoscopic (Lap) conversion for colorectal surgery across a group of subspecialist surgeons with expertise in minimally invasive techniques.

Methods/Interventions: We reviewed prospective data of all patients who underwent abdominopelvic procedures from 7/1/2007 through 12/31/2016 at a tertiary care facility. We identified procedures that were converted from Lap to open (Lap converted). Lap converted procedures were matched to Lap completed and open procedures based on elective versus urgent indications and surgeon of record. We also abstracted variables such as patient diagnosis, BMI, age, sex, ASA, and patient outcomes at 30 days using the American College of Surgeons National Surgical Quality Improvement Program defined adverse event list. We analyzed outcomes across these groups (Lap converted, Lap completed, open procedures) with χ^2 and t tests and used the Bonferroni Correction to account for multiple statistical testing.

Results/Outcome(s): From a database of 12,454 procedures, we identified 100 Lap converted procedures and matched them to 305 open procedures and 339 Lap completed procedures. In our dataset of abdominopelvic procedures, Lap techniques were attempted in 49+/-1%. We noted a higher risk of aggregate morbidity following open procedures (64+/-5%) as compared to the Lap converted cohort (49+/-10%) and the matched Lap completed procedures (38 +/-3%; $p<0.001$). Proportionately more patients in the open matched cohort had surgical site infections (20 +/- 5%) as compared to the Lap converted cohort (17+/-7%) and the Lap completed cohort (9+/-3%; $p=0.0008$). Converted cases had the longest operative time (222+/-102 min), compared to lap completed (177+/-110), and open procedures (183+/-89). There were no differences in mortality, sepsis complications, anastomotic leaks, or unplanned returns to the operating room across the three operative groups.

Conclusions/Discussion: Although aggregate morbidity of Lap converted procedures is higher than in Lap completed procedures, it remains less than in matched open procedures. Compared to Lap completed procedures, the additional morbidity of Lap converted procedures appears to be related to additional surgical site infection risk. Our data suggest that surgeons should not necessarily be influenced by additional complications associated with conversion when contemplating complex laparoscopic colorectal procedures

IMPACT OF OPERATING ROOM PERSONNEL CHANGES ON PERIOPERATIVE EVENTS.

P216

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Purpose/Background: The aim of this study is to evaluate the effect of OR personnel changes on intraoperative and postoperative complications. We hypothesized that increased personnel changes are associated with worse perioperative outcomes.

P215 Morbidity of Conversion

	Matched Open (n=301)	Proportion 95% CI	Converted (n=100)	Proportion 95% CI	Matched MIS (n=343)	Proportion 95% CI	p value
SSI	59	20% (15-25%)	17	17% (10-25%)	32	9% (6-13%)	0.0008
Sepsis	4	1% (.5-3%)	1	1% (.02-5%)	4	1% (.5-3%)	0.9
Anastomotic leak	8	3% (1-5%)	3	3% (1-8%)	10	3% (2-5%)	0.9
Mortality	10	3% (2-6%)	3	3% (1-8%)	2	.6% (.1-2%)	0.03
Aggregate Morbidity	193	64% (59-69%)	49	49% (39-59%)	130	38% (33-43%)	<.0001

Methods/Interventions: Retrospective chart review of all colorectal operations between April-August 2016 was performed. The names of scrub technicians and circulator nurses were collected in addition to their times in the operating room and the number of personnel changes. The primary scrub technician and circulating nurse were determined by percent of time in the OR. The primary outcome was postoperative complications which was measured with Clavien-Dindo scale and further classified into those with no or mild complications (Clavien Dindo Grade I) and high grade complications (Clavien Dindo Grade II-V). We also measured intraoperative adverse events. Chi square and ANOVA were used to evaluate categorical and continuous variables respectively. Two logistic regression models were constructed to adjust for the influence of personnel change and operative time. Significance defined as $p < 0.05$.

Results/Outcome(s): 83 cases were reviewed. High grade complications occurred in 25.3% of cases. Adverse intraoperative events were infrequent, with one event in each the low and high grade complications groups. On univariate analysis, we found that patients who had no complications or mild complications had fewer scrub technician changes (2.1 vs 3.1, $p=0.036$) than those with clinically relevant complications. There was no difference in the mean percentage of case time of the primary scrub technician (83.0% vs 83.1%, $p=0.993$), percentage of primary scrub technicians present at case start (80.6% vs 76.2%, $p=0.439$), or percentage present at case end (79.0% vs 71.4%, $p=0.331$). We found that patients who had no complications or mild complications had fewer circulator nurse changes relative to those with high grade complications, although this did not reach statistical significance (2.3 vs 2.9, $p=0.152$). Mean percent of case time for the primary circulator nurse was not different between the two groups (81.6% vs 79.8%, $p=0.695$), neither was the percentage of primary circulator nurses present at case start (87.1% vs 81.0%, $p=.356$), nor present at case end (79.0% vs 61.9%, $p=0.104$). When we adjusted for confounders, we found that case length was the only factor associated with severe postoperative complications.

Conclusions/Discussion: Our rate of severe complications was low. The number of scrub technician or circulator nurse changes does not appear to influence the rate of high grade postoperative complications when case length is accounted for. Efforts to minimize scrub and circulator turnover may not result in quality improvements.

WHAT ARE THE COST DRIVERS FOR THE MAJOR BOWEL BUNDLED PAYMENTS FOR CARE IMPROVEMENT INITIATIVE?

P217

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Purpose/Background: The Bundled Payments for Care Improvement (BPCI) initiative links payments for service beneficiaries during an episode of care (limited to 90 days from index surgery discharge). In this analysis, we identify drivers of costs/payments for the major bowel BPCI initiative.

Methods/Interventions: We obtained Medicare Standard Analytic Files of discharges from all hospitals participating in the major bowel bundle of the BPCI initiative from 9/1/2012 through 9/30/2014 with included Diagnostic Related Groups (DRG) of 329, 330 or 331. Next, we calculated all costs/payments for the three days prior to surgery, the index hospitalization including surgery, and the 90-day postoperative period. We then determined costs for laparoscopic (Lap) versus open procedures utilizing ICD-9 procedure codes for each of the DRGs as well as in aggregate. Last, we calculated differential impact of cost drivers on overall total episode costs.

Results/Outcome(s): In the cohort of hospitals participating in the major bowel BPCI initiative, open procedures (\$45,073) cost 1.6X more than Lap. In the lowest complexity DRG (331), open procedures were less frequently performed than Lap procedures but when performed, were associated with a 20% increase in total average episode costs. In the highest complexity DRG (329); the lap approach was still associated with lower

P216 Logistic Regression - Odds of High Grade Complications

Model	Variable	Odds Ratio	95% Confidence Interval - Low	95% Confidence Interval - High	p Value
Scrub Technician	Operating Room Time	1.366	0.978	1.909	0.068
	Number of Scrub Technician Changes	0.992	0.642	1.532	0.972
Circulator Nurse	Operating Room Time	1.463	1.064	2.012	0.019*
	Number of Circulator Nurse Changes	0.862	0.555	1.338	0.507

* Significance defined by $p < 0.05$

average cost, however open procedures were 4.8 times more likely to be performed than Lap procedures which led to a more modest 14% increase in average episode costs per patient. In the lowest complexity DRG (331), few patients were readmitted (15%), required postoperative admission to a skilled nursing facility (4%), or home health services (23%) regardless of open vs. Lap procedure. In the highest complexity DRG (329), twice as many patients were readmitted (34%), five times more required a skilled nursing facility (19%), and 37% of patients received home health services. For the lowest complexity DRG (331), performance of the procedure with open techniques was the largest total episode cost driver as utilization of post discharge services remained low. In the highest complexity DRG (329), readmission costs, skilled nursing facilities costs, and home health services costs were the greatest cost drivers after hospital services.

Conclusions/Discussion: In the lowest complexity DRG (331) open surgical techniques differentially drove costs in the major bowel BPCI. Alternatively, in the setting of higher complexity DRG (329), readmission and utilization of skilled nursing facilities and home health services drove costs to a greater extent. These results indicate that efforts to safely perform open procedures with lap techniques would be most effective in reducing costs for lower complexity DRGs whereas efforts to impact readmission and post discharge service utilization would be most impactful for the higher complexity DRGs.

SEQUENTIAL HEMORRHOID BANDING - A COST EFFECTIVENESS ANALYSIS.

P218

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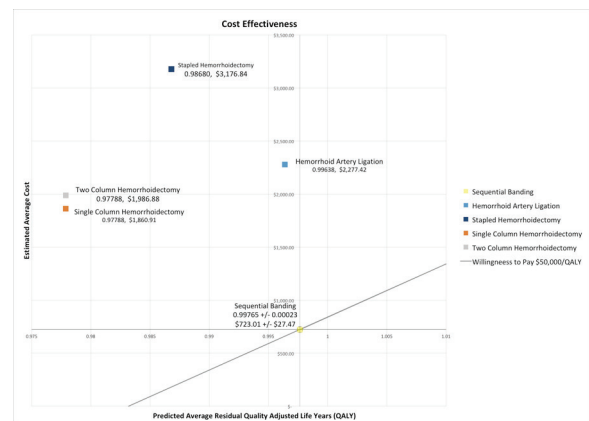
Purpose/Background: Hemorrhoid banding is an established treatment for symptomatic Internal Hemorrhoids with proven clinical efficacy, low cost, and limited post-operative discomfort. While the costs and quality of life following individual banding treatments have been investigated, little is known about the comprehensive cost and quality of life from sequential banding therapy or how these cumulative costs compare to initial surgical therapy.

Methods/Interventions: Retrospective billing review was performed assessing treatment courses for patients who presented to the clinic of six board certified colorectal surgeons between March 2012 and March 2017. Patients treated with banding were followed to identify number of repeat banding procedures and conversion to surgical therapy: Hemorrhoid Artery Ligation (HAL), Stapled Hemorrhoidopexy (PPH), or Surgical Hemorrhoidectomy (SH). Treatment costs were estimated using CMS reimbursement rates and device costs. Post-operative recovery Quality Adjusted Life Year (QALY) predictions were determined using Hubble and eTHoS post-procedural

EQ-5D survey results. TreeAge Pro and Excel were used to aggregate cumulative cost and QALY to compare with cost and QALY following initial surgical therapy.

Results/Outcome(s): Identification of 2028 hemorrhoid banding patients provided 4171 procedures for consideration. A single banding procedure was required for 56% of patients with subsequent cumulative resolution rates of 80%, 89%, and 92% after second, third, and fourth banding procedures. Surgical therapy was required for 127 (6%) patients after a varying number (1-6) of banding procedures. Average estimated cost of sequential banding therapy was \$723.01 per patient with average predicted QALY loss of -0.00235 (including patients requiring delayed surgical intervention). This compares with predicted Cost/QALY of \$2277/-0.00362 after HAL, \$3177/-0.01320 after PPH, and \$1987/-0.02212 after SH.

Conclusions/Discussion: When considering accumulated cost, sequential banding therapy compares favorably against initial surgical therapy. Specifically, costs for surgery are estimated to be 3.15 times higher for HAL, 4.39 times higher for PPH, and 2.75 times higher for SH compared with average sequential banding cost. Additionally, patients are predicted to experience a greater quality of life deficit (more discomfort) following surgery. Compared with average sequential banding therapy, we expect QALY lost to be 1.54 times higher for HAL, 5.62 times higher for PPH, and 9.45 times higher for SH. Using a willingness to pay of \$50,000/QALY, we find cost effective equivalence at 6 banding treatments for HAL, 8 banding treatments for SH, and 10 banding treatments for PPH. For patients with symptomatic Internal Hemorrhoids amenable to banding, pursuing a course of sequential banding represents the dominant cost effective strategy and provides a clear benefit both in estimated average cost and predicted quality of life when compared to primary surgical therapy.



HOW DO NSQIP REPORTED COMPLICATIONS COMPARE WITH PATIENT REPORTED POSTOPERATIVE COMPLICATIONS?

P219

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Purpose/Background: The American College of Surgeons' National Surgical Quality Improvement Program (NSQIP) reports 30-day risk-adjusted outcomes, including postoperative complications, to participating hospitals to guide quality improvement efforts. In this study, we compare NSQIP validated postoperative complications with patient reported postoperative complications.

Methods/Interventions: We evaluated all patients selected by NSQIP and who underwent colorectal surgery between 10/1/2016 through 3/30/2017 at a tertiary care hospital. At time of routine follow-up, an impartial research specialist specifically asked each patient open ended questions about patient perceived postoperative complications/adverse events, the type of complication experienced, whether the complication was expected, and if the complication resolved to their satisfaction. We then compared NSQIP reported complications with patient reported complications. Last, we performed a qualitative analysis of the patient reported data analyzing the responses verbatim while coding for common themes and verbiage.

Results/Outcome(s): We approached 35 patients while 31 gave verbal consent for participation. Of the 31 sampled patients, 39 +/- 15% (n=12) perceived no postoperative complication while 61 +/- 16% (n=19) reported a postoperative complication. In total, significantly more patients indicated a patient reported complication (61 +/- 16%; n=19) as compared to those who met NSQIP criteria for a postoperative complication 10 +/- 11% (n=3; $p < 0.0001$). The most common "patient-reported" complications were fatigue (19%), unexpected pain (13%), and wound disruption (13%). Interestingly, 41% (n=13) felt that these complications were unexpected. Furthermore, only one of the three patients with a NSQIP defined complication acknowledged it during the interview.

Conclusions/Discussion: NSQIP validated complications significantly underreported patient perceptions of complications in our cohort of colorectal surgery patients. These results demonstrate the importance of harmonizing patient reported outcomes with NSQIP definitions in order to develop more patient-centered quality improvement efforts.

A PROPENSITY SCORE-MATCHED COMPARISON OF INTRACORPOREAL AND EXTRACORPOREAL TECHNIQUES FOR ROBOTIC-ASSISTED RIGHT COLECTOMY IN AN ENHANCED RECOVERY PATHWAY.

P220

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Purpose/Background: Recent studies suggest there may be short-term outcomes advantages for the intracorporeal approach to minimally invasive right colectomy when compared to extracorporeal. With the intracorporeal approach, there is no concern about the transverse colon reaching the extraction site and no resultant mesenteric stretching and bleeding, possibly requiring incision extension and compromising gastrointestinal recovery time. The extraction site incision for the extracorporeal approach is typically the midline where incisional hernia rates are 8-10%. In contrast, the intracorporeal extraction site may be off midline and often in the Pfannenstiel location, where incisional hernia rates are <2% and the incision length is limited only by the pathology. The purpose of this study was to compare outcomes for intracorporeal and extracorporeal robotic right colectomy techniques for benign and malignant disease.

Methods/Interventions: This is a retrospective propensity score-matched comparison of intracorporeal and extracorporeal techniques for robotic right colectomy in an Enhanced Recovery Pathway between 2-12-12 and 8-31-17. Unadjusted outcomes are presented for all patient characteristics and perioperative variables. Propensity score-matching was performed using age, BMI, number of comorbidities, history of previous abdominal surgery, tobacco use, alcohol use, history of hypertension, history of diabetes, and history of CAD as predictors in the propensity score models.

Results/Outcome(s): There were 191 cases. After propensity score-matching, 110 cases were available for analysis – 55 in the intracorporeal and 55 in the extracorporeal groups. There was no significant difference in age, sex, race, BMI, number of comorbidities, ASA class, diagnosis, and stage of malignant disease between groups. There were significantly more patients with COPD in the intracorporeal group ($p=0.03$). Operative time was significantly longer in the intracorporeal group ($p < 0.001$). Outcomes significantly favorable for the intracorporeal group included: conversion to open (0% vs 7.27%, $p=0.013$), incision size (4.58cm vs 5.42cm, $p=0.007$), time to first flatus ($p < 0.001$), time to first bowel movement ($p=0.006$), and dehydration (3.64% vs 18.18%, $p=0.03$). There were no significant differences in other complications and hospital length of stay ($p=0.06$). There were more extraction site hernias in the midline location

compared to off-midline or Pfannenstiel locations (0% vs 9.26%), though this difference did not reach significance ($p=0.06$).

Conclusions/Discussion: There are several outcomes advantages in favor of the intracorporeal technique and off-midline specimen extraction sites for robotic right colectomy when compared to the extracorporeal approach for patients in an Enhanced Recovery Pathway. These data may help guide surgeons considering minimally invasive operative choices.

Table: IA vs EA Outcomes

Variable	Unadjusted		P Value
	Intracorporeal (N = 118)	Extracorporeal (N = 73)	
Incision Size (cm), Mean (SD)	4.684 (1.161)	5.258 (1.686)	0.018
Operative Time, Mean (SD)	185.276 (53.577)	138.952 (38.9)	<.001
Conversion, N (%)	0 (0%)	10 (13.7%)	<0.001
LOS, Mean (SD)	3.353 (2.619)	5.429 (10.19)	0.039
Time to First Flatus, Mean (SD)	29.698 (14.09)	42.492 (23.152)	<.001
Time to First BM, Mean (SD)	34.665 (17.147)	46.971 (28.086)	<.001
Number of Complications, Mean (SD)	0.839 (1.684)	1.699 (2.289)	0.003
Ileus, N (%)	11 (9.32%)	13 (17.81%)	0.135
Any SSI, N (%)	2 (1.69%)	5 (6.85%)	0.108
Sepsis, N (%)	2 (1.69%)	3 (4.11%)	0.372
Anastomotic Leak, N (%)	0 (0%)	6 (8.22%)	0.003
AKI, N (%)	13 (11.02%)	12 (16.44%)	0.39
Dehydration, N (%)	6 (5.08%)	11 (15.07%)	0.036
Urinary Retention, N (%)	10 (8.47%)	7 (9.59%)	0.999
UTI, N (%)	3 (2.54%)	3 (4.11%)	0.676
CHF, N (%)	2 (1.69%)	0 (0%)	0.525
Pneumonia, N (%)	2 (1.69%)	1 (1.37%)	> 0.999
DVT, N (%)	0 (0%)	1 (1.37%)	0.382
PE, N (%)	1 (0.85%)	0 (0%)	> 0.999
Death, N (%)	1 (0.85%)	0 (0%)	> 0.999
Discharged Not Home, N (%)	9 (7.63%)	8 (10.96%)	0.6
Readmission, N (%)	13 (11.02%)	9 (12.33%)	0.966
Reoperation, N (%)	1 (0.85%)	3 (4.11%)	0.157
Hernia, N (%)	2 (1.69%)	10 (13.7%)	0.001

Note: p-values for categorical outcomes from chi-square and Fisher exact tests. P-values for continuous = acute kidney infection; DVT = deep vein thrombosis; UTI = urinary tract infection.

TRANSANAL MINIMALLY INVASIVE SURGERY (TAMIS): PUSHING THE ENVELOPE WITHOUT INCREASED COMPLICATIONS.

P221

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Purpose/Background: Transanal Minimally Invasive Surgery (TAMIS) is a new surgical technique that has enabled resection of early stage rectal cancers and pre-cancerous polyps not otherwise amenable to removal by transanal excision (TAE). However, its complication profile is not well described and has never been compared to traditional transanal technique. Our aim was to compare the complication rates between TAMIS and TAE approaches.

Methods/Interventions: Patients who underwent full-thickness surgical excision of rectal lesions via TAMIS or TAE at a single institution from 2010-2017 were included. Partial-thickness excisions were excluded from analysis. Primary outcome was complication rate, including bleeding, postoperative urinary retention, abscess, incontinence, and readmission. Secondary outcomes included the quality of specimen characteristics, specifically fragmentation and rate of margin positivity.

Results/Outcome(s): Of 161 patients who underwent full-thickness excision of their rectal lesions, median age was 58yrs, 57% were male, and 65% were white. Forty-five percent (n=72) underwent TAMIS, while 55% (n=89) underwent TAE. There was no difference in baseline demographics or comorbidities between both groups, although the mean age of patients who underwent TAMIS tended to be slightly older (61 vs 57yrs; $p=0.05$). Compared to TAE, patients who underwent a TAMIS procedure were more likely to have larger tumors (2.4 vs 1.9 cm; $p=0.047$), malignant histology (64% vs 21%; $p<0.001$), pre-malignant lesions (37% vs 11%; $p=0.017$), and more proximal tumors located further distance from the anal verge (7 vs 4 cm; $p<0.001$). Despite TAMIS being used for larger, higher, and malignant tumors, the complication profile between groups was similar. There was no difference in postoperative bleeding (3% vs 1%; $p=0.587$), urinary retention (10% vs 3%; $p=0.113$), abscess formation (3% vs 0%; $p=0.198$), or incontinence (3% vs 3%; $p=1.000$). While most TAEs were outpatient procedures, patients undergoing TAMIS were more likely to stay overnight in the hospital (1 vs 0 days; $p=0.002$), although there was no difference in readmission rates between the two (8% vs 3%; $p=0.301$). TAMIS procedures were also more likely to produce a higher quality specimen, with the rate of fragmentation being only 3% compared to 26% for TAE ($p<0.001$). The margin negative rate was also higher for TAMIS (94% vs 84%; $p=0.043$).

Conclusions/Discussion: Despite resecting more difficult tumors (larger, higher, and malignant), TAMIS yielded a higher-quality specimen with no increase in complications compared to traditional TAE. TAMIS is a viable approach to safely excise rectal lesions that may not otherwise be amenable to a transanal technique via traditional TAE, and thus should be incorporated into training programs at high-volume centers.

WHEN IS THE BEST TIME FOR PROTECTIVE ILEOSTOMY REVERSAL: A SINGLE CENTER EXPERIENCE WITH EARLY VS. LATE REVERSAL.

P222

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Purpose/Background: A protective ileostomy is often used to reduce the morbidity and mortality of anastomotic leakage for patients who undergo colorectal anastomosis. However, there is no consensus for when the best time to reverse the ileostomy is. Some publications report that early reversal is safe and effective, while others report increased complications associated with early reversal. The goal of this study was to evaluate the intraoperative and postoperative outcomes between early and late reversal.

Methods/Interventions: This is a retrospective review of loop ileostomy reversals following low colorectal anastomosis performed by colorectal surgeons at a single institution. Patients included underwent either low anterior resection or distal sigmoid resection for malignant or benign disease with protective ileostomy creation and subsequent ileostomy closure. To be included, both index and reversal operation were performed at our institution. Patients who were under 18 years old, had an additional operation performed with their ileostomy reversal, or those who had an abdominal operation between their index and reversal operation were excluded.

Results/Outcome(s): Between January 2014 and October 2017, operative reports of the colorectal surgeons at our institution were reviewed. Early reversal was defined as ileostomy closure within 90 days of the index operation, and late reversal was defined as 90 days or longer. 66 consecutive loop ileostomy reversals were identified that met the inclusion criteria, of which 34 were early reversals and 32 late reversals. The average operative duration was 101 minutes (range 58-259) in the early group and 102 minutes (range 61-204) in the late group ($p=0.86$). There was no significant difference between the groups for operative blood loss ($p=0.54$), intravenous fluids ($p=0.68$), or intraoperative vasopressor use ($p=0.95$). One patient in each group required conversion to laparotomy for adhesiolysis. One patient in the late group required a laparotomy on post-op day 3 after ileostomy closure for volvulus. The length of stay for the early reversal group was 3.4 days compared to 5.1 days in the late group ($p=0.01$). There was one readmission in the early group for lower GI bleed that had a negative colonoscopy. In the late group there were 3 readmissions, 2 for superficial surgical site infections that had bedside incision and drainage, and 1 for ileus that resolved with conservative management.

Conclusions/Discussion: There is no consensus on the ideal time to reverse a protective ileostomy. Our data supports that ileostomy reversal before 90 days is safe and effective with no increase in operative duration or risk of conversion to laparotomy. Length of stay was significantly less for the early reversal group compared to the late reversal group. Surgeons should consider early ileostomy reversal when deciding when to close a protective ileostomy placed for a low colorectal anastomosis.

IMPACT OF FRAILTY ON OUTCOMES AFTER REVERSAL OF HARTMANN'S PROCEDURE.

P223

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Purpose/Background: Frailty is a patient-specific measure of decreased physiologic reserve and increased vulnerability to the stress of surgery. Association between

frailty and worsened postoperative outcomes have been demonstrated in the context of other surgical procedures; however, impact of frailty on outcomes following Hartmann's reversals is unclear.

Methods/Interventions: The National Surgical Quality Improvement Program (NSQIP) database was queried for patients undergoing Hartmann's reversal between 2005-2016. A modified frailty index (mFI) score summed from 11 clinical variables was used to quantify frailty into 4 groups. Complications were classified as minor (I-II) and major (III-IV) based on the Clavien-Dindo Criteria. Univariate and multivariate (MVA) logistic regression analyses evaluated primary outcome of postoperative morbidity and multiple secondary outcomes.

Results/Outcome(s): 6,908 patients undergoing Hartmann's reversal were identified with mean age of 57.7 ± 15 years and BMI 28 ± 6.5 kg/m². 82.6% ($n=5723$) of cases utilized an open approach. Major complications occurred in 4.7% of patients, most commonly sepsis (5.4%) and organ space infection (4.6%). Mortality of 0.8% was observed. Patients were grouped into cohorts based on their mFI score (45.5% mFI=0, 32.4% mFI=1, 15.3% mFI=2, 6.7% mFI ≥ 3). On univariate analysis, patients with an mFI ≥ 3 had increased risk of major complications (mFI=0: 2.3%, mFI=1: 3.8%, mFI=2: 6.3%, mFI ≥ 3 : 11.2%, $p<0.0001$) After adjusting for confounding variables, a score of mFI ≥ 3 was independently associated with increased rates of overall complications (OR 1.9; 95%CI 1.521-2.441), major complications (OR 2.4; 95%CI 1.587-3.606) and need for reoperation (OR 1.7; 95%CI 1.180-2.583). Further analysis of secondary outcomes demonstrated an association between mFI ≥ 3 and organ space infection (OR 2.2; 95%CI 1.390-3.605), sepsis (OR 1.9; 95%CI 1.207-2.983) and septic shock (OR 2.5; 95%CI 1.238-5.008). On univariate analysis, patients with increased frailty had higher rates of 30-day mortality (mFI=0: 0.3%, mFI=1 0.7%, mFI=2: 1.6%, mFI ≥ 3 : 2.4%, $p<0.0001$); however, no association was elucidated on multivariate analysis (OR 1.1; 95%CI 0.439-2.855).

Conclusions/Discussion: In this analysis of patients selected for restoration of intestinal continuity after a Hartmann's procedure, an increase in patient frailty index score ≥ 3 was associated with a higher risk of postoperative complications and reoperation. Similarly, "healthier" mFI scores of 1 and 2 were also associated with increased risk of overall complications, organ space infection and sepsis. In the setting of higher-risk elective surgical procedures, use of an objective measure may aid surgeons in patient selection for Hartmann's reversal. Further research is needed to validate the use of a frailty scoring system in all patients after Hartmann's procedure to delineate which patient populations are most likely to

Table 1. Impact of Modified Frailty Index Score (mFI) on Postoperative Outcomes*

Outcomes	mFI =1		mFI =2		mFI ≥3		p-value
	OR	95%CI	OR	95%CI	OR	95%CI	
Overall Complications	1.2	1.077-1.427	1.6	1.343-1.922	1.9	1.521-2.441	<0.0001
Superficial SSI	1.2	0.965-1.419	1.4	1.128-1.851	1.5	1.095-2.133	0.01
Organ/Space SSI	1.4	1.001-1.828	1.8	1.234-2.609	2.2	1.390-3.605	0.0028
Sepsis	1.5	1.124-1.951	1.8	1.282-2.553	1.9	1.207-2.983	0.002
Septic Shock	1.7	0.954-2.916	2.1	1.132-3.888	2.5	1.238-5.008	0.05
Clavien-Dindo ≥3	1.2	0.876-1.680	1.6	1.077-2.242	2.4	1.587-3.606	0.0002
Reoperation	0.9	0.699-1.203	1.2	0.878-1.691	1.7	1.180-2.583	0.006

*compared to baseline mFI=0

ADHERENCE TO A MODIFIED ASCRS RECTAL CANCER MANAGEMENT CHECKLIST AND ITS ASSOCIATION TO SHORT-TERM SURGERY AND CANCER-RELATED OUTCOMES.

P224

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Purpose/Background: Realizing the complexities of rectal cancer management in the Philippines, with both general and colorectal surgeons managing patients, together with the myriad of combinations for adjunct treatment, the use of checklists can improve outcomes by allowing clinicians to constantly adhere to best and evidence-based practices. This study aims to retrospectively document the peri-operative management of adult non-metastatic rectal cancer patients in a tertiary hospital in the Philippines using a modified ASCRS rectal cancer management checklist, and to determine the level of adherence and association of adherence with surgery-related and 3-year cancer-related outcomes. This could become a basis in revising and implementing it for other centers to use.

Methods/Interventions: This is a descriptive retrospective study of the management and outcomes of non-metastatic, biopsy-proven, rectal cancer patients, 19 years old and above, who underwent surgery in a tertiary private institution in the Philippines from 2011-2013. The medical records of patients who fulfilled the inclusion and exclusion criteria were used to complete the modified ASCRS checklist and the data collection forms. For the patient follow up, out-patient and subsequent in-patient records were retrieved to look for events such as re-admissions and/or re-operations related to the rectal cancer surgery. Thirty-day morbidity and mortality rates, 30-day re-admission rates and 3-year recurrence and survival rates were determined. The association between outcomes and adherence to the modified ASCRS checklist were reported. *Modified ASCRS Rectal Cancer Checklist* The ASCRS rectal cancer checklist was revised to adapt to the limitation of resources in the country. While the original checklist contained 25 items, the revised checklist consisted of 28 items. The checklist was presented to and approved by a group of colorectal surgeons who manage rectal cancer cases regularly.

Results/Outcome(s): Fifty-nine patients were included with mean age of 59 years (SD ± 12.9). Seventy percent were males and most were diagnosed with regional disease

(47.5%). The mean over-all adherence rate was 69.5% (SD ± 11.8), highest on post-operative elements (84.9%). Only 42.4% had an over-all adherence of at least 75% of the items but majority (96.6%) were at least 50% compliant. Overall non-adherence was significantly related to the occurrence of positive circumferential resection margin (CRM). Less adherence to pre-operative elements was significantly related to in-hospital morbidity while greater adherence to post-operative elements was significantly associated with increased 3-year survival rates.

Conclusions/Discussion: This study showed the applicability of a modified checklist in managing rectal cancer patients in the Philippines. Increased adherence showed association to better surgery-related and short-term cancer-related outcomes.

Table 1. Association of non-adherence to peri-operative elements and outcomes among rectal cancer patients who underwent surgery from January 2011 - December 2013

Outcomes	Pre-Operative Non-Adherence ^a			Intra-Op Non-Adherence			Post-Op Non-Adherence		
	OR	95% CI	p value	OR	95% CI	p value	OR	95% CI	p value
In-hospital morbidity	8.18	0.92 to 72.91	0.0596*	0.19	0.02 to 1.73	0.1420	0.9	0.18 to 4.46	0.9005
In-hospital mortality	-	-	-	0.9982	-	-	0.9976	-	-
30-day re-admission	-	-	-	0.9982	2.87	0.25 to 33.55	0.4007	-	-
30-day re-operation	0.54	0.05 to 6.27	0.6199	-	-	-	0.9979	0.32	0.03 to 3.79
30-day morbidity	0.25	0.03 to 2.38	0.2283	2.18	0.34 to 14.15	0.4135	0.15	0.02 to 1.41	0.0964
30-day mortality	-	-	-	-	-	-	-	-	-
Positive CRM	2.42	0.41 to 14.35	0.3316	3.05	0.51 to 18.15	0.221	3.83	0.42 to 35.11	0.2344
Adequate LN	0.87	0.28 to 2.74	0.8115	1.32	0.41 to 4.28	0.6445	-	-	0.9975
Incomplete TME Specimen	-	-	-	0.9976	0.73	0.04 to 12.21	0.8249	-	-
3-year recurrence	2.35	0.64 to 8.58	0.1970	0.44	0.10 to 1.87	0.2663	1.52	0.42 to 5.51	0.5274
3-year overall survival	1.03	0.27 to 3.94	0.9672	3.13	0.60 to 16.46	0.1778	0.19	0.04 to 0.998	0.0494*

* significant

WEEKEND DISCHARGE DOES NOT INCREASE RISK OF READMISSION AFTER ILEOSTOMY.

P225

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Purpose/Background: Readmission after creation of an ileostomy is common, with most instances related to dehydration or other stoma related complications. This high readmission rate contributes to overall healthcare costs and in the current “pay for performance” climate of healthcare today provides an opportunity to streamline care. Many factors contributing to readmission rates after ileostomy have been described including age and severity of medical comorbidities to name a few. Our prediction is that an additional factor which contributes to new ileostomy readmission rate is the timing of discharge, specifically the day of the week on which discharge occurs. Our belief is that patients who are discharged on a the weekend have a greater change of readmission due to a number of reasons including fewer training sessions with the ostomy nurses, discharges being performed by cross covering providers who are not as familiar with the individual patient and more limited home nursing availability.

Methods/Interventions: All patients who underwent new ileostomy placement at Washington Hospital Center from 10/2013 to 10/2017 were identified via case booking records. Those who underwent emergency surgery or who had a major postoperative complication (ie. pulmonary

embolism, anastomotic leak, etc) were excluded. Data captured included basic demographics as well as the reason for ileostomy, ASA score, length of stay, the number of stoma teaching sessions, the day of the week of discharge, readmissions within 30 days and mortality. 126 patients met inclusion criteria. Due to small sample size, all variables were assumed to have a nonparametric distribution. Categorical variables were compared using Fisher's Exact Test. Quantitative and Ordinal variables were compared using Mann-Whitney U Test. Bonferroni corrections were applied for multiple comparisons.

Results/Outcome(s): Of patients who met inclusion criteria 20% were readmitted within 30 days and 46% of these admissions were due to a stoma related complication. The rate of readmission after a weekend discharge was 21%, 38% of which were due to stoma related complications. On average patients underwent 2.9 stoma teaching sessions vs 2.7 teaching sessions for those discharged on the weekend. Patients who were readmitted after a weekend discharge averaged 2.9 stoma teaching sessions.

Conclusions/Discussion: Though this study is underpowered or experience demonstrates that weekend discharge does not necessarily confer a higher risk of readmission after ileostomy. Patients who required a greater involvement of the stoma consult service were at higher risk for readmission. Patients with a history of a prior ileostomy were actually at higher risk of readmission though this is likely reflective of the presence of additional underlying comorbidities. Additional factors which were correlated with increased risk of readmission after a weekend discharge included open procedures and presence of inflammatory bowel disease.

CORRELATION BETWEEN PROCEDURAL AND CLINICAL SUCCESS RATES IN COLONIC STENTING IN A COMMUNITY COLORECTAL SURGERY PRACTICE.

P226

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Purpose/Background: Enteral stenting has emerged as an acceptable bridge to resection in colonic obstruction. However, although procedural success rates have been as high as 90-100%, clinical success rates in ostomy prevention are around 60-80% amongst different studies. In view of this background, we designed our study to analyze patients who underwent colonic stenting for obstruction from different pathologies to evaluate whether clinical success was achieved or not.

Methods/Interventions: We conducted a retrospective chart review of 60 patients that underwent successful placement of colonic stents between February 2010 and June 2017 by our practice. Our primary objective was to analyze whether clinical success was achieved in these cases. This included relief of obstruction and prevention of ostomy, if indicated, as a bridge to surgery. Secondary objectives included any immediate or delayed complications and overall outcomes.

Results/Outcome(s): We had a 96% procedural success rate over the mentioned time period. The clinical success rate was 90%, with 6 patients failing the procedure and eventually requiring an ostomy. We had 13 procedure related complications (21%) with restenosis and perforation being the most common. The majority of our patients (68.3%) had cancer as their diagnosis and were successfully managed without needing an ostomy. There was a higher rate of complications in stents placed for diverticular disease versus malignant obstruction.

Conclusions/Discussion: Colonic stents are associated with a lower morbidity and mortality as compared to emergency surgery for large bowel obstruction with encouraging clinical and procedural success rates. Our patient analysis

P225 Results

	All Patients	Readmission After Weekday Discharge	Readmission After Weekend Discharge
Average Age	54	58	45.8
% Male	56%	61%	50%
Average ASA Score	2.5	2.6	2.5
% with Benign Disease	44%	44%	63%
% of Open Ileostomy	41%	56%	50%
Average Length of Stay	6.2	9.8	6.1
Average Number of Stoma Teaching Sessions	2.9	3.6	2.9
% of Patients with Prior Ileostomy	12%	11%	25%
% Readmitted	20%	20%	21%
% of Readmissions Related to Stoma	46%	50%	38%

shows excellent ostomy prevention rates with an acceptable complication rate that is at the national average. Hence, we are utilizing the use of self-expanding metallic stents in our practice. We are now performing further analysis to compare the effect on morbidity and mortality of patients undergoing the eventual index procedure after stent placement.

TWO-YEAR IMPACT OF A COMMUNITY COLORECTAL ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL.

P227

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Purpose/Background: Enhanced Recovery After Surgery (ERAS) is a multimodal perioperative care pathway designed to optimize patient recovery following

major surgery, which includes preoperative, perioperative, and postoperative changes. While studies on the effectiveness of colorectal ERAS protocols are numerous, little evidence exists regarding their implementation in community hospital settings. We hypothesize this community ERAS protocol would improve patient outcomes and produce effects comparable to those previously achieved in academic centres.

Methods/Interventions: This retrospective cohort study reviewed records of consecutive patients undergoing elective colorectal surgery in a community hospital in Quebec from 2013 to 2017. Data was collected for all cases occurring in the two years preceding and two years following implementation of the colorectal ERAS protocol. Cases were grouped into pre-ERAS and post-ERAS cohorts. This study was approved by the institutional review board.

Results/Outcome(s): A total of 317 patients were included in this study: 165 in the pre-ERAS group and 152 in the post-ERAS group. The mean age at time of surgery

P227 Patient characteristics and outcomes pre- & post- implementation of a community colorectal surgery ERAS pathway

Patient characteristics				
Characteristic	All cases	Pre-ERAS	Post-ERAS	p value
N (%)	317 (100)	165 (52.1)	152 (47.9)	N/A
Female, N (%)	87 (49.4)	79 (47.9)	72 (47.4)	0.93
Age, mean (years)	69.2	70.1	68.3	0.18
Preoperative comorbidities				
Cardiovascular disease	197 (62.1)	116 (70.3)	81 (53.3)	0.01
Metabolic disease	120 (37.9)	67 (40.6)	53 (34.9)	0.29
Respiratory disease	62 (19.6)	32 (19.4)	30 (19.7)	0.94
Renal disease	30 (9.5)	22 (13.3)	8 (5.3)	0.01
Immunosuppression	12 (3.8)	7 (4.2)	5 (3.3)	0.66
Active tobacco smoking	55 (17.4)	25 (15.2)	30 (19.7)	0.38
Other	3 (0.9)	1 (0.6)	2 (1.3)	0.51
Postoperative outcomes				
Outcome	All cases	Pre-ERAS	Post-ERAS	p value
Total postoperative hospital stay, mean (days)	8.9	9.1	8.7	0.32
30-day mortality, N (%)	3 (0.9)	2 (1.2)	1 (0.7)	0.61
30-day readmission, N (%)	9 (2.8)	5 (3.0)	4 (2.6)	0.83
30-day morbidity, N (%)				
Any complication	123 (38.8)	73 (44.2)	50 (32.9)	0.04
Cardiac complication	20 (6.3)	14 (8.5)	6 (3.9)	0.10
Respiratory complication	15 (4.7)	7 (4.2)	8 (5.3)	0.67
Urinary complication	27 (8.5)	16 (9.7)	11 (7.2)	0.43
Other medical complication	40 (12.6)	24 (14.5)	16 (10.5)	0.28
Anastomotic leak	15 (4.7)	7 (4.2)	8 (5.3)	0.67
SSI	25 (7.9)	12 (7.3)	13 (8.6)	0.67
Persistent Ileus	36 (11.4)	20 (12.1)	16 (10.5)	0.65
Hemorrhage	20 (6.3)	12 (7.3)	8 (5.3)	0.46
Other surgical complication	9 (2.8)	7 (4.2)	2 (1.3)	0.12

was 69.2 years and 47.6% (N=151) were female. There was no significant difference in patient demographics between groups. The pre-ERAS cohort had higher rates of cardiovascular ($p<0.05$) and renal ($p<0.05$) comorbidities, however no significant difference was found in rates of other comorbid conditions. The most common operative indication was neoplastic resection (81.1%, N=257) and there were no significant differences in operative indication between the pre- and post-ERAS cohorts. There were also no differences in the operative procedures performed between cohorts. Overall, postoperative 30-day morbidity was 38.8% for both groups combined, with 68% of these representing Clavien-Dindo Class I or II complications. There was a significantly lower 30-day postoperative morbidity in the post-ERAS cohort compared to the pre-ERAS cohort (32.9% vs. 44.2%, RR 0.74, 95% CI 0.56-0.99, $p=0.04$). There was also a significantly lower rate of Clavien Dindo Class III complications in the post-ERAS cohort (9.6% of complications vs. 2.0%, $p=0.04$). The overall 30-day mortality was 0.9% with no difference between groups. There was similarly no significant difference between groups for primary postoperative hospital stay (mean 8.6 days for all-comers), 30-day reoperation rate (7.3% for all-comers), and 30-day readmission rate (2.8% for all-comers).

Conclusions/Discussion: The implementation of a colorectal ERAS protocol in a community setting was associated with decreased rates of 30-day postoperative morbidity within 2 years of implementation. No benefit was demonstrated in length of stay. The study was limited by its retrospective nature and lack of data on compliance with the pathway. These findings help support the generalizability of ERAS protocols, particularly for their use in a community setting.

CREATION AND VALIDATION OF A UNIQUE SIMPLIFIED FRAILTY SCORE TO PREDICT MORBIDITY AFTER RADICAL PELVIC SURGERY.

P228

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Purpose/Background: Preoperative frailty is considered a predictor of adverse outcomes in post-operative patients. Patients undergoing radical pelvic surgery, specifically proctectomy and radical cystectomy, experience increased incidence of complications and mortality compared to other general surgery and urology procedures. Using NSQIP data, a new frailty score is created and investigated regarding its ability to predict the incidence and quantity of Clavien-Dindo grade IV complications, return to the operating room (OR), and 30 day mortality, following proctectomy and cystectomy.

Methods/Interventions: The 2008-2012 ACS NSQIP databases were retrospectively reviewed to identify proctectomy and radical cystectomy patients using CPT codes. Multivariate logistic regression analysis was performed to produce a full and complete frailty score. The full score consisted of age ≥ 50 , WBC ≥ 6000 , dependent functional status, CHF, COPD or pneumonia, hypertension, and ASA >3 . The simple score consisted of age ≥ 50 , dependent functional status, presence of CHF, and ASA >3 . This model was created by identifying the top 4 individual predictors from the full score by AUROC. One point was assigned per variable present. The scores were used to identify frail patients and then investigate the incidence of Clavien-Dindo grade IV complications following proctectomy and radical cystectomy, as well as the incidence of patients returning to the OR, and 30 day mortality. AUROC comparison was performed of the two scores. The simplified four variable score was internally validated using bootstrapping with random resampling and 1000 replications, and was then used to predict complications using three comparative multivariable logistic regression techniques. The score was then used in fully adjusted analysis to predict outcomes.

Results/Outcome(s): The simplified four variable score was found to be non-inferior to the full score on ROC (AUC 0.605 vs 0.619, test of equality $p=0.166$). On multivariable regression analysis the validated simplified frailty score was demonstrated to predict both the occurrence of 30-day Clavien-Dindo grade IV complications ($p<0.001$), and the complication count ($p<0.001$). The simplified score was not predictive of returning to the OR after surgery, or of 30-day mortality.

Conclusions/Discussion: Age of 50 years and older, dependent functional status, CHF and ASA > 3 are objective criteria readily gleaned from the medical records, which can be employed as a concise scoring tool to identify frail patients undergoing proctectomy and radical cystectomy, and predict the incidence of Clavien-Dindo grade IV complications.

Table 3. Multivariable regression for 30-day post-operative outcomes by simplified frailty index score*

Predictors present	Complications			Complication Count			Return to Operating Room			Mortality			
	OR	95%CI	Pvalue	OR	95%CI	Pvalue	OR	95%CI	Pvalue	OR	95%CI	Pvalue	
♀	0.73	2.63 - 5.29	<0.001	3.96	2.82 - 5.56	<0.001	1.18	0.97 - 1.44	0.092	1.08	0.71 - 1.63	0.715	
IIIV		11.82 - 17.79	<0.001		11.80 - 17.23	<0.001		0.83	0.53 - 1.30	0.418		1.16 - 0.51 - 2.66	0.722

*OR, odds ratio; CI, confidence interval; IRR, incidence rate ratio.

RISK FACTORS OF POSTOPERATIVE COMPLICATION AFTER LAPAROSCOPIC PROCTECTOMY IN ELDERLY RECTAL CANCER PATIENTS.

P229

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Purpose/Background: In this aging society, the number of elderly rectal cancer patients has been increasing. However, the feasibility of laparoscopic surgery for elderly

rectal cancer patients is still unclear as they are usually excluded from clinical trials. The aim of this study is to clarify short-term outcomes and risk factors of postoperative complication following laparoscopic surgery in elderly rectal cancer patients.

Methods/Interventions: Seventy-seven rectal cancer patients aged 80 years or older who underwent laparoscopic proctectomy between 2007 and 2015 at Saitama Medical University, International Medical Center were enrolled in this study. The risk factors of postoperative complication with grade II or more by Clavien-Dindo classification were retrospectively analyzed.

Results/Outcome(s): Of all 77 patients, tumor was located above and below the peritoneal reflection in 49 and 28 patients, respectively. The conversion rate of laparotomy was 6.5 %. The overall incidence of postoperative complication with grade II or more was 27.3 % and the re-operation rate was 9.1 %. As major complications, anastomotic leakage, ileus and pneumonia occurred in 7, 7 and 3 patients, respectively. The mortality rate was 2.6 % and the median postoperative hospital stay was 10 (6 – 199) days. The univariate analysis revealed that performance status ($p=0.044$), Glasgow prognostic score (GPS) ($p=0.009$), serum albumin level ($p=0.017$) and tumor location ($p=0.032$) were significantly related to the incidence of postoperative complication. Furthermore, poor GPS (OR=3.560, $p=0.046$) and lower tumor location (OR=5.016, $p=0.013$) were selected as the independent risk factors by multivariate analysis.

Conclusions/Discussion: Rectal cancer patients aged 80 years or older with lower tumor location and poor preoperative general condition may be the potential high-risk group for laparoscopic proctectomy.

TRANSPERINEAL RECTOCELE REPAIR USING MINIATURE MESH.

P230

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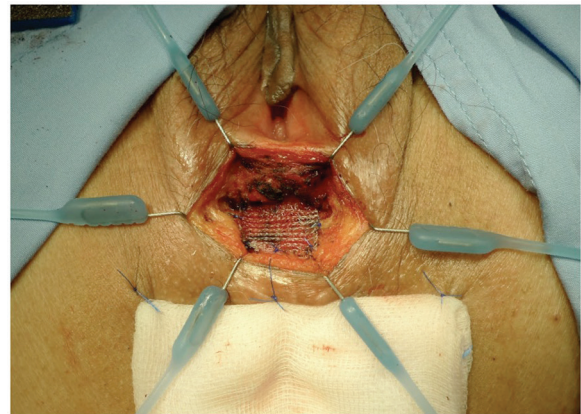
Purpose/Background: This study was designed to establish the safety and efficacy of transperineal mesh repair in patients with obstructed defecation caused by rectocele.

Methods/Interventions: Site-specific rectocele repair with small prolene mesh (2 sq.cm) was performed using transperineal approach. Patients with pelvic floor descend or patients with previous rectocele repair were excluded from the study. The functional outcomes were evaluated using Watson's Score Criteria.

Results/Outcome(s): There were 11 symptomatic rectocele women included in this study. Symptom of prolong straining, incomplete evacuation, and digitation were improved significantly. Preoperative and postoperative score were 6.55 ± 2.73 and 2.27 ± 1.42 respectively ($p=0.003$). Ten of eleven patients (90.9%) rated

their global functional outcome as satisfied or very satisfied postoperatively. Mesh-related complications (Mesh erosion, mesh infection, and perineal pain) were not found. Dyspareunia was not reported in sexually active patients. Mean follow up time was 2 years.

Conclusions/Discussion: Transperineal rectocele repair using miniature mesh is effective and safe. The technique is straightforward and reproducible. Patient selection is of paramount importance.



PROPIVERINE HYDROCHLORIDE AS A TREATMENT FOR FECAL INCONTINENCE.

P231

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Purpose/Background: Propiverine hydrochloride has been used for the treatment of urinary incontinence due to bladder over-activity. The aim of this study was to evaluate the therapeutic value of propiverine hydrochloride for fecal incontinence.

Methods/Interventions: A prospective open study was conducted at Takano hospital. Patients (n=24) with fecal incontinence and urinary incontinence as comorbidity underwent oral administration of propiverine hydrochloride at a dose of 10 – 20 mg per day. The primary endpoint was a reduction in the frequency of fecal incontinence per week. An evaluation criteria of $\geq 50\%$ reduction in frequency was determined effective. The percentage of the patients who could achieve the $\geq 50\%$ effective criteria (responders) was also calculated. As secondary endpoints, we evaluated the variation in the Fecal Incontinence Severity Index (FISI), Cleveland Clinic Florida Fecal Incontinence Score (Wexner Score), and Fecal Incontinence Quality of Life Scale (JFIQL) between the pre-treatment status and the post-treatment status.

Results/Outcome(s): The frequency of fecal incontinence per week was reduced to 6.0 ± 8.2 (0.25 – 30) at baseline and to 1.6 ± 2.1 (0 – 7) at the post therapeutic state ($p=0.009$). A reduction of $\geq 50\%$ was seen in 14 patients (58.3%). A FISI score was obtained from 23 patients,

and the number and the percentage of the patients in each post treatment status was the following (reduction: 14(58.3%); no change: 1(4%); increase: 7(29.2%)). And also Wexner score was obtained 24 patients (reduction: 19(76%); no change: 3(12.5%); increase: 2(8.3%)). The treatment provided a significant ($p=0.003$) reduction in FISI: 24.1 ± 10.2 (8 – 49) at baseline and 1.6 ± 2.1 (0 – 7) at the post treatment state. The Wexner score at baseline was 11.6 ± 3.5 (3 – 17) and at the post treatment state it was 7.4 ± 4.2 (0 – 13) indicating that there was also a significant ($p<0.0001$) reduction in fecal incontinence. Twelve patients (50%) answered questionnaire of JFIQL. The mean scores of following items were calculated: coping / behavior was 2.5 ± 0.7 (1.4 – 4) at baseline and 2.7 ± 0.8 (1.1 – 4) at the post treatment state ($p=0.01$); depression / self-perception was 2.8 ± 0.8 (1.3 – 3.9) at baseline and 3.1 ± 0.9 (1.7 – 4.5) at the post treatment state ($p=0.02$); embarrassment was 2.1 ± 0.7 (1 – 3.5) at baseline and 2.6 ± 0.8 (1.3 – 4) at the post treatment state ($p=0.04$); and the generic score was 2.5 ± 0.1 (1.5 – 3.4) at baseline and 2.8 ± 0.7 (1.5 – 3.8) at the post treatment state ($p=0.004$). All of the items significantly improved after the treatment.

Conclusions/Discussion: Propiverine hydrochloride is effective for patients with fecal incontinence and urinary incontinence. This study introduces a further therapeutic option in the treatment of fecal incontinence.

STAPLED MUSCOSECTOMY IMPROVES OUTCOMES AND PROVIDES LONG TERM BENEFITS FOR SYMPTOMATIC RECTAL MUCOSAL PROLAPSE.

P232

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Purpose/Background: Rectal mucosal prolapse is a clinically challenging condition that describes the descent of the rectal mucosa through the anus. Currently the literature surrounding the treatment of rectal mucosal prolapse offers little in regards to diagnostic pathways and potential treatment algorithms. Stapled mucosectomy appears to be a promising treatment option for rectal mucosal prolapse. The aim of this prospective study was to evaluate the long term functional outcomes of stapled mucosectomy on symptomatic (excluding obstructed defaecation) rectal mucosal prolapse.

Methods/Interventions: 33 participants (16 male, Median age 62.5 (SEM 2.25)) underwent a stapled mucosectomy procedure for rectal mucosal prolapse. Indications included passive faecal incontinence, bleeding, mucus and pain. Wexner incontinence and patient satisfaction scores, were assessed and proctoscopy, colonoscopy, anal manometry and physiology studies were performed before and after the procedure

Results/Outcome(s): No immediate or late complications occurred. Resolution of bleeding, pain and mucus occurred in all patients with those symptoms. A 78% (10/14) complete response rate was observed in subjects with faecal incontinence. There were co-existing pudendal nerve neuropathies (57.10%), internal (21.40%) and external (35.70%) anal sphincter defects. Of those with continuing incontinence, mean resting pressures were significantly less in those with residual passive soiling (50.233 (SEM 5.45) vs 90.06 (SEM 9.13); ($p<0.014$). Resolution of symptoms was achieved with targeted biofeedback therapy. There was one progression to full thickness prolapse. The mean follow-up was five years

Conclusions/Discussion: Stapled mucosectomy for symptomatic rectal prolapse improves long term functional outcomes with resolution of bleeding, pain and mucus secretion. Passive faecal incontinence improved in most cases unless anal resting pressures were very low whereupon subsequent management of other co-existing causes is effective

MANAGEMENT OF 'OBSTRUCTED DEFECATION SYNDROME' IN A DEVELOPING COUNTRY – OUTCOME OF 'STAPLED TRANSANAL RECTAL RESECTION' WITHOUT PREOPERATIVE MR DEFECOGRAM.

P233

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Purpose/Background: Obstructed Defecation Syndrome (ODS) is one of the commonest constipation related disorder worldwide, especially in multiparous women. Initially treated conservatively. Any co-existing anatomic abnormality confirmed by 'Magnetic Resonance (MR) defecogram', may require a surgical procedure like stapled transanal rectal resection (STARR). In Bangladesh, ODS is common in the large number of multiparous women. Moreover, expensive investigations like MR defecogram are neither available nor affordable. So, we have performed STARR, solely on the basis of specific clinical features. We call them the '**Clinical Indicators of Surgery**'. Our study was designed to determine the efficacy of STARR on patients selected entirely on the basis of clinical features.

Methods/Interventions: From January 2013 to January 2017, 73 patients (age: 46 ± 13 years, Female: 59, Male: 14), from multiple government & private institutions of Dhaka, were recruited for this **interventional study**. This was a non-randomized, open label, single group assigned intervention, whose primary purpose was treatment. Selection criterion was the **Clinical indicators of surgery**. The **primary outcome measure** was symptomatic improvement after STARR, objectively quantified by **Cleveland**

Clinic Constipations(CCC) Scoring System. Secondary outcome measure was the practical utility of **Clinical Indicators of Surgery**, used instead of MR defecogram, as the selection criteria for STARR. Patients were followed up from enrollment upto 6 months postoperatively.

Results/Outcome(s): In this multicentre trial, 34(47%) patients had rectocele, 14(19%)patients had rectal intussusception & 25(34%)patients had both. All patients had constipation according to **CCC Scoring System(>15)**. Mean total score, at baseline was 19.7 ± 2.2 ; following conservative treatment was 18.3 ± 1.5 ($p > 0.05$) & 6 months postoperatively was 9.1 ± 1.4 ($p < 0.05$) (Table 3). 51(70%)patients were classified as responders. No improvement was seen in 7(10%)patients. Postoperatively, significant ($p < 0.05$) subjective symptomatic improvement was seen in patients with history of digital assistance (2.0 vs. 0.15), multiple unsuccessful attempts (3.4 vs. 1.1) & painful evacuation (2.9 vs. 1.0). Commonest intraoperative & postoperative complication was 'staple line bleeding' 80%(58) & 'defecatory urgency' 60%(44), respectively. After 6-month, 24(33%)patients judged their final outcome as 'excellent', 27(37%) as 'good', 15(20%) as 'moderate', with only 7(10%)patients as 'poor/no improvement'.

Conclusions/Discussion: Limitations: Short follow up period & selection bias. Without MR defecogram, pre- & postoperative anatomical documentation was not possible. **Conclusion:** Careful patient selection, according to a specifically defined clinical criterion as an alternative to MR defecogram, combined with a well trained, experienced colorectal surgeon performing the surgery, will result in satisfactory surgical outcome in patients with ODS.

MEN AND WOMEN WITH FECAL INCONTINENCE EXHIBIT DIFFERENT PHYSIOLOGIC RELATIONSHIPS THAN NORMAL INDIVIDUALS: A THREE-DIMENSIONAL HIGH RESOLUTION ANORECTAL MANOMETRY STUDY.

P234

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Purpose/Background: Fecal incontinence (FI) affects approximately 8% of the US adult population and adversely impacts quality of life. Three-dimensional high resolution anorectal manometry (3D HRAM) is replacing traditional water perfusion techniques in the physiologic evaluation of patients with defecatory disorders. This transition is due to both the increased density of microtransducers on the probe and the ability to reconstruct data to model 3D functional anatomy. New normal values for men and women for 3D HRAM have been published. Normal men have higher maximum (max) squeeze pressures as well as residual anal and intrarectal pressures with simulated defecation compared to women. Women exhibit longer sustained squeeze duration compared to men. The relationship between 3D HRAM measurements of men and women with FI has not been determined. The purpose of this study was to delineate differences in physiologic measurements between men and women with FI using 3D HRAM.

Methods/Interventions: A retrospective review of a prospectively maintained anorectal physiology database was performed. Patients with FI were included in the

P233 Presenting symptoms according to Cleveland Clinic Constipations Scoring System of patients at initial presentation, after medical therapy & 6 months after STARR.

Questions	Score	Score	Score
	At initial presentation (Mean + SD)	After medical therapy (Mean + SD)	After STARR (Mean + SD)
Frequency of bowel movements	0.0 ± 0.0	0.0 ± 0.0 ($p > 0.05$)	0.0 ± 0.0 ($p > 0.05$)
Difficulty: Painful evacuation effort	2.9 ± 0.5	2.5 ± 0.5 ($p > 0.05$)	1.0 ± 0.1 ($p < 0.05$)
Completeness: Feeling of incomplete evacuation	3.8 ± 0.2	3.7 ± 0.4 ($p > 0.05$)	1.4 ± 0.2 ($p < 0.05$)
Pain: Abdominal pain	2.1 ± 0.5	1.5 ± 0.3 ($p > 0.05$)	1.8 ± 0.3 ($p > 0.05$)
Time: Minutes in lavatory per attempt	3.2 ± 0.3	3.1 ± 0.3 ($p > 0.05$)	1.3 ± 0.2 ($p < 0.05$)
Assistance: Type of assistance	2.0 ± 0.0	2.0 ± 0.0 ($p > 0.05$)	0.15 ± 0.0 ($p < 0.05$)
Failure: Unsuccessful attempts for evacuation per 24 hours	3.4 ± 0.2	3.2 ± 0.1 ($p > 0.05$)	1.1 ± 0.1 ($p < 0.05$)
History: Duration of constipation (Years)	2.3 ± 0.5	2.3 ± 0.5 ($p > 0.05$)	2.3 ± 0.5 ($p > 0.05$)
Total score: (Maximal 30; constipation >15)	19.7 ± 2.2	18.3 ± 1.5 ($p > 0.05$)	9.1 ± 1.4 ($p < 0.05$)

analysis, whereas patients with primary symptoms of obstructed defecation, a diagnosis of rectal cancer, or anorectal surgery within 6 months were excluded. Mean resting pressure, max squeeze pressure, duration of squeeze, as well as residual anal pressure and intrarectal pressure during simulated defecation were recorded. T tests were performed to assess differences between mean values for men and women. Adjusted p-values are presented with significance <0.05 . Statistical analysis was performed using SPSS v21.

Results/Outcome(s): From 1/2013-10/2017, 190 patients underwent 3D HRAM for evaluation of defecatory disorders. A total of 22 men and 59 women with FI met inclusion criteria. There were no differences in mean age (66 vs 67 years, $p=0.81$) or BMI (27 vs 26 kg/m^2 , $p=0.367$) between men and women, respectively. Men with FI had higher mean resting pressure (60.2 and 47.2 mm Hg, $p=0.035$) and max squeeze pressure (199.2 vs 116.6 mm Hg, $p<0.001$) than women with FI. There was no difference in sustained squeeze duration between men and women (8.9 vs 9.9 s, $p=0.348$). During simulated defecation, men exhibited higher residual anal pressure (84.0 vs 56.0 mm Hg, $p<0.001$), and intrarectal pressure (47.8 vs 27.3 mmHg, $p=0.002$) compared to women.

Conclusions/Discussion: Men with FI have higher max squeeze and mean resting pressures than women with FI. During simulated defecation, men also exhibit higher residual anal and intrarectal pressures compared to women with FI. Men and women with FI have similarly low durations of squeeze pressure. These findings suggest that the relationships between physiologic parameters of men and women without disorders of defecation are not all maintained in patients with FI.

FUNCTIONAL OUTCOME AND QUALITY OF LIFE IN THE POSTOPERATIVE PATIENTS WITH SLOW TRANSIT CONSTIPATION.

P235

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Purpose/Background: Although surgical options for slow transit constipation (STC) have been proven to be a definite treatment, improvements in the evacuation function and quality of life are rarely studied. This study aims to evaluate the effectiveness of surgery for STC both in evacuation function and quality of life.

Methods/Interventions: Between March 2013 and September 2017, the medical records of 30 patients (4 males) undergoing ileorectal anastomosis (IRA) or cecorectal anastomosis (CRA) for colonic inertia in our department

were obtained. Preoperative and operative details were recorded. All patients were successfully followed up via a further telephonic questionnaires, including the Gastrointestinal Quality of Life Index (GIQLI), the Wexner constipation and incontinence (WC and WI) scales, the short-form (SF)-36 survey, satisfaction with surgery and functional variables, such as bowel movements, abdominal pain, bloating, straining, laxative use, enema and diarrhea.

Results/Outcome(s): More than 77.78% of patients in each group were satisfied with the surgery. The number of bowel movements per week during a 3-month follow-up increased ($p<0.01$) and the increased tool frequency was improved 6 months after surgery. The WC and GIQLI scores in the groups following surgery were significantly improved ($p<0.01$). Furthermore, results of SF-36 showed improvements in 6 spheres (role physical, role emotional, physical pain, vitality, mental health and general health) during a 6 months follow-up postoperatively ($p<0.05$). There was a trend postoperatively toward the amelioration of abdominal pain, bloating, straining, laxative use, enema and diarrhea.

Conclusions/Discussion: Surgery for STC is an effective and acceptable option in properly selected patients. A majority of patients received significant symptom relief and experienced a significant trend toward recovery in their quality of life.

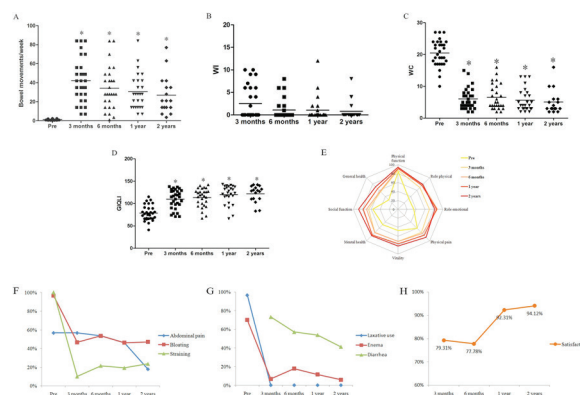


Fig. A, Bowel movements of STC patients;

B, WI scores of STC patients;

C, WC scores of STC patients;

D, GIQLI scores of STC patients;

E, SF-36 test results of STC patients;

F,G,H, General conditions of STC patients.

* $p<0.05$ compared with the results in the preoperative group.

GIQLI Gastrointestinal Quality of Life Index; WC Wexner Constipation Scale; WI Wexner Incontinence Scale

OUTCOMES AFTER RECTOVAGINAL FISTULA REPAIR: A SINGLE TERTIARY CENTER EXPERIENCE.

P236

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Purpose/Background: Rectovaginal fistulas (RVFs) cause significant morbidity for affected women. They are often chronic in nature and multiple operations are sometimes necessary prior to healing. While risk factors for the development and recurrence of RVFs have been delineated, the ideal technique for repair varies depending on type of fistula. The present study evaluates our single center experience with RVF repairs.

Methods/Interventions: An IRB-approved, retrospective review of patients with RVFs treated between 1992-2017 at a single academic tertiary medical center was performed. All repairs were performed by Colon and Rectal Surgeons. Examined variables included demographic data, etiology of the fistula, previous procedures, type of surgical procedure, and resolution of symptoms. P-values less than 0.05 were considered significant.

Results/Outcome(s): 159 women underwent a total of 360 procedures (287 performed at our institution). 34 patients had at least one previous procedure at another institution. The median age at presentation was 42 (range, 17-93) years and mean follow-up time was 19.2 months. Underlying causes included obstetric complications in 58 patients, IBD in 39 patients, malignancy in 20 patients, iatrogenic causes in 23 patients, unknown or other causes in 19 patients. Surgical procedures performed are outlined in Table 1. Patients undergoing repair of RVFs due to obstetric or IBD were more likely to undergo ≥ 3 procedures compared to the other groups ($p=0.04$). 77 patients underwent one procedure, 69 of whom (89%) were symptom free at follow up. Overall, 148 (93%) of the women were successfully repaired. There was no association between the type of surgery performed and resolution of symptoms or need for additional procedures.

Conclusions/Discussion: RVFs present a challenging clinical scenario, often requiring multiple procedures for resolution. With persistence, RVFs can be successfully treated by a number of approaches, regardless of etiology. The surgical approach should be individualized to increase the likelihood of success.

THE BRIDGE BETWEEN PRIMARY CARE AND THE COLORECTAL SPECIALIST IN THE TREATMENT OF FECAL INCONTINENCE AND CONSTIPATION.

P237

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Purpose/Background: Expert management of patients with fecal incontinence (FI) and constipation often involves coordination between primary care physicians and colorectal surgeons. The purpose of this study was to formulate a care pathway to facilitate timely, accurate diagnosis and treatment of patients with these conditions starting in the primary care setting.

Methods/Interventions: Primary care physicians and advanced practice nurses within the fields of family and community medicine (FCM) and internal medicine (IM) were given a survey to assess their management of patients presenting with symptoms of FI and constipation. The survey was administered via an online application and focused on first and second line therapies, imaging modalities, and triggers for referral to a gastrointestinal specialist such as a colorectal surgeon or gastroenterologist. The data was then evaluated to identify opportunities for

P236 Table 1.

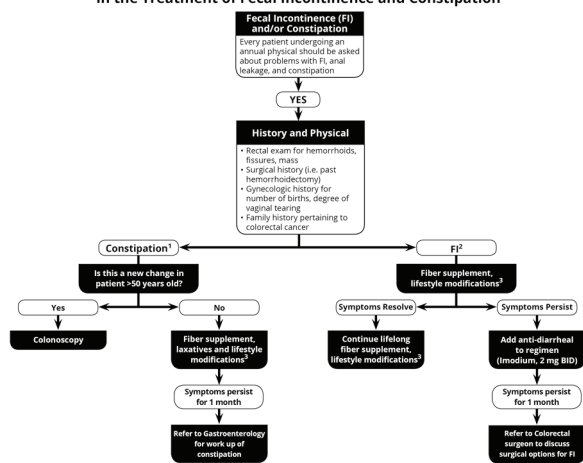
Type of Surgery	Number	Percent
Primary Closure	15	5.2
Gracilius Flap	3	1
Bowel Resection	5	1.7
Advancement Flap	61	21.2
Primary Closure with diversion	3	1
I&D, EUA, Seton placement	75	26.2
Mesh Repair	3	1
Advancement Flap and Fibrin Glue	2	0.7
Transperineal Repair with Sphincteroplasty	46	16
Sphincteroplasty and Endorectal Flap	6	2.1
Diversion	34	11.8
Transabdominal ligation, Omental Flap	3	1
Fistulotomy, LIFT	2	0.6
Plug, Fibrin	26	9
Diversion, Sphincteroplasty	1	0.3
Diversion, Omental Flap	1	0.3
Diversion, Advancement Flap	1	0.3

improvement in early management and to create a care pathway to guide future management of FI and constipation (See Figure 1.).

Results/Outcome(s): 36 healthcare providers responded to the survey. The response rate was 20%. The majority of FCM attendings (70%) and IM attending (86%) recommended lifestyle modification (high fiber diet, appropriate water intake, medication modification) as 1st line therapy for FI. FCM and IM residents were more likely to just recommend fiber. With regard to the treatment of constipation, greater than 50% of FCM attendings treated constipation with lifestyle modification, while FCM residents and IM practitioners had no predominant plan. FCM and IM attendings (70%) were more likely to appropriately choose fiber supplementation and osmotic laxatives as a 2nd line constipation regimen when compared to FCM and IM residents (35%). The majority of practitioners in both FCM and IM preferred to make a referral to a specialist prior to ordering imaging. The most common reasons for referral to a colorectal surgeon were patient request followed by being unsure of the next step in the care plan.

Conclusions/Discussion: FI and constipation are highly distressing conditions that require long-term coordinated care between primary care physicians and gastrointestinal specialists. Based on our survey results, we found that the best time to intervene with education is during FCM and IM training. We propose that this care pathway will facilitate timelier, step-wise management of these patients as well as promote a team-based approach between primary care providers and colorectal surgeons.

The Bridge between Primary Care and the Colorectal Specialist in the Treatment of Fecal Incontinence and Constipation



KEY:
¹Defined by the Rome Criteria (less than three bowel movements per week with straining, hard stools and/or incomplete evacuation >25% of the time).
²Defined as recurrent uncontrolled passage of fecal material for at least one month.

³Lifestyle modifications are high fiber diet, increased water intake and medication modification.

CLINICAL VALUE OF RESTING VECTOR VOLUME FOR PREDICTION OF FECAL INCONTINENCE BEFORE ILEOSTOMY REVERSAL: A LONGITUDINAL STUDY AFTER SPHINCTER-PRESERVING SURGERY FOR MID OR LOW RECTAL CANCER.

P238

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Purpose/Background: There are no reports regarding the clinical value of anorectal manometry for predicting major fecal incontinence before ileostomy reversal. The aim of this study is to investigate whether anorectal manometry can predict major fecal incontinence before stoma reversal in patients who have undergone sphincter-preserving surgery for mid or low rectal cancer.

Methods/Interventions: The subjects were 173 patients who underwent ileostomy reversal after sphincter-preserving surgery for mid or low rectal cancer between March 2005 and May 2016. We compared the anorectal manometric variables before ileostomy reversal, and clinical data between 81 consecutive patients with continence or minor incontinence (Fecal Incontinence Severity Index [FISI] < 25) and 92 patients with major fecal incontinence (FISI ≥ 25) 12 months after stoma reversal. Multivariable analysis was performed for all manometric variables with $p < 0.25$ in the univariate analysis.

Results/Outcome(s): Resting pressure, resting vector volume, and sphincter length before ileostomy reversal were lower in the major fecal incontinence group compared with the continence and minor incontinence groups (28.4 ± 15.8 vs. 34.3 ± 18.6 mmHg, $p < 0.027$; $143,601 \pm 118,961$ vs. $278,922 \pm 289,674$ mmHg²×mm, $p < 0.001$; 3.3 ± 1.1 cm vs. 3.7 ± 1.0 cm, $p = 0.034$, respectively). Asymmetry at rest and asymmetry at squeezing were higher in the major fecal incontinence group ($39.1 \pm 11.7\%$ vs. $34.1 \pm 9.6\%$, $p = 0.002$; $34.2 \pm 9.3\%$ vs. $31.4 \pm 8.3\%$, $p = 0.046$, respectively). Multivariate analysis revealed resting vector volume as the only independent factor predicting major fecal incontinence (hazard ratio [HR] = 0.675 per 100,000 mmHg²×mm, 95% confidence interval [CI] 0.532–0.823, $p = 0.006$), whereas resting pressure, sphincter length, and asymmetry at rest and at squeezing were not predictive factors (HR = 1.009, 95% CI 0.985–1.035, $p = 0.456$; HR = 0.858, 95% CI 0.502–1.467, $p = 0.575$; HR = 1.022, 95% CI 0.979–1.066, $p = 0.324$; HR = 1.010, 95% CI 0.966–1.056, $p = 0.654$, respectively).

Conclusions/Discussion: This is the first large-scale longitudinal study showing that resting vector volume can predict major fecal incontinence before ileostomy reversal. This information should therefore be provided when ileostomy reversal is considered for patients who have undergone sphincter-preserving surgery for mid or low rectal cancer.

FECAL INCONTINENCE FOLLOWING LOW ANTERIOR RESECTION AND NEOADJUVANT TREATMENT FOR RECTAL CANCER CAN BE MANAGED WITH A NEW ARTIFICIAL ANA SPHINCTER.

P239

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Purpose/Background: Improvements in surgical technique and use of neoadjuvant treatment have increased proportion of patients (pts) with rectal cancer to undergo sphincter-sparing resections. However, up to 60% of those pts will complain bowel dysfunctions, including increased stool frequency, urgency, soiling, seepage, incontinence to gas, liquid and solid stools. Management of fecal incontinence (FI) after multimodal treatment of rectal cancer is challenging, mostly due its multifactorial etiology. Implant of a new artificial anal sphincter has been attempted in this condition.

Methods/Interventions: Both Gatekeeper (GK) and the following evolution, SphinKeeper (SK), (both produced by THD SpA, Correggio, Italy) provide the anal implant of polyacrylonitrile thin, solid, self-expandable cylinders which become thicker, shorter and softer within 48 hours after their placement into the intersphincteric space. GK provides the implant of 6 prostheses, while SK the delivery of 10 prostheses. The procedure was performed under local anesthesia; the prostheses delivery, by a specifically designed system, was guided by endoanal ultrasound (EAUS). At baseline and follow up, the number of FI episodes and Cleveland Clinic Fecal Incontinence score (CCFIS) were recorded.

Results/Outcome(s): Eight pts (2 females, 6 males, medium age 62.5 years, range 41-82) were treated with GK (7 pts) or SK (1 pt) for FI following neoadjuvant chemoradiotherapy and low anterior resection because of a rectal cancer. Median duration of procedure (including EAUS) was 42 minutes (range 30-60). Neither intra- nor postoperative complications were reported. Median follow up was 21 months (range 12-60). Following implant of GK/SK prostheses, FI episodes decreased significantly if compared to baseline (soiling: from 5.0 ± 3.6 to 0.8 ± 1.7 ; gas: from 9.4 ± 6.0 to 5.8 ± 5.1 ; liquids: from 4.5 ± 3.6 to 1.1 ± 2.1 ; solids: from 2.3 ± 2.8 to 0.4 ± 1.1). At last follow up, 6 pts reported at least 75 per cent improvement in number of major FI episodes. Mean CCFIS was significantly reduced from 15.3 ± 3.4 to 8.0 ± 4.8 .

Conclusions/Discussion: GK and SK can be safely implanted in patients suffering from FI after multimodal treatment of low rectal cancer. In this study, the procedure was well tolerated without morbidity. Clinical benefits concerned the majority of treated pts and were sustained at long term follow-up.

ALGORITHM FOR MANAGEMENT OF FECAL INCONTINENCE PATIENTS EXPEDITES DECISION MAKING FOR THOSE THAT MAY BE CANDIDATES FOR SNS.

P240

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Purpose/Background: To evaluate our current algorithm in managing fecal incontinence patients. Our group began using a common algorithm shortly after our adoption of SNS. This algorithm was developed to expedite the workup and non-operative management of patients that we felt would be good candidates for SNS and were failing conservative measures.

Methods/Interventions: Patients who underwent SNS implantation between January 1, 2014 to September 30, 2017 were retrospectively reviewed from their initial presentation to clinic with a chief complaint of fecal incontinence. All patients were counseled on conservative measures at the initial visit including dietary influences, medication usage, bowel habit training, and pelvic floor physical therapy. Anal manometry and pelvic floor physical therapy were scheduled during the initial visit with subsequent follow up to review results and assess progress of the patients' symptoms. The time from initial presentation to implantation of SNS was evaluated in days. The conversion rate from test phase/lead implant (Stage I) to permanent generator implant (Stage II) was also evaluated.

Results/Outcome(s): Our cohort included 119 patients who underwent SNS implantation from 8/1/2013 to 9/30/2017. The overall mean time from initial office presentation to SNS implant was 104 days. Of patients that underwent Stage I lead placement, 98.3% went on to permanent generator placement or Stage II. As adoption of the protocol became more standardized in our practice, it was noticed that the mean time from initial office presentation to SNS implant decreased by 40 days from 2015 to 2017 without compromising the conversion rate.

Conclusions/Discussion: With the adoption of SNS therapy for fecal incontinence within our group, patients are managed comprehensively but efficiently with a standard algorithm that serves to educate patients, manage their expectations, and select out those that would benefit from SNS.

	Mean time from initial evaluation to OR (days)	Mean time to conversion (days)
2013 – 2015	109.2	8.7
2016 – 2017	78.4	10.2

A PROSPECTIVE STUDY WITH A LONG FOLLOW UP TO EVALUATE V.A.A.F.T. (VIDEO ASSISTED ANAL FISTULA TREATMENT) IN THE TREATMENT OF COMPLEX ANAL FISTULA.

P241

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Purpose/Background: We report data of a prospective study designed to evaluate healing rate, recurrence rate and valuations of continence after VAAFT (Video-Assisted Anal Fistula Treatment) in the treatment of complex anal fistula.

Methods/Interventions: From November 2012 to June 2017 a total of 47 consecutive patients referred to our coloproctology unit. All patients had a complex anal fistula and were treated by VAAFT. Postoperative evaluation was made at 15 days, 1, 3, 6 and 12 months, 24month, 36month

Results/Outcome(s): The median follow-up period was 29 months. All fistulas were complex and in particular: high transphincteric in 40 patients, extrasphincteric in 6 patients, suprasphincteric in 1 patient. No major complications, neither active sepsis or mortality were observed. Only two minor bleeding were observed and postoperative pain was acceptable. Healing rate of 74,5% was achieved without continence impairment (assessed by Wexner Score for Incontinence). 12 patients had persistent symptoms and required further surgical treatment.

Conclusions/Discussion: Complex anal fistula represents the real challenge of this pathology. VAAFT offers the possibility to identify secondary tracts and internal opening with more chance to achieve a good healing rate, preserving sphincteric structures



CLINICAL PRESENTATION AND OUTCOMES OF ACUTE DIVERTICULITIS IN A MIDDLE EASTERN POPULATION.

P242

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Purpose/Background: There is no literature available describing the presentation of diverticulitis in the Middle East population. The aim of the study is to provide an analysis of the epidemiological indicators of acute diverticulitis in Kuwait, describing age and patterns of presentation, management and outcomes of diverticulitis.

Methods/Interventions: A retrospective review of all adult patients over the age of 17 who were admitted to the surgical service diagnosed with acute diverticulitis between January 2010 and October 2017 at a major university affiliated government hospital in the state of Kuwait. The hospital has a catchment area of 1.3 million people and all patients admitted with diverticulitis are treated under the surgical service as per Ministry of Health policy. The institutional ethical committee approved this retrospective study. 139 patients were identified and included for this analysis. Data was collected using patient medical records.

Results/Outcome(s): Between January 2010 and October 2017 there were 139 patients admitted with a diagnosis of acute diverticulitis. All of the patients were included for this analysis. Mean age of presentation is 50.1 [\pm 13.6]. Of all admissions 53.2% were Kuwaiti citizens, 9.4% were non-Arab expatriates and the remaining patients are non-Kuwaiti Arab expatriates. Recurrence of non-complicated acute diverticulitis was seen in 33.8% of the patient population. Of the study population 114 (82.0%) were classified as Hinchey one, 17 (12.2%) were classified as Hinchey two, and seven (5.0%) fall under Hinchey three. During this time period only one patient (0.7%) had Hinchey four. All patients with Hinchey three and four underwent emergency surgery. There were four patients that were readmitted within thirty days. There were 7 patients (5%) who had cecal diverticulitis, 9 (6.5%) had ascending colon diverticulitis and 2 (1.4%) had transverse diverticulitis. 121 (87.1%) had sigmoid/descending colon diverticulitis representing the majority of patients. There were no mortalities within 30 days of admission. The mean length of stay was 5.7 days [\pm 5.3].

Conclusions/Discussion: Our study suggests that there is a low prevalence of acute diverticulitis in Arabs living

P242 Hinchey Classification of the cohort

Hinchey 1	114 (82%)
Hinchey 2	17 (12.2%)
Hinchey 3	7 (5%)
Hinchey 4	1 (0.7%)

in Kuwait, and that when they do present it is typically with acute non-complicated diverticulitis (Hinchey one) with the majority presenting at a relatively younger age than what has been reported in the west. Based on our data it appears that the incidence of acute diverticulitis in the study period appears to be stable. These findings may be attributed to a lifestyle and cultural diet change that could represent an increased risk to the development of diverticulitis.

A NEW DEVICE FOR THE TREATMENT OF COMPLEX ANAL FISTULAS OF CRYPTOGLANDULAR ORIGIN: LONG-TERM RESULTS.

P243

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Purpose/Background: Surgical treatment of cryptoglandular anal fistulas (AFs) remains challenging. Aims of this prospective study were to evaluate the safety and the long-term efficacy of a new device.

Methods/Interventions: The CuraSeal AF™ Plug device (Curaseal Inc, Sana Clara, CA, USA) is made of a disk of silicone, and a delivery catheter containing 6 cylindrical collagen matrices. The collagen matrices provide a scaffold during the natural healing process, while the silicone disk provides an internal seal and is expelled from the anus when the resorbable sutures degrade. Follow-up (FU) visits were scheduled at 1 and 2 weeks, 1, 2, 3 and 6 months after the operation. All patients (pts) were evaluated by clinical and physical examination, and endoanal ultrasound at the baseline and, then, at the 2 weeks, 1, 2, 3 and 6 months FU visits. In the most recent period of the study pts were evaluated also by a pelvic MRI, at the baseline and at the 6 and 12 months FU visits.

Results/Outcome(s): From February 2015 to August 2017, 38 pts (20 males, mean age 55.1 years) were enrolled, and in 34 pts the "CuraSeal AF™ Plug" was inserted. Fistulas were transphincteric in 32 pts and extrasphincteric in two. Neither intra- nor postoperative complication occurred. The mean FU was 17.0 months (range, 3-33). At the last-FU visit, the success rate was 61.8% (21/34 pts), confirmed by clinical evaluation, 3D-EAUS and pelvic-MRI. Failures were related to: persistence of the serum discharge (11 pts), persistence of inflammatory tissue around the fistula tract (1 case), device expulsion (1 case); one case of recurrence after initial healing occurred 10 months after operation. No patient experienced any change of continence.

Conclusions/Discussion: Procedure is technically simple, with a low morbidity rate. Continence status did not change in any patient. Long-term FU results seem promising. However, a longer FU and larger population study are needed to confirm these results.

SURGICAL PROCEDURES FOR PERFORATED DIVERTICULITIS: CASE-MATCHED ANALYSIS OF A LARGE INTEGRATED HEALTH SYSTEM DATABASE.

P244

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Fontana, CA

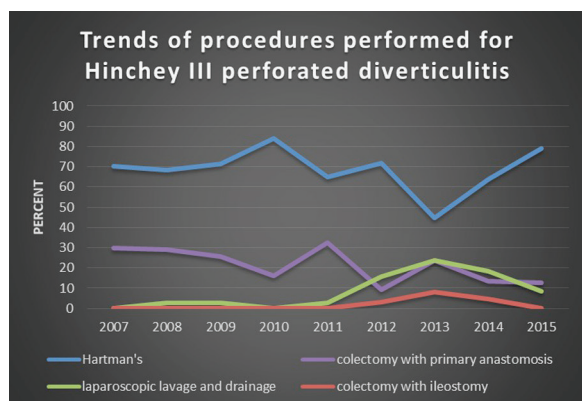
Purpose/Background: Perforated diverticulitis (PD) is often managed by Hartman's procedure (HP). Laparoscopic lavage and drainage (LLD), colectomy with primary anastomosis (CPA), and colectomy with diverting ileostomy (CDI) are alternative surgical procedures that might reduce short- and long-term morbidity associated with HP. This study compares 30-day any morbidity (AM), serious morbidity (SM), mortality (MO), unplanned reoperation (UR), readmission (RE) and hospital length of stay (LOS) after these procedures for PD.

Methods/Interventions: Patients undergoing emergent surgery for PD at the southern California Kaiser Permanente hospitals (N=13) were included (2007-2015). Those with Hinchey grade IV diverticulitis or other diagnoses found intraoperatively were excluded. The outcomes of those procedures were compared using bivariate, multivariate and propensity-score analysis.

Results/Outcome(s): Out of 608 patients undergoing emergency surgery for PD, 459 met our inclusion criteria. Of those, 60% had HP; 27% had CPA; 10% had LLD; and 3% had CDI. The majority of patients had Hinchey grade III diverticulitis (67%). Among patients with Hinchey grade III, CPA performance declined from 29% of the total procedures in 2007 to 12% in 2015. Between 2012 and 2014, performing LLD had peaked (comprising 16%-23% of all procedures) and HP performance had declined (44%-63%). Patients undergoing HP were more likely to have Hinchey III diverticulitis [HP (77%), LLD (53%), CPA (56%), and CDI (35%); $p<0.001$] and Charlson Comorbidity Score ≥ 3 [HP (23%), LLD (16%), CPA (11%), and CDI (7%); $p<0.001$]. AM, SM and MO were 46%, 30% and 5% respectively. HP was associated with the highest MO (6.9%) in comparison to LLD (2.3%), CPA (0%) and CDI (0%) ($p=0.012$). SM was higher after HP (30%) and CDI (37%) than LLD (23%) and CPA (14%) ($p<0.001$). LLD was associated with the highest RE rate [LLD (20%), HP (11%), CDI (7%), and CPA (5%), $p=0.024$] and the shortest hospital LOS [median; LLD=6.5 d, HP=10 d, CDI=12 d, and CPA=8 d, $p<0.001$]. In multivariate analysis, LLD was associated with lower AM (OR=0.48; 95%CI=0.23-0.99) and CPA was associated with lower SM (OR=0.43, 95%CI=0.23-0.79) than HP, but mortality was not different ($p>0.05$). In case-matched cohorts: 1) LLD and CPA had comparable MO, AM, SM, UR, RE, and hospital LOS ($p>0.05$); 2) MO, AM, and SM were not different between LLD and HP, however, LLD was associated with higher RE and shorter hospital LOS

($p < 0.05$) than HP; 3) CPA was associated with lower MO (0% vs. 5%) and shorter hospital LOS than HP ($p < 0.01$).

Conclusions/Discussion: Emergent LLD and PA for perforated diverticulitis have comparable outcomes and they are not associated with increased risk of postoperative morbidity and mortality in comparison to HP. Among all procedures, LLD is associated with the shortest hospital stay and highest readmission rate.



AN ASSESSMENT OF THE QUALITY AND CONTENT OF STOMA INFORMATION ON THE INTERNET.

P245

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Purpose/Background: Although commonly the first port of call for medical information for patients, the internet provides unregulated data of variable quality. We aimed to evaluate commonly accessed web-based information on intestinal stomas using validated and novel scoring systems.

Methods/Interventions: The key words 'stoma,' 'colostomy,' 'ileostomy' and 'bowel bag' were entered into top internet search engines (Google/Bing/Yahoo). The first 10 websites from each were analyzed using the validated Journal of the American Medical Association (JAMA) benchmark criteria and DISCERN scoring systems. A novel stoma-specific score was devised and applied.

Results/Outcome(s): Forty three unique websites were identified. The majority (49%) were from nonprofit or governmental agencies. 9% were from commercial entities. The mean total DISCERN score for all websites was 42.4 +/- 10.2 (range=18-63, maximum score of 75). The highest DISCERN scores were found in the clarity of aims category (mean 3.5 +/- 1.2, maximum points for individual category of 5). The mean JAMA and stoma-specific scores were 2.1 +/- 1.0 (maximum score of 4) and 12.9 +/- 6.1 (27 points possible) respectively. The lowest JAMA scores were in the category of attribution with 70% of websites lacking references for information provided. 88% displayed disclosure/paid advertiser information, however, only 39%

revealed authorship. 42% did not provide the date of last update. Cancer and IBD were the most commonly cited reasons for stoma creation (79 and 70% of websites). Trauma and diverticulitis were cited in 37%. Chronic constipation was only mentioned in 4.6%. 67% described the surgery. 58% provided an image or diagram. 72% described a stomal therapist or nurse. 51% provided information on when to seek medical help.

Conclusions/Discussion: Web-based information on stomas is of variable content and quality. None of the top searched websites achieved maximum score in either validated scoring system for medical information or a unique surgeon created stoma specific scoring system inclusive of topics important to patients with stomas or undergoing stoma creation. Authorship and the source of information provided are unclear in most. Only half provided information on when to seek medical help for complications including high output and dehydration. These findings should be highlighted to patients utilizing the internet to obtain information on stomas.

INPATIENT HEMORRHOIDS: TRENDS AND OUTCOMES FROM THE NATIONAL INPATIENT SAMPLE (NIS).

P246

K. Schlosser, A. Kao, J. Otero, T. Prasad, A. Lincourt,
B. Heniford, K. Kasten, B. Davis
Charlotte, NC

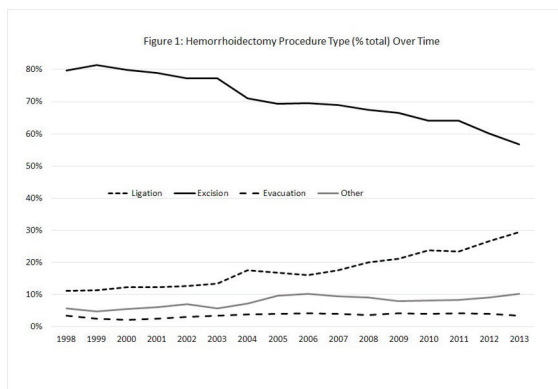
Purpose/Background: Hemorrhoid management is ubiquitous in most colorectal practices. While normally considered an outpatient procedure, bleeding and other complications can trigger emergency department visits and costly hospital admissions. Here we review national trends in hemorrhoidectomy as captured by the Healthcare Cost and Utilization Project National Inpatient Sample (NIS).

Methods/Interventions: NIS database (estimated 20% of US hospital admissions) was queried for patients who underwent hemorrhoidectomy (1998-2013). Procedures were grouped into ligation, excision, evacuation, and other hemorrhoid procedures (cryotherapy, reduction, injection, cauterization, etc.). Patient demographics and postoperative outcomes were compared over time and by procedure group using chi-square tests. Multivariate logistic regression analysis was used to control for other comorbidities.

Results/Outcome(s): A total of 44,471 patients were identified. 16.7% underwent ligation, 72.4% excision, 3.5% evacuation, and 7.5% other hemorrhoid procedure. 59.4% were performed in large hospitals, 81.3% in urban, and 36.4% in urban teaching hospitals. Rate of ligation procedures increased (11.1% to 29.5%) and excision decreased (79.7% to 56.8%, $p < 0.0001$). Patient demographics changed significantly, with increase in mean age (54.7 +/- 17.3yr to 56.9 +/- 17.9yr $p < 0.0001$), percentage of Caucasian population (77.1% to 64.8%, $p < 0.0001$),

increase in Charlson Comorbidity Index (CCI 0.6 ± 1.3 to 1.4 ± 2 , $p < 0.0001$), and increase in both Medicare and Medicaid coverage (36% to 41.7%, 7.3% to 13.2%, respectively, $p < 0.0001$). Patient care demographics changed, with an increase in emergency department utilization from 44.3% to 59% (2007 to 2013, $p < 0.0001$), a decrease in elective cases from 47.4% to 25.1% (2002 to 2013, $p < 0.0001$), and care shifting to more urban settings (78.0% to 85.7%, $p < 0.0001$). Patients who underwent ligation were older (61.5 ± 17.4 yr, mean 55.0 ± 17.3 yr, $p < 0.0001$), with more comorbidities (CCI 1.5 ± 2.0), had more emergent cases (76.6% $p < 0.0001$), and utilized more emergency services (63.1%, $p < 0.0001$). Mean overall complication rate was 10.22%, ligation had the highest at 11.0%. Overall complication rate decreased over time (12.8% to 6.8%, $p < 0.0001$), reflecting decreases in infectious and urinary complications. This trend persisted on multivariate analysis across all years examined, with ligation having highest complication rate, followed by excision, then evacuation.

Conclusions/Discussion: Sixteen years of national inpatient data reveals increasingly comorbid patients undergoing non-elective inpatient hemorrhoidectomy. While associated postoperative complications have decreased over time, the inpatient treatment of this traditionally outpatient procedure reflects changing trends in presentation and management. Further study is necessary to evaluate underlying reasons for these changes.



ANAL FISSURES: TRENDS AND OUTCOMES FROM TWO NATIONAL DATABASES.

P247

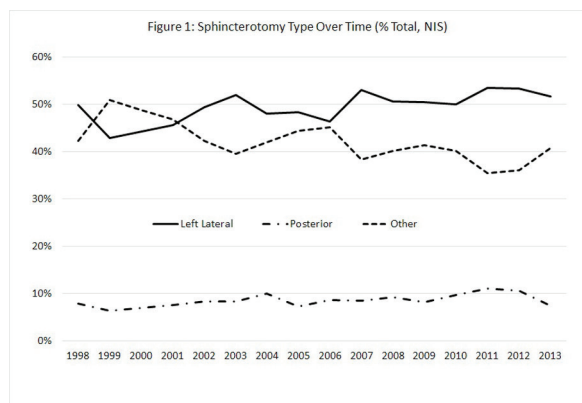
K. Schlosser, J. Otero, A. Kao, T. Prasad, A. Lincourt, B. Heniford, K. Kasten, B. Davis
Charlotte, NC

Purpose/Background: The nonsurgical management of anal fissures has changed patient management algorithms. Here we review national trends in surgical management of anal fissure as captured by the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) and the Healthcare Cost and Utilization Project National Inpatient Sample (NIS).

Methods/Interventions: The NSQIP (2005-2016) and the NIS database (1998-2013) were queried for patients who underwent treatment for anal fissure. NIS patients were grouped into posterior, left lateral, and other sphincterotomy. NSQIP patients were grouped into chemo-denervation, fissurectomy, sphincterotomy, curettage/cautery, and other fissure procedures. Patient demographics and postoperative outcomes were compared over time and by procedure group using chi-square tests. Multivariate logistic regression analysis was used to control for other comorbidities.

Results/Outcome(s): 725 patients were identified in the NSQIP database. 30.5% underwent sphincterotomy, 27.3% fissurectomy, 22.8% curettage/cautery, and 13.2% chemo-denervation. There was no difference in wound infection rate (1.4%), reoperation (2.1%), readmission (3.4%) over time or by group examined. 76.7% of procedures were outpatient, most often chemo-denervation (84%), and least often sphincterotomy (67.1%, $p = 0.0001$). General anesthesia was used less frequently over time (93.9% to 75.4%, $p < 0.0001$) and most often used for chemo-denervation and sphincterotomy (80.2%, 77.9% respectively, $p = 0.02$). 5151 patients were identified in the NIS database, 48.6% had left lateral, 8.3% posterior, and 43.1% other sphincterotomies. Inpatient sphincterotomies decreased over time from 532 (10.3%) in 1998 to 120 (2.3%) in 2013. There was an increase in left lateral (42.8% to 51.7%) and a decrease in other sphincterotomies (50.9% to 40.8%, $p < 0.0001$). There was no change in overall or wound complication rate over time or by group (12.0%, 1.0% respectively), though urinary complications decreased (10.3% to 0.8%, $p < 0.0001$). Posterior sphincterotomies were more likely to be performed on males (53.7% vs. 46.8% left lateral, $p = 0.03$), on younger patients (52.3 ± 17.3 vs 54.4 ± 17.6 other, $p = 0.04$), and in urban teaching hospitals (38% vs. 33% left lateral, $p = 0.03$). Over time, patients decreased in age (55.5 ± 17.7 to 52.7 ± 16.6 , $p = 0.045$), and increased in Charlson Comorbidity Index (0.6 ± 1.4 to 1.1 ± 1.6 , $p < 0.0001$). There was a decrease in elective cases from 49.5% to 31.9% ($p < 0.0001$), an increase in Medicaid utilization (6.8% to 17.5%, $p < 0.0001$), and an increased involvement of emergency services (34.7% to 48.3%, $p = 0.05$).

Conclusions/Discussion: These distinct national databases reveal trends in management of anal fissures. While inpatient postoperative complications have decreased over time, the persistent inpatient treatment of this traditionally outpatient procedure reflects changing trends in presentation and management. Further study is necessary to evaluate underlying reasons for these changes.



MANAGEMENT OF FISTULA IN-ANO: ROOM FOR IMPROVEMENT IN THE OHIO VALLEY.

P248

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Purpose/Background: There are several options available for the treatment of anal fistulas, but the dominant procedures include ligation of intersphincteric fistula tract (LIFT), rectal advancement flap (RAF), and fistulotomy (FL). In prior surveys <30% of respondents perform LIFT or RAF as definitive treatment, most preferring fistulotomy. Colorectal trainees are likely to absorb the philosophy of their teachers in their choice of option and perpetuate practices based on professors' preferences. We wondered about treatment choices for fistula-in-ano in the USA. Columbus and Cleveland, Ohio, are two centers that have written consistently about the management of fistula in ano and have developed a reputation in the area. In this study we aimed to document the surgical practices adopted in this area of the country.

Methods/Interventions: An online questionnaire was sent to 67 members of the Ohio Valley Society of Colon and Rectal Surgeons. The survey assessed choice of operative technique and success rate for uncomplicated anal fistulas. We defined excellent results as complete healing rates >80% and worsening fecal incontinence rates <10%. Complete healing means absence of any symptom and a sealed external opening.

Results/Outcome(s): There were 38 respondents (57%), with 19/36 (53%) from academic centres, 11/36 (31%) in private practice, and 6 (16.7%) working in community

hospitals. Half the respondents trained before 2000 and half after. 19/37 (51%) treated 3-5 cryptoglandular fistulas per month and a further 7(19%) treated more than 5. Only 59% (22/37) saw patients with Crohn's-related anal fistulas and only 38% (14/37) saw more than one such patient a month. 11/37 (30%) of respondents saw patients referred from other surgeons 50% or more of the time. The most common procedures used often or always were draining seton (28/37 (76%), fistulotomy (26/37, 70%), RAF (12/37, 32%), LIFT (7/36, 19%), cutting seton (2/36, 6%) and fistula plug (1/36, 3%). The rate of excellent results is shown in the table. In case scenarios presented in the survey, anterior intersphincteric fistulas in females were treated with fistulotomy in 41% of cases, or a mucosal advancement flap (41%). Low, posterior transsphincteric fistulas were commonly treated by fistulotomy (48%), however in patients who had had multiple vaginal deliveries, even without documented injuries, respondents were less inclined to offer fistulotomies (32%) and considered LIFT (26%) or RAF (23%). High posterior transsphincteric fistula in males were treated with LIFT (36%), fistulotomy (27%) or RAF (21%). For obese patients, participants preferred to leave draining setons (14%) and were less inclined to offer LIFT (23%), whilst the frequency of RAF was unchanged (23%).

Conclusions/Discussion: The high rate of fistulotomies and their associated incontinence raises a concern about the training of young colorectal surgeons in the management of anal fistulas. LIFT and RAF are underutilized and performed with suboptimal results.

PERIANAL FISTULAS: TRENDS AND OUTCOMES FROM BY THE AMERICAN COLLEGE OF SURGEONS NATIONAL SURGICAL QUALITY IMPROVEMENT PROGRAM (NSQIP).

P249

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Purpose/Background: The emergent and long-term management of perianal fistulas is a nuanced cornerstone of colorectal practice. Here we review national trends in management of perianal fistulas as captured by the NSQIP database.

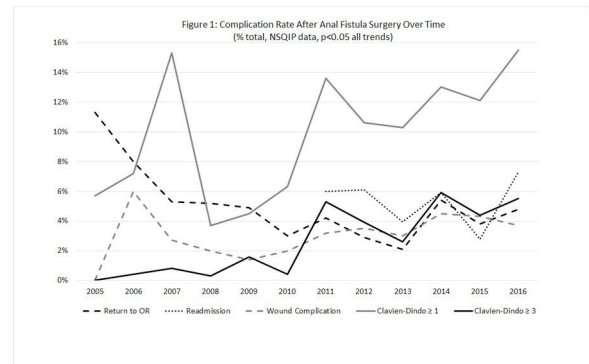
P248 Complete healing rates >80% and incontinence rates <10% (Excellent results)

	RAF	LIFT	Plug	Fistulotomy	Overall
Complete healing rate >80%	8/34 (24%)	4/24 (17%)	2/24 (18%)	33/36 (92%)	21/37 (57%)
Fecal incontinence rate <10%	29/35 (83%)	22/26 (85%)	23/25 (92%)	21/36 (58%)	27/27 (73%)

Methods/Interventions: NSQIP database was queried for patients who had undergone surgical management of fistula-in-ano (2005-2016). Interventions were grouped by CPT codes. Patient demographics and postoperative outcomes were compared over time and by procedure group using chi-square tests. Multivariate logistic regression analysis was used to control for other comorbidities.

Results/Outcome(s): Intervention for perianal fistula accounted for 6,455 cases. Mean age was 45.1 ± 14.8 yr, BMI 29.1 ± 7.6 , and 63.2% were male. 51.3% involved ischioanal or intramural abscess, 26.9% involved seton placement, and 6.7% were glue or plug repairs. 4.5% returned to the OR, 3.2% developed wound complications, and 3% had complications \geq Clavien-Dindo grade 3. Over time, ischioanal/intramural abscesses with fistula increased from 39.6 to 61.3% of procedures, isolated seton placement decreased from 28.3 to 18.6%, and glue/plug placement decreased from 15.1 to 3.5% ($p < 0.0001$). Fewer outpatient operations were performed (71.7 to 61.8%, $p < 0.0001$), and fewer procedures required general anesthesia (90.6 to 82.5%, $p < 0.0001$). Over time, patients were less likely to smoke or have diabetes (35.8 to 26.5%, $p = 0.009$; 13.2 to 11.5%, $p < 0.0001$, respectively), but were more likely to be taking steroids (5.7 to 15.3% $p < 0.0001$). Notably, outcomes worsened over time, with an increase in overall complications (5.7 to 15.5%, $p < 0.0001$), readmission rate (6 to 7.3%, $p = 0.003$), wound complications (0 to 3.7%, $p = 0.005$), and complications \geq Clavien-Dindo grade 3 (0 to 5.5%, $p < 0.0001$). When compared by group, fistulas with ischioanal or intramural abscesses had the shortest mean operative time (29.1 ± 30.1 min), followed by glue/plug (38.9 ± 59.6 min) and seton placement (41.4 ± 53.2 min, $p < 0.0001$). Glue/plug intervention was most likely to be performed as an outpatient, with shortest length of stay (88.8%, 0.5 ± 2.0 d). Trans/supra/extrasphincteric or multiple fistulas were most likely to be on steroids (16.3%, $p < 0.0001$), more often inpatient (58.7%, $p < 0.0001$), had longest length of stay (4.4 ± 9.5 d, $p < 0.0001$), and had the highest rates of return to OR (7.2%, $p = 0.01$), wound complications (5.7%, $p = 0.03$), and complications \geq Clavien-Dindo grade 3 (5.3%, $p = 0.05$). Patients with associated ischioanal/intramural abscesses were most likely to present with sepsis (11.5% $p < 0.0001$), but had lowest wound complication rates (2.8%, $p = 0.03$).

Conclusions/Discussion: Eleven years of national data reveals trends in management and outcomes of perianal fistulas, most notably an increase of high-grade complications and decrease in outpatient management of this disease. Further study is necessary to evaluate underlying reasons for these changes.



OUTCOMES AFTER INCISION AND DRAINAGE OF PERIANAL SEPSIS IN IMMUNOSUPPRESSED VERSUS IMMUNOCOMPETENT PATIENTS: AN ACS-NSQIP ANALYSIS.

P250

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Purpose/Background: Patients on immunosuppressive regimens are predisposed to perianal sepsis for which incision and drainage (I & D) is the established treatment. However, risk and rates of adverse events following I & D in the immunocompromised population have not been described. We sought to determine the impact of immunosuppression on major morbidity and mortality following I & D for perianal sepsis using the American College of Surgeons National Quality Surgical Improvement Project (ACS-NSQIP) database.

Methods/Interventions: Patients undergoing I & D for perianal sepsis between 2011 and 2016 were identified in the ACS-NSQIP multicenter database. Patients with a diagnosis of Crohn's disease, necrotizing fasciitis, or abscesses outside of the perianal region were excluded. The remaining patients were stratified into patients taking immunosuppressants at time of surgery and patients taking none. Surgical interventions were divided into three groups (I & D alone, I & D with fistulotomy, and I & D with seton placement). Associations of immunosuppression with 30-day return to the operating room (ROR), major morbidity, and mortality were assessed using univariate comparisons and multivariable logistic regression.

Results/Outcome(s): 13,666 patients underwent I & D for perianal sepsis (I & D only=10,959, I & D with fistulotomy=2,290, I & D with seton placement=417); 930 were immunocompromised and 12,736 were immunocompetent. Immunocompromised patients had higher ASA scores, worse nutrition (albumin<3.5), and anemia (hematocrit<30) preoperatively, yet underwent fewer emergency operations (all $p < 0.001$). On univariate analysis, immunocompromised status was associated with 30-day ROR (8.3% versus 4.4%), major morbidity (18.7% versus 11.4%), and mortality (1.8% versus 0.5%) (all $p < 0.001$). With respect

to major morbidity, the immunocompromised group experienced increased rates of 30-day post-operative systemic sepsis and respiratory complications (both $p < 0.05$). On multivariable analysis, immunocompromised status was independently associated with 30-day ROR (OR, 1.9; 95% CI, 1.4-2.4), major morbidity (OR, 1.6; 95% CI, 1.3-1.9), and mortality (OR, 2.6; 95% CI, 1.4-4.6) (Table).

Conclusions/Discussion: Patients on immunosuppressants experienced higher 30-day unplanned ROR, increased major morbidity, and increased mortality following operations for perianal sepsis, highlighting the need for heightened post-operative surveillance in patients on immunosuppression regimens undergoing I & D.

Table. Multivariable Models for Major Morbidity, Return to OR, and Mortality

Variable	Major Morbidity Odds Ratio (95% CI)	Return to OR Odds Ratio (95% CI)	Mortality Odds Ratio (95% CI)
Immunocompromised	1.6 (1.3-1.9)	1.9 (1.4-2.4)	2.6 (1.4-4.6)
Pre-operative shock (reference none)			
Pre-operative SIRS	1.6 (1.3-2.1)	1.2 (0.9-1.7)	1.5 (0.5-4.3)
Pre-operative sepsis	5.0 (4.4-5.7)	1.8 (1.5-2.2)	3.1 (1.8-5.2)
Pre-operative septic shock	15.6 (9.2-26.6)	2.2 (1.1-4.6)	22.1 (9.7-50.5)
Diabetes	1.0 (0.9-1.2)	1.0 (0.8-1.3)	1.5 (0.8-2.5)
Age quartiles (reference <34)			
34-45 vs <34	1.0 (0.8-1.2)		2.3 (0.7-7.3)
46-55 vs <34	1.0 (0.8-1.2)	----	2.8 (0.9-8.8)
>55 vs <34	1.2 (1.0-1.4)		7.8 (2.7-22.7)
>10% weight loss 6 months before surgery	1.8 (1.2-2.6)	1.9 (1.2-3.2)	6.1 (2.9-12.7)
Emergency surgery	1.1 (0.9-1.2)	1.1 (0.9-1.3)	----
ASA class (reference I/II)			
III	1.6 (1.4-1.8)	1.3 (1.1-1.5)	----
IV/V	2.7 (2.1-3.5)	1.3 (0.9-1.9)	----
Procedure (I & D only reference)			
I & D plus fistulotomy	----	0.7 (0.5-0.9)	----
I & D plus seton		1.3 (0.9-2.0)	

Selected variables from the models presented due to space constraints

INTESTINAL ASPERGILLOSIS: PATTERNS OF CLINICAL PRESENTATION AND MANAGEMENT. A SYSTEMATIC REVIEW.

P251

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Purpose/Background: Intestinal aspergillosis (IA) is a rare entity primarily discovered in immunocompromised patients. Due to its low incidence, invasive aspergillosis is not routinely considered in the differential of abdominal pain, distension, diarrhea, and lower GI bleeding. A systematic characterization of demographics, comorbidities, clinical presentations, and outcomes can help surgeons recognize IA in critically-ill patients and guide treatment planning.

Methods/Interventions: Literature search was carried out using Pubmed, MEDLINE, and Scopus databases by two independent authors. The following Mesh terms were used: 'intestines', 'intestinal', and 'aspergillosis' combined with the Boolean operator 'AND' (all synonyms were combined with the Boolean operator 'OR'). Intestinal aspergillosis was defined as the inflammation of the gastrointestinal tract from the duodenum to the rectum caused by *Aspergillus* spp. All papers reporting IA were included. Articles describing aspergillosis of the esophagus and

stomach were excluded. The data were extracted from the papers to a previously defined table and included: demographics, comorbidities, patterns of clinical presentation, management modalities, and outcomes. Statistical analysis was performed using SPSS Software (Version 18; SPSS Inc., Chicago, IL, USA).

Results/Outcome(s): 42 articles reporting 56 cases were included in the study. Mean age was 44.9 ± 20.5 . Male to female ratio was 29:27. The most common preexisting condition in patients who developed IA was transplant (19 patients, 34%), followed by acute myeloid leukemia (16 patients, 29%). The most common clinical presentation of IA was abdominal pain (21 patients, 38%), followed by diarrhea (12 patients, 21%), and gastrointestinal bleeding (11 patients, 20%) and distension (11 patients, 20%). Mean time to diagnosis was 8.6 ± 11.3 days. The most common means of diagnosis was exploratory laparotomy (35 patients, 63%), followed by endoscopy (7 patients, 13%). 37 (66%) patients had primary IA, whereas 19 (34%) patients developed IA secondarily as a result of systemic infection. In 34 (61%) patients, aspergillosis involved the small bowel only, whereas in 12 (21%) patients, IA involved large bowel only. In 7 (13%) patients, IA was limited to the ileo-cecal junction. In 43 (77%) patients, bowel resection appeared to be the definitive treatment of IA, while in 13 (23%) patients, treatment was anti-fungal therapy only. There is a trend to better survival with surgery and anti-fungal therapy compared to anti-fungal therapy alone as the difference was not statistically significant (63% vs 46%, $P 0.34$). Mortality rate was 39%.

Conclusions/Discussion: IA is a life-threatening condition with mortality rate up to 39%. In immunocompromised patients presenting with abdominal pain, diarrhea, and/or hematochezia, IA should be ruled out. Survival rate after surgery with anti-fungal therapy was better than that after anti-fungal therapy alone.

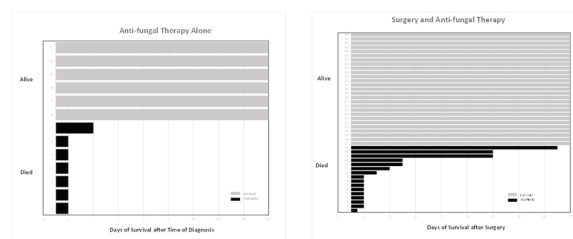


Figure 1. Histograms depicting the outcome (survival versus mortality) of patients treated by: A. Anti-fungal therapy only. B. Surgery

OUTCOMES OF APPENDICULAR MASS IN ADULTS.

P252

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Purpose/Background: There remains a paucity of literature available describing the outcomes for adults presenting with an appendicular mass (abscess or phlegmon). The aim of the study is to provide an analysis of the outcomes of appendiceal phlegmons and abscesses, describing their presentation, management and outcomes.

Methods/Interventions: A retrospective review of all adult patients over the age of 17 who were admitted to the surgical service diagnosed with appendicitis complicated with abscess or phlegmon between September 2011 and October 2017 at a major university affiliated government hospital in the state of Kuwait. The institutional ethical committee approved this retrospective study. Forty-five patients were identified and included for this analysis. Data were collected using patient medical records.

Results/Outcome(s): Between September 2011 and October 2017 there were 45 patients admitted with a diagnosis of appendicitis complicated by phlegmon or abscess formation. From the cohort 19 (42.2%) patients underwent surgical intervention, while 26 (57.8%) patients had conservative therapy (antibiotics with or without percutaneous drainage). Eight patients (42.1%) presented with an abscess in those patients who underwent surgery, versus 14 patients (53.8%) for those who were treated conservatively, $p = 0.55$. The decision to operate or not was determined by the attending surgeon preference. The mean age of presentation is 44.4 [± 12.6] years for those who underwent surgical intervention and 35.7 [± 10.4] years for those who were treated conservatively, $p = 0.03$. The mean length of stay was 6.6 [± 3.7] days for those who required surgical intervention and 5.9 [± 2.4] days for those who were treated conservatively, $p = 0.70$. The

overall 30-day complication rate was 31.6% for those who underwent surgical intervention and 11.5% for those who were treated conservatively, $p = 0.14$. There were no mortalities within 30 days of admission.

Conclusions/Discussion: It appears that the conservative management of appendicitis presenting with phlegmon or abscess is feasible and associated with less overall complications compared with surgical management. Those who did require surgical intervention were more likely to have a more aggressive resection. However, given the nature of a retrospective non-randomized design of this study with a small sample size, a larger prospective trial is needed to verify these results.

TREATMENT OF CHRONIC ANAL FISSURE (TOCA): A RANDOMIZED CLINICAL TRIAL ON DILTIAZEM VERSUS MYOXINOL/CARBOXYMETHYL GLUCAN (NCT02158013).

P253

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Purpose/Background: First-line therapy for the treatment of chronic anal fissures includes topical application of ointments, such as diltiazem and glyceryltrinitrat gels, aiming to reduce the tonus of the anal sphincter. In general, the success rates are disappointing compared with placebo. A new ointment containing myoxinol, a hydrolyzed *hibiscus esculentus* extract with a "Botox-like" effect and carboxymethyl glucan, thought to promote re-epithelization, has shown promising results in observational studies. The purpose of this study was to compare diltiazem 2% gel with myoxinol 3% emulgel in the treatment of chronic anal fissures.

Methods/Interventions: This was a single blinded, randomized, controlled, clinical trial. Patients with a dorsal or ventral anal fissure, defecation pain >8 weeks and presence of a sentinel anal tag or hypertrophic papilla

P252 Comparison of outcomes between conservative and surgical groups

	Surgery (n=19)	Conservative (n=26)	p-value
Mean age in years (SD)	44.4 (12.6)	35.7 (10.4)	0.03
Length of stay (SD)	6.6 (3.7)	5.9 (2.4)	0.70
Gender			
Male	11 (57.9%)	16 (61.5%)	1.00
Female	8 (42.1%)	10 (38.5%)	
Presence of abscess	8 (42.1%)	14 (53.8%)	0.55
30-day complications	6 (31.6%)	3 (11.5%)	0.14
30-day readmission	7 (36.8%)	4 (15.4%)	0.16
30-day mortality	0	0	NA
Median duration of symptoms	6.5 (3.0, 11.0)	7.0 (5.0, 10.5)	0.40

and/or exposure of the horizontal fibers of the internal anal sphincter were randomized to diltiazem or myoxinol twice daily for 8 weeks. Exclusion criteria included anal abscess or fistula, anal surgery within 12 weeks and current or previous use of calcium channel blockers. Primary endpoint was complete healing of the anal fissure 12 weeks after treatment initiation. Secondary endpoints included complete healing after 8 weeks, efficacy on pain relief and stool form as evaluated by the Bristol stool scale (BSS). Follow-up included telephone interviews at day 3 and 7 focusing on pain intensity and clinical examinations after 8 and 12 weeks. A non-inferiority design based on expected success rates of 50% for diltiazem and 70% for myoxinol was chosen. Using a non-inferiority limit of 10%, a total of 88 patients were required to provide a statistical power of 0.90 and a two sided α of 0.05. Data are presented as median and interquartile range (IQR) or number and percentages.

Results/Outcome(s): Recruitment commenced in September 2014 and was terminated in November 2017 because of a slow inclusion rate. A total of 55 patients were randomized. The last follow-up visit is scheduled in January 2018, and the randomization code will be revealed hereafter. In total, 36 of 55 (66%) patients were females, and the median age was 27 years (IQR 24 – 33). Onset of perianal pain was median 26 weeks (IQR 11 – 52) prior to inclusion. The etiology of the fissures was constipation in 60%, diarrhea in 15% and unknown in 25%. In addition, one patient had hemorrhoid surgery and 3 female patients had recently given birth. 87% of the patients suffered from

hematochezia and 49% from severe itching. At inclusion, 42% had BSS type 1-3, 28 (51%) type 4-5 and 4 (7%) type 6 stool. One patient had minor incontinence. 60% had a dorsal fissure, 26% a ventral fissure, and 16% fissures at both locations. 62% had exposed muscle fibers and 58% a sentinel pile.

Conclusions/Discussion: The results of the study, for these patients with chronic anal fissures, will be presented at the ASCRS meeting.

PREDICTORS OF OSTOMY CREATION AFTER ELECTIVE SURGERY FOR DIVERTICULITIS.

P254

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Purpose/Background: Prior to 2014, elective colectomy was recommended after two or more episodes of acute diverticulitis to avoid complications such as emergent operations and ostomy creation. However, new ASCRS guidelines recommend elective colectomy based on the severity of episodes, ongoing symptoms, as well as a patient's risk factors and preferences. The aim of this study was to determine predictors of ostomy creation in elective colectomies performed in patients with a history of acute diverticulitis since the implementation of these new guidelines.

P254 Study Characteristics

	No ostomy N=61	Ostomy N=7	P	Multivariate analysis HR [CI] P
Age	56.42 ± 12.73	61.42 ± 16.07	0.341	
Gender (male)	27 (44.3%)	2 (28.6%)	0.69	
Charlson Comorbidity Index	36 (59%)	3 (42.9%)	0.708	
<2	18 (29.5%)	3 (42.9%)		
≥2	7 (11.5%)	1 (14.3%)		
≥4				
Abdominal surgeries	0.90 ± 1.12	0.71 ± 1.11	0.677	
Total episodes of diverticulitis	2.12 ± 0.92	1.75 ± 0.95	0.435	
Fistula	5 (8.2%)	0	1.000	
Interval between most recent episode and surgery (days)	114.86 ± 122.49	98.42 ± 96.81	0.733	
BMI	28.04 ± 4.27	26.557 ± 8.66	0.443	
IR intervention	5 (8.2%)	3 (42.9%)	0.031	1.841 [0.153-22.074] 0.630
Hinchey classification	45 (73.8%)	1 (14.3%)	0.005	0.256 [0.061-1.066] 0.061
0	10 (16.4%)	3 (42.9%)		
1	6 (9.8%)	3 (42.9%)		
2				
Smoking	10 (16.4%)	5 (71.4%)	0.005	13.648 [1.786-104.302] 0.012

Methods/Interventions: A retrospective review was performed at a single, tertiary center of all patients who underwent an elective colectomy for acute diverticulitis between January 2014 and September 2017. Surgery was performed at least 6-8 weeks after resolution of symptoms. Patients were divided into 2 groups: patients who received a temporary ostomy and patients who did not. Demographics, smoking status, Charlson comorbidity index, history of abdominal surgeries, total episodes of diverticulitis, IR intervention, Hinchey classification, presence of a fistula, and time interval between the last diverticulitis episode and the date of surgery were collected.

Results/Outcome(s): Of the 68 patients who underwent elective surgery for diverticulitis, 7 (10.29%) received an ostomy. When comparing the ostomy group to the no ostomy group, there was no significant difference in age (61.42 ± 16.07 vs 56.42 ± 12.73 ; $p=0.341$), gender (males 28.6% vs 44.3%; $p=0.69$), BMI (26.557 ± 8.66 vs 28.04 ± 4.27 ; $p=0.443$), Charlson comorbidity index ($p=0.708$), history of abdominal surgeries (0.71 ± 1.11 vs 0.90 ± 1.12 ; $p=0.677$), total episodes of diverticulitis (1.75 ± 0.95 vs 2.12 ± 0.92 , $p=0.435$), presence of a fistula (0% vs 8.2%, $p=1.000$), or the time interval between the last diverticulitis episode and the date of surgery (98.42 ± 96.81 days vs 114.86 ± 122.49 days; $p=0.733$). There was, however, a statistically significant difference between the ostomy and the no ostomy groups in smoking (71.4% vs 16.4%; $p=0.005$), IR intervention (42.9% vs 8.2%; $p=0.031$), and Hinchey classification ($p=0.005$) on univariate analysis. With multivariate regression, smoking remained the sole predictor of ostomy creation ($HR=13.648$ [1.786-104.302]; $p=0.012$).

Conclusions/Discussion: This retrospective study identifies smoking as a risk factor for ostomy creation in patients undergoing an elective colectomy for a history of acute diverticulitis. Therefore, smoking cessation should be emphasized for all smokers undergoing an elective colectomy for diverticular disease.

INCIDENCE OF ADENOMA IN NORMAL RISK PATIENTS YOUNGER THAN 50 HIGHER THAN PREVIOUSLY REPORTED.

P255

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Purpose/Background: Older studies report a low yield of screening colonoscopy in normal risk patients below age 50. However, the incidence of colorectal cancer in persons under 50 years of age is increasing in the US. The current incidence of adenoma in patients under 50 may be different than that described in the literature. The primary objective of this study is to measure the incidence of colorectal adenoma in normal-risk patients under the age of 50 years.

Methods/Interventions: This is a retrospective chart review. Diagnostic colonoscopies done from January 1, 2016 to December 31, 2016 by multiple endoscopists at a large, tertiary hybrid medical center. Patients under 50 who underwent elective full colonoscopy were included. Patients with personal or first-degree family history of CRC, previous adenomatous polyp or IBD diagnosis were excluded, as were colonoscopies performed emergently. The main outcome measured was the presence of adenoma. Age, BMI and smoking history, as well as location and type of adenoma were also recorded.

Results/Outcome(s): A total of 1109 patients ranging in age from 16-49 underwent diagnostic colonoscopy during the study period. 285 were excluded on the basis of personal or family history, the presence of IBD or emergent setting. In the remaining 824 patients, 196 (23.7%) were found to have adenoma. The incidence of adenoma in ages 16-19 was 4 of 29 patients. (13.7%) In those ages 20-29, 13 of 171 or 7.6% had an adenoma. Of those ages 30-39, the incidence was 52 of 237 or 21.9%. Finally, in patients ages 40-49 years, 127 of 387 or 32.8% were found to have adenoma.

Conclusions/Discussion: The incidence of adenoma in average-risk patients under age 50 in our sample is 23.7%, which is higher than has been previously reported. The incidence appears to increase with advancing age. More study is warranted to corroborate this finding, to investigate possible associated variables, and to assess the benefit of earlier colorectal cancer screening.

P255 Age Stratification In Adenoma Incidence

	Age 16-19yr (No. = 29)	Age 20-29yr (No. = 171)	Age 30-39yr (No. = 237)	Age 40-49yr (No. = 387)
Findings	No. (%)	No. (%)	No. (%)	No. (%)
Normal	25 (86.3)	158 (92.4)	185 (78.1)	260 (67.2)
Adenoma	4 (13.7)	13 (7.6)	52 (21.9)	127 (32.8)

DOES THE APPLICATION OF NEGATIVE PRESSURE WOUND THERAPY TO CLOSED INCISIONS DECREASE SURGICAL SITE INFECTIONS IN COLORECTAL SURGERY?

P256

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Purpose/Background: Negative Pressure Wound Therapy (NPWT) has been commonly used for open and dehisced wounds to augment wound healing by increasing cellular proliferation, reducing edema, and protecting the wound from infection. However, the effect of NPWT on the rate of surgical site infections (SSI) in closed wounds is still unknown. In this study, the aim was to evaluate the

effectiveness of NPWT in decreasing the rate of SSIs when applied to closed wounds in patients who are at high-risk for developing SSIs.

Methods/Interventions: A retrospective chart review was performed at a single institution to find patients who underwent abdominal or perineal surgeries between May 2012 and June 2017 and were considered high-risk for SSI. The 30-day SSI rate was compared between patients who were treated with NPWT at the conclusion of their operation (intervention group) and patients who did not receive NPWT (control group). The patients were matched based on procedure, BMI, and wound class. A BMI ≥ 30 or a wound class of 3 or 4 was considered high risk for SSI.

Results/Outcome(s): 27 patients were included in the intervention group and were matched to 27 controls. There was no difference between the groups in age (62.5 ± 13.6 ,

P256 Study characteristics

	Control group (No NPWT)	Intervention group (NPWT)	P value
Total N	27	27	
BMI	33.2 \pm 8.1	32.9 \pm 7.6	0.87
Wound Class	1 (3.7%)	1 (3.7%)	0.99
1	11 (40.7%)	11 (40.7%)	
2	7 (25.9%)	8 (29.6%)	
3	8 (29.6%)	7 (25.9%)	
4			
Procedure performed	3 (11.1%)	3 (11.1%)	1.00
Small bowel resection	2 (7.4%)	2 (7.4%)	
R hemicolectomy	7 (25.9%)	7 (25.9%)	
LAR	2 (7.4%)	2 (7.4%)	
APR	1 (3.7%)	1 (3.7%)	
Exploratory Laparotomy	5 (18.5%)	5 (18.5%)	
Ostomy reversal	5 (18.5%)	5 (18.5%)	
Hernia repair	2 (7.4%)	2 (7.4%)	
Perineal surgeries			
Surgical Approach	20 (74.1%)	20 (74.1%)	1.00
Open	6 (22.2%)	6 (22.2%)	
Laparoscopic	1 (3.7%)	1 (3.7%)	
HALS			
Mesh present	6 (22.2%)	6 (22.2%)	1.00
Age	61.44 \pm 17.1	62.5 \pm 13.6	0.80
Gender (males)	13 (48%)	10 (37%)	0.58
Tobacco use	3 (11%)	3 (11%)	1.00
Immunosuppression	1 (3.7%)	4 (15%)	0.35
Diabetes	8 (30%)	7 (26%)	1.00
ASA class	1 (3.7%)	1 (3.7%)	0.68
1	12 (44.4%)	7 (25.9%)	
2	10 (37%)	14 (51.9%)	
3	3 (11.1%)	3 (11.1%)	
4	1 (3.7%)	2 (7.4%)	
5			
Length of stay	5.9 \pm 4.8	6.3 \pm 7.4	0.82

61.44±17.1; $p=0.80$), gender (males 37%, 48%; $p=0.58$), ASA class ($p=0.68$), diabetes (26%, 30%; $p=1.00$), immunosuppression (15%, 3.7%, $p=0.35$) or smoking (11%, 11%; $p=1.00$), respectively. The 30-day SSI rate in the intervention group was 7.4% (2/27), compared to 15% (4/27) in the control group (HR= 0.46, CI 0.08-2.75; $p=0.40$). On subgroup analysis of the 6 patients with SSI, there was a trend toward a shorter mean duration of SSI healing in the intervention group compared to the control group (21±11 days vs. 61±28 days; $p=0.07$).

Conclusions/Discussion: In this study, the application of NPWT to closed surgical incisions in patients considered high risk for infection resulted in fewer SSIs. In addition, there was a trend towards decreased time needed to heal in patients who received NPWT. A larger, randomized-controlled trial is necessary to validate these results.

MANAGEMENT OF COMPLICATED DIVERTICULITIS WITH TUBOOVARIAN ABSCESS.

P257

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Purpose/Background: Complicated sigmoid colon diverticulitis in the form of perforation and abscess formation in the left lower quadrant of the abdomen is one of the most common surgical emergencies. CT scan of the abdomen and pelvis is often obtained in the ER-which on rare occasion shows involvement of the adnexa in female patients. We recently encountered a series of patients who presented with adnexal / ovarian abscess originating from perforated sigmoid colon diverticulitis. Here we report our clinical outcomes, as there is limited existing literature guiding the treatment and prognostication.

Methods/Interventions: This study is a retrospective chart review. All patients who presented with ovarian abscess from perforated sigmoid colon diverticulitis from 2007-2017 were included in the study. Their medical charts were reviewed retrospectively to obtain pertinent data related to this study. The data retrieved included patient demographics, findings of laboratory and imaging tests, and hospital course. Particular attention was paid to findings in the CT scan, percutaneous drainage procedure and surgical intervention if performed.

Results/Outcome(s): Seven individuals at our institution presented with complicated diverticulitis that resulted in tuboovarian abscess. Each individual was initially treated with non-operative management in the form of percutaneous IR drain placement. Six of the seven individuals failed conservative treatment and ultimately required surgical intervention.

Conclusions/Discussion: The treatment of complicated diverticular disease often requires a multimodality approach. Experienced endo- scopists and interventional

radiologists can provide a safer bridge to surgery or may even obviate the need for surgery altogether. Much of the treatment of uncomplicated diverticulitis now falls to the gastroenterologist, the emergency medicine physician, and the family physician. Most cases of diverticulitis are currently managed with only surgical standby for hemodynamic instability and possible future elective resections. When surgery is necessary or recommended, the initial nonoperative management of complications allows time for bowel prepping, thus facilitating one-stage operative procedures and potentially saving the patient from needing an ostomy. However, some diverticular complications are amenable to cure only by surgery. Here we suggest one of those complications is a tuboovarian abscess. These abscesses rarely resolve with percutaneous drainage.

PRIMARY SYNCHRONOUS LEIOMYOMA IN THE PERIANAL REGION. AN EXCEPTIONAL FINDING.

P258

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Purpose/Background: Present the case of development of two primary synchronous leiomyomas in the perianal region.

Methods/Interventions: Review of the patient's medical records and of the literature about synchronous leiomyomas in the perianal region.

Results/Outcome(s): Case report: woman, sixty-nine years old, looked for specialized medical assistance describing the concomitant growth of two tumors in the perianal region for five years. She mentioned that, for the past six months, the lesions had slowly and progressively increased their sizes, causing pain when she sat. She also mentioned that there was a background of chronic intestinal constipation treated with diet and osmotic laxatives. She denied the existence of bleeding during excretion and weight loss during the period. She had been submitted to open hemorrhoidectomy 37 years ago and two natural deliveries. In the proctologic examination for inspection, it has been observed the presence of two tumors with 3 and 2 cm of diameter located in the left anterolateral walls of the anus, respectively. Both nodulations had a distance of 2 cm from the anus, which presented preserved contractility at the dynamic inspection. During digital rectal examination, the tumors dislocated the anal lumen with no signs of infiltration in the wall of the rectum. The lesions were isolated, mobile, had a fibro-elastic consistence and were little painful to mobilization. The rectoscopy has confirmed that the anorectal mucosa had not been compromised. The MRI in the pelvic area has confirmed the presence of the two solid, isolated lesions located in the left-side lateral perianal wall with no evidence of infiltration in the wall of

the rectum and the anal channel. There was no commitment of the lymph nodes in the mesorectum and inguinal region. Based on the findings, the decision was to perform the local excision of both nodulations. The lesions have been easily isolated from the perianal subcutaneous tissue as they were circumscribed and had intimate contact with the muscle of the internal sphincter of the anus. The individual presented a good recovery and was released from the hospital in the first post-operation. The conventional histopathologic examination showed two isolated neoplasia of mesenchymal origin. The immuno-histochemical panel showed positivity for actin of the smooth muscle tissue and desmin; and negativity for the S100 protein. The KI-67 was positive in less than 2% of the cells. The results of the immune-histochemical panel allowed the diagnosis of primary synchronous leiomyoma in the perianal region. At the moment, the patient is having follow-ups in the clinic without relapse 18 months after the surgical resection.

Conclusions/Discussion: Primary primitive benign tumors in the perianal region is a possibility rarely described. The development of primary leiomyomas in the perianal region is an exceptional finding, as the presence of synchronous leiomyomas in that region had never been described before.

BENIGN MULTICYSTIC PERITONEAL MESOTHELIOMA: A REMARKABLE CASE IN A MALE PATIENT.

P259

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Purpose/Background: Benign multicystic peritoneal mesothelioma (BMPM) is a rare tumor arising from the mesenchymal cells of the peritoneum, affecting primarily reproductive-aged females. BMPM affects women at 5 times the incidence of males. BMPM is a benign tumor and does not metastasize, though there has been some evidence of malignant transformation. It is found in the peritoneal cavity intimately attached to serosa of the intestine and omentum, or attached in the retroperitoneal space, spleen and liver. Presenting symptoms are often vague abdominal discomfort or distension, and diagnosis is rarely based on physical exam or pre-op imaging. Instead, diagnosis results from excision of the mass and histological examination. Therefore, the only current treatment strategy is en-bloc removal of the mass. However, there is still a 50% recurrence rate 3-27 months after complete resection, with higher rate of recurrence in females vs. males. Adjuvant chemotherapy and radiation is not recommended. HIPEC following cytoreduction has been considered, but is not recommended as primary treatment for resectable lesions.

Methods/Interventions: A 58 year old male who 9 years prior had bladder cancer treated with TURBT and BCG instillation presented with mild abdominal pain and mild right scrotal swelling. He was otherwise healthy. He had no weight or appetite changes, and no changes in quality or consistency of his stool. Physical exam was remarkable only for a large palpable mass in the right lower abdomen. Abdominal CT scan showed a large, septated cystic lesion in the right lower quadrant. Given his history of bladder cancer, there was concern for metastasis, appendiceal carcinoma/mucocoele, sarcoma or melanoma. An MRI couldn't further characterize the lesion. Surgical removal of the mass was undertaken. At exploration, the mass was found intimately associated with the cecum and adherent to the retroperitoneum, right ureter and duodenum. The mass was sharply dissected free and was resected intact, en-bloc with the right colon, without damage to other structures.

Results/Outcome(s): This patient had an uncomplicated recovery post-op and was discharged home in stable condition post-op day 5. Final pathology showed benign multicystic mesothelioma involving pericecal and periappendiceal peritoneum, 13 cm in greatest dimension with no evidence of mucinous neoplasm and 13 benign lymph nodes. All margins were negative.

Conclusions/Discussion: This is a rare case presentation of BMPM in a male, as only around 130 patients have been reported in literature to date. As was the case here, presenting symptoms are vague and nondescript. The mass was in a typical location and was removed without damage to surrounding tissues. As expected, preoperative imaging was non-diagnostic. Preoperative biopsy is not indicated for potentially resectable lesions. This case study highlights some classic features of BMPM as well as presenting an unusual diagnosis of a retroperitoneal mass in a male.

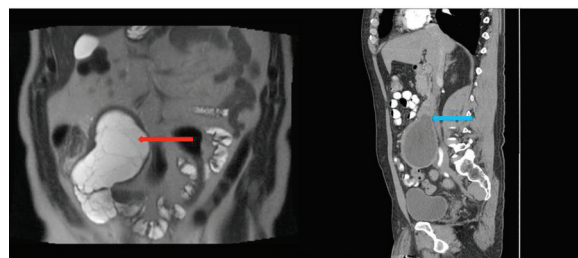


Figure 1. Left image shows T2-weighted coronal image of the cystic mass in the right lower quadrant. Red arrow indicates the mass. Right image shows a sagittal image of a CT scan with contrast. Blue arrow demonstrates close proximity with the duodenum and retroperitoneum with the cystic mass.

CASE REPORT: PROLIFERATING TRICHILEMMAL CYST IN THE PERIANAL REGION.

P260

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Purpose/Background: Present the case of proliferating trichilemmal cyst in the perianal region

Methods/Interventions: Review of the patient's medical records and of the literature about proliferating trichilemmal cyst in the perianal region

Results/Outcome(s): Case report: A 56-year-old woman complained of perianal discomfort upon sitting. She presented with a perianal nodule of approximately 3 cm in diameter that had exhibited slow and progressive growth over 8 years. Proctological examination revealed a nodular cystic lesion in the right posterolateral region of the anus, 2 cm from the mucocutaneous transition zone and measuring 3 cm at its widest diameter. It was covered by a normal epidermis, with no ulcerations or signs of bleeding. Magnetic resonance imaging of the pelvis confirmed the presence of a single cystic, nodular image, described as an ovaloid with mucinous content inside it, located near the anal margin in the posterior median line, with regular contours and well-defined limits. The examination also showed that the lesion measured 2.5 × 1.7 × 2.2 cm, was not invading the sphincter muscle and rectal wall, and did not involve the coccyx or regional lymph node. After surgical excision of the lesion with safety margins, histopathological examination of the excised specimen revealed a squamous lesion with trichilemmal keratinization and largely comprised squamous cells with abrupt keratinization and containing hyaline areas. These characteristics resulted in a diagnosis of proliferating trichilemmal cyst (PTC), which was subsequently confirmed by an immunohistochemistry panel; Ki-67 demonstrated low mitotic index, as well as a low expression of p53 and p63, suggesting the lesion was benign. CD34 expression, to differentiate the PTC from squamous cell carcinoma, also confirmed the diagnosis

Conclusions/Discussion: There are no reports in the literature on PTC in the perianal region. The location with the highest prevalence is the scalp; other sites of occurrence are the neck, trunk, underarms, pubis, vulva, lower and upper limbs, upper lip, and gluteal region. The development of PTC in the perianal region is an exceptional occurrence, and when it does occur, surgical treatment should always be indicated because of the risk of malignant degeneration to form epidermoid carcinoma.

NEOPLASTIC CANCER-ASSOCIATED RETINOPATHY AS PRESENTING SYMPTOM IN COLON CANCER.

P261

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Purpose/Background: Paraneoplastic syndrome associated with adenocarcinoma of colorectal origin is exceedingly rare. Even more unusual are associated visual disorders such as cancer-associated retinopathy (CAR); only three cases had been reported in literature.

Methods/Interventions: We present a case of a 55-year-old female with progressive decreasing visual acuity for one year was found to have retinopathy secondary to antiretinal antibodies. An occult malignancy workup yielded no source on positron emission tomography (PET). Patient underwent intravenous immunoglobulin and oral steroid therapy with minimal improvement of symptoms. One year later, the patient presented with rectal bleeding and was found to have a 3-cm sigmoid adenocarcinoma. Final pathology after laparoscopic sigmoidectomy demonstrated stage IIIa adenocarcinoma (pT3N1a). Chemotherapy was initiated six weeks after resection and she was found to have stable visual acuity and optical coherence tomography with no need for further immunosuppression on ophthalmological follow-up.

Results/Outcome(s): CAR is most commonly associated with small-cell lung cancer and gynecological malignancies, and about 65% of patients present antiretinal antibodies (anti α -enolase, anti-transducin, anti-carbonic

P261 Review of Cancer Associated Retinopathy

Author Year	Location of Malignancy	TMN Stage	Presenting Symptom	Antiretinal Antibodies	CAR Course after Treatment of Malignancy
Jacobson 2000	Sigmoid colon	pT3N1	Progressive visual glare in both eyes	None	Stable visual acuity
Chao 2013	Sigmoid Colon	pT3N1	Visual constriction in both eyes	α -enolase	Improved visual acuity
Weixler 2016	Ascending colon	pT1N0	Progressive vision loss in both eyes	None	Progressive visual loss

*CAR denotes cancer related retinopathy

anhydrase II and anti-recoverin antibodies). Half of CAR syndromes of colonic origin reported, including this case report, detected antibodies against α -enolase and seventy-five percent experienced arrested or improved visual acuity after definitive treatment of underlying malignancy.

Conclusions/Discussion: Because of its detectability with antiretinal antibodies and early stage presentation in malignancy, timely identification of CAR may offer an important indication for associated colonic malignancy. Screening with colonoscopy at the time of symptomatic paraneoplastic visual syndromes could potentially reveal underlying colonic adenocarcinoma below the threshold of nuclear medicine scans. Currently, treatment of the underlying malignancy is the mainstay treatment for CAR and early detection may arrest the progression of devastating retinopathy.

ROBOTIC COLON RESECTION WITH INTRACORPOREAL ANASTOMOSIS FOR SEVERE DIVERTICULITIS DECREASES MORBIDITY IN MORBIDLY OBESE PATIENTS.

P262

J. Hurley
Dallas, TX

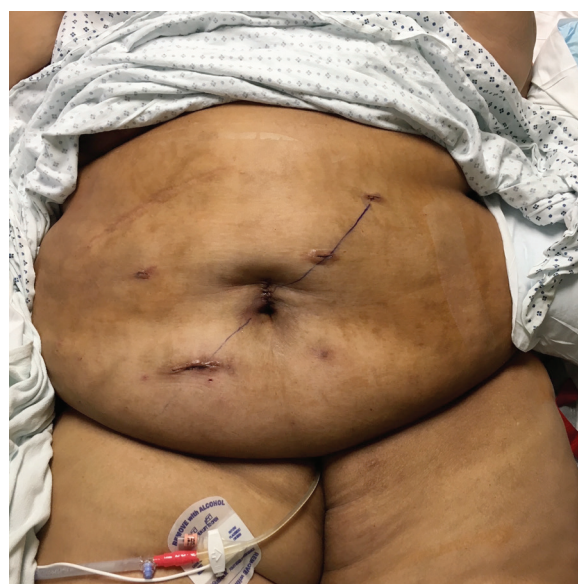
Purpose/Background: Morbidly obese patients present a challenge for colorectal surgical procedures because of high complication rates. Minimally invasive surgery has been shown to decrease morbidity in these patients. With robotic surgery, intracorporeal anastomosis can be more easily and safely performed, which may further decrease morbidity.

Methods/Interventions: Two patients are presented. A 42 year old male with a BMI of 44 had a history of numerous attacks of diverticulitis with a pelvic abscess and liver abscesses. He underwent robotic low anterior resection and intracorporeal anastomosis without complication. His post-operative length of stay was two days. He developed a lower abdominal pannus wound infection that resolved with antibiotics and basic wound care. A 43 year old female with a BMI of 81 had a history of recurrent diverticulitis with abscess. She again presented with diverticulitis with contained sigmoid perforation and pelvic abscess. She was managed with interventional radiology drainage and IV antibiotics. During this admission, she underwent robotic sigmoid colon resection with intracorporeal anastomosis without complication. Her post-operative length of stay was five days. She had no infections or other complications.

Results/Outcome(s): Both patients were managed successfully with robotic colon resection with intracorporeal anastomosis, with minimal to no morbidity.

Conclusions/Discussion: Colon resection with anastomosis can be complicated by wound infections, anastomotic leaks and other perioperative complications. The traditional method of laparoscopic colon resection usually

involves a laparoscopic mobilization and major vessel ligation, followed by an extracorporealization to resect and perform an anastomosis. In contrast, intracorporeal anastomosis involves a full resection and anastomosis performed intracorporeally, followed by extension of one incision to remove the surgical specimen. This technique has the advantages of less tissue mobilization, smaller extraction incision size, and potentially less risk of mesenteric and colonic damage due to extracorporealization. However, because of instrument limitations, laparoscopic intracorporeal resection and anastomosis is a difficult procedure and is not widely utilized. Robotic surgery, with its inherent improved camera vision and control, as well as wristed instruments that allow for intracorporeal suturing, allows the surgeon to more easily and safely perform intracorporeal resection and anastomosis. By limiting tissue dissection and incision size, surgical pain is lessened. This allows for early mobilization and helps avoid complications such as DVT and ileus, which allows a shorter length of stay and quicker return to function. We believe robotic colorectal resection with intracorporeal anastomosis is a good technique for many patients, but has particular value in the morbidly obese patient with diverticulitis.



Diverticulitis in BMI = 81

EXTENSIVE NEOVAGINAL SQUAMOUS CANCER IN A TRANSGENDER FEMALE PRESENTS AS A LARGE PELVIC MASS.

P263

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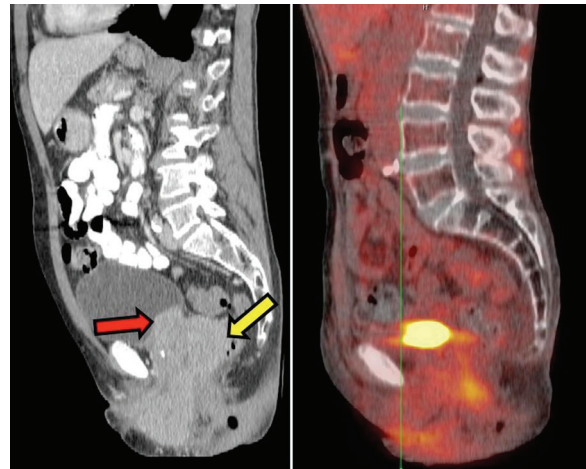
Purpose/Background: With 3200 gender reassignment surgeries performed in 2016, the population of transgender individuals presenting for evaluation by a colorectal

surgeon can be expected to rise. This is one such case. A 63 transgender female, who underwent reassignment surgery in 1972, presented with a pelvic mass causing obstructive uropathy. She had episodes of vaginal bleeding over the last year she attributed to “fibroids.” Increasing pelvic pain and an inability to void compelled her seek treatment. CT scan demonstrated an 8cm mass between the neovagina and the rectum, with impingement on the bladder with consequent obstructive uropathy. The patient had never had a colonoscopy, and had not seen a gynecologist. She denied any bowel symptoms. She stopped taking her hormonal medications a decade ago.

Methods/Interventions: Under anesthesia, bimanual exam was performed, noting a large left labial/vulvar mass without evidence of necrosis. The urethra was indiscernible due to the bulky tumor and surgically altered anatomy. Digital exam and colonoscopy showed extrinsic compression of the rectum at the anorectal junction but no mucosal abnormality. Nephrostomy tubes were placed for urinary decompression with normalization of kidney function. Pathology revealed invasive moderately differentiated squamous cell carcinoma, positive for HPV p16. MRI demonstrated involvement of posterior bladder wall, anterior rectal wall, perineum, and inguinal nodes. At multidisciplinary tumor board this was felt to represent a locally advanced squamous cell carcinoma of the neovagina. She received 46Gy in 23 fractions, with weekly cisplatin.

Results/Outcome(s): Within seven weeks she had resolution of pelvic pain and vaginal bleeding. At completion of treatment, no residual tumor is appreciated on physical exam. The extrinsic compression was no longer present on repeat colonoscopy. PET-CT revealed significant reduction in volume of pelvic mass without evidence of metastatic disease. Additional follow up will guide whether pelvic exenteration will be undertaken. The patient currently is not considering surgery.

Conclusions/Discussion: We present a case of neovaginal squamous cell carcinoma that presented as a locally advanced pelvic mass with an excellent early response to chemoradiotherapy. Transgender patients are known to be at high risk for HPV related neoplasm. In addition, they have surgically altered anatomy, with penile and scrotal skin, typically used to create the neovagina, exposed to different conditions, such as a moist internal location, and a modified hormonal milieu. Furthermore, the internally displaced tissue is no longer available for self-examination. How these factors relate to malignant transformation is unknown but vigilance is warranted. It would be reasonable to recommend that transgender females undergo speculum examination and Pap smear as part of routine cancer screening.



Arrows point to neovaginal tumor impinging on bladder and rectum, followed by complete response after chemoradiation

CLOSTRIDIUM DIFFICILE ENTERITIS IN AN ULCERATIVE COLITIS PATIENT, AFTER TOTAL PROCTOCOLECTOMY AND END ILEOSTOMY.

P264

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Purpose/Background: As the incidence of *Clostridium difficile* infection rises, so does the number of fatal cases. It is the most common cause of nosocomial infectious diarrhea. This gram-negative spore-forming organism is associated with pseudomembranous colitis. However, a rare entity exists where this infection not only involves the colon, but also, the small intestine as *Clostridium difficile* enteritis. Historically, according to small case series, *Clostridium difficile* enteritis carried a mortality rate approaching 66%, but recent studies and systematic reviews have measured this rate closer to 25%. From a recent published review, only 83 cases of *Clostridium difficile* enteritis have been documented in the literature and a significant mortality rate is associated with the immunocompromised patients or those with inflammatory bowel disease.

Methods/Interventions: We explore this rare presentation of the disease, and describe a fatal presentation in an 83-year-old female with a six-year history of ulcerative colitis while on long-term immunosuppressant therapy. With progressively worsening symptoms and failed medical management, this patient underwent a robotic-assisted total proctocolectomy with end colostomy and perineal resection.

Results/Outcome(s): Consequently, she suffered a high-grade small bowel obstruction secondary to a port-site hernia. Following return to the OR for repair of the hernia, patient had high-output from her ileostomy. Furthermore, she developed septic shock leading to acute respiratory

failure and acute renal failure, managed by intravenous hydration, aggressive therapy with broad-spectrum intravenous antibiotics, supportive care, hemodialysis, and intubation. Two days later, the patient developed pseudomembranes visible on her ileostomy. *Clostridium difficile* PCR was sent for testing and revealed a positive result. Oral vancomycin and intravenous flagyl was started. Unfortunately, by this time, all efforts were futile and comfort care was initiated as per family's request.

Conclusions/Discussion: *Clostridium difficile* enteritis after total proctocolectomy should be considered in patients with elevated ileostomy output. This sometimes can be wrongly attributed to the normal physiological adaptation to a shorter bowel. *Clostridium difficile* enteritis is still rare and requires a high index of suspicion to initiate treatment early. Important factors for successful outcomes include early recognition and aggressive treatment to avoid the high mortality associated with this rare clinical entity.

LAPAROSCOPIC VERSUS OPEN PELVIC EXENTERATION FOR COLORECTAL MALIGNANCIS: COMPARISON OF PERIOPERATIVE OUTCOMES.

P265

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Purpose/Background: The role of laparoscopic surgery for advanced colorectal cancer invading to neighboring organs is controversial. Pelvic exenteration (PE) is among the most aggressive and complicated surgeries for pelvic malignancies invading to the prostate or bladder. The aim of the present study was to examine the feasibility of laparoscopic PE for colorectal malignancies.

Methods/Interventions: We analyzed 47 patients with colorectal malignancies who underwent open or laparoscopic PE from 2005 to May 2017 at our institution. Perioperative outcomes were compared between laparoscopic (n = 26) versus open (n = 21) PE.

Results/Outcome(s): Six patients in both groups underwent anterior PE (P=0.7438). Conversion to open surgery occurred in two patients (7.7%). Six patients in the laparoscopic group and one patient in the open group underwent sacrectomy (P=0.4129). The percentage of the ileal neobladder (laparoscopic, 11.5% vs. open, 4.8%; P=0.6174) and perineal reconstructions (30.8% vs 14.3%; P=0.3) were similar between groups. The estimated blood loss (750 ml vs. 2965 ml; P=0.0001) and total volume of blood transfusion (0 ml vs. 1680 ml; P=0.0001) were significantly lower in the laparoscopic compared with the open group. R0 resection was 95.2% in the laparoscopic

group and 100% in the open group (P=1). The operation time (laparoscopic, 798 min vs. open, 803 min; P=0.9148) and complication rate (laparoscopic, 73.1% vs. open, 85.7%; P=0.447) were similar in both groups.

Conclusions/Discussion: Laparoscopic PE is feasible and can be safely performed in selected patients by specialized laparoscopic colorectal surgeons, and has significant advantages of less blood loss compared with open PE.

FEASIBILITY OF PREOPERATIVE CHEMORADIOTHERAPY FOR ELDERLY PATIENTS WITH RECTAL CANCER.

P266

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Purpose/Background: Preoperative chemoradiotherapy (CRT) is a standard treatment for patients with locally advanced rectal cancer. It is not well informed about the feasibility of CRT for elderly patients with rectal cancer.

Methods/Interventions: Between July 2004 and December 2013, 417 stage II/III rectal cancer patients underwent curative resection in our institution. Forty-six of all patients were over 75 years and were included in the elderly group (E group). The residual 371 patients were under 75 years and included in the young group (Y group). The patients in each group were divided into sub-groups according to the presence or absence of CRT, and clinicopathological features and the long-term outcomes were examined.

Results/Outcome(s): In E group, 15 (32.6%) patients had received CRT (E-CRT group) and other 31 (67.4%) patients had no preoperative treatment (E-no CRT group). In Y group, 276 (74.3%) patients had received preoperative CRT (Y-CRT group). In E group, the rate of co-morbidity was significantly lower in patients of E-CRT group than that of E-no CRT group (p=0.01). The 5-year local recurrence rate (LR) of E-CRT group was lower than that of E-no CRT group, but the difference did not reach statistically significant (6.7 vs. 16.3%, p=0.35). In comparison between E-CRT and Y-CRT groups, clinicopathological features, rate of postoperative complication, pathological response rate, and 5-year LR rate did not differ significantly. In multivariate analysis for postoperative complication, sex, longer operative time, and tumor size were the independent risk factors, but there was no relation between age and postoperative complication.

Conclusions/Discussion: In carefully selected patients, preoperative CRT could be performed safely in rectal cancer patients over 75 years, and local control was good for these patients.

DOSE-ESCALATED RADIOTHERAPY UTILIZING STEREOTACTIC RADIOTHERAPY BOOST AND CONCURRENT AND EXTENDED CAPECITABINE FOR PATIENTS WITH MEDICALLY INOPERABLE T2-3N0M0 RECTAL ADENOCARCINOMA.

P267

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Purpose/Background: Total mesorectal excision (TME) with neoadjuvant chemoradiation is the standard treatment in locally advanced rectal cancer. However, a proportion of patients with pre-existing medical comorbidity are at prohibitive risk for TME. These patients are often considered for more limited surgery such as transanal excision (TAE), although certain disease criteria may render TAE suboptimal. We retrospectively reviewed medically inoperable patients with T2-3N0M0 rectal adenocarcinoma treated definitively with dose escalated radiotherapy and concurrent/extended Capecitabine

Methods/Interventions: From 2008-2015 9 patients received definitive chemoradiotherapy AJCC 2007 T2-T3N0M0 (T2=5, T3=4) rectal adenocarcinoma. Patients were deemed medically inoperable for TME independently by 2 colorectal surgeons. No patients were ideal candidates for TAE due to stage, bulk of disease, or technical factors. Patients received concurrent oral capecitabine with 4 weeks of extended capecitabine after radiotherapy. A PET CT scan was utilized for accurate localization of the gross tumor volume. Patients received pelvic radiotherapy to a total dose of 45-50.4 Gy in 25-28 fractions. Dose escalation was achieved through stereotactic radiotherapy (SRT) boost to the involved partial circumference of rectum with doses ranging from 10-20 Gy in 5-8 fractions. Total composite GTV doses ranged from 59-68.4 Gy in 30-34 fractions. Response was evaluated by clinical exam and proctoscopy at 1, 2, 3 months and every 3 months thereafter. Acute and late toxicity were graded with CTCAE v4.0.

Results/Outcome(s): Median age was 68 years (range 50-94). Median tumor diameter was 3.0 cm (range 1.5-4.0). Median circumference involved was 33% (range 20-50). Median distance from the anal verge was 7.5 cm (range 2.0-13.0). Median follow up was 12 months (range 4.8-40.1). At 3 month follow up all patients had tumor response with 6 of 9 (66.7%) having complete clinical response. 4 of 6 had biopsy proven complete response. Time to complete clinical response was 3 months. There were no local or distant recurrences in the 6 complete clinical responders at last follow up. Three patients (T2=1 and T3=2) did not achieve complete clinical response and were salvaged with TAE. Pathology showed only focal residual disease in 1 patient and partial response in 2 patients. There was no grade 3 or higher acute toxicity

from treatment. 89% had retained sphincter function and fecal continence after treatment (8 of 9). There was no grade 2 or higher late rectal bleeding.

Conclusions/Discussion: Surgical resection is the mainstay of therapy for rectal adenocarcinoma. Accordingly, medically inoperable patients pose a treatment dilemma. Definitive chemoradiotherapy with dose escalation utilizing SRT boost may be an acceptable treatment option for selected patients with inoperable rectal adenocarcinoma.

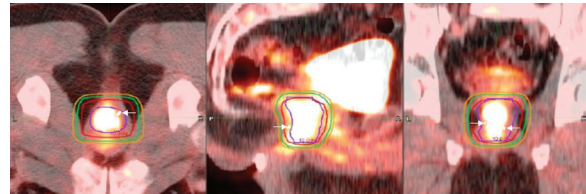


Figure 1. SBRT dosimetry with PET/CT planning demonstrates complete tumor coverage with the prescription isodose line (red line) and rapid dose fall off (green line) to the uninvolved rectum. Gold fiducial markers (white arrow) implanted by surgeon for image-guidance during radiotherapy.

IMPROVED LOCAL CONTROL WITH NEW MULTIMODAL THERAPY FOR ANAL MELANOMA.

P268

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Purpose/Background: Anorectal melanoma is a rare form of colorectal cancer, accounting for approximately 0.05% of all colorectal cancers. Median survival is 20 months, with a range of 10 months for stage III disease to 30 months for stage I disease. The goal for local disease is to perform an R0 resection, typically accomplished by local excision or abdominoperineal resection, and survival rates are similar between the surgical approaches. Unfortunately, many patients quickly develop distant disease regardless of surgical approach. As such, consideration should be given to the patient's quality of life when discussing surgical options. Fortunately, new treatments are available for melanoma, including anti-PD-1 and anti-CTLA4 monoclonal antibodies. This immunotherapy is showing utility in the control of mucosal melanoma. One area that warrants further study is the combination of immunotherapy with surgery for the management of anorectal melanoma. This case series reviews five patients with anorectal melanoma currently being managed with these new modalities.

Methods/Interventions: A retrospective chart review was performed on all five patients with primary anorectal melanoma treated with the multimodal therapy of surgery and combinations of ipilimumab, pembrolizumab, and nivolumab. At the time of diagnosis, four patients had local disease and one patient had metastatic disease.

Two patients underwent surgical excision of their lesion followed by immunotherapy. Two patients received neoadjuvant immunotherapy to reduce tumor size, and subsequently underwent surgical excision. One patient received immunotherapy alone.

Results/Outcome(s): All patients in this case series are still living with a median of 12 months from the time of diagnosis (range: 8-36 months). After receiving immunotherapy and surgical excision, three patients continue to be treated but have stable metastatic disease. One patient treated with immunotherapy alone continues to have local and distant disease control. The final patient has completed treatment for anal melanoma, has no evidence of disease, and is being followed at regular intervals with PET-CT. No patients required an APR, and only one patient required a temporary diverting colostomy. This is improved over the historic rates of approximately 25% for a colostomy.

Conclusions/Discussion: A combination of local excision and immunotherapy has been shown to control local disease without a long-term stoma and manage distant metastases, with one patient having improved survival over historical averages. As more patients are treated with these modalities in our institution, we can further assess the efficacy of this promising new treatment option.

Table of Patient Outcomes

	Case 1	Case 2	Case 3	Case 4	Case 5
Age	55	54	63	77	70
Gender	Male	Female	Male	Female	Male
Months Since Diagnosis	10	36	12	8	18
Neoadjuvant Treatment	-	Ipilimumab Pembrolizumab	-	Ipilimumab Nivolumab	Ipilimumab Nivolumab
Surgery	WLE, re-excision for margins	Colostomy, WLE, colostomy takedown	WLE	-	WLE
Adjuvant Treatment	Ipilimumab Pembrolizumab Biochemotherapy	Pembrolizumab	Ipilimumab	-	-
Disease Status	Progression	Mixed response	Progression	Mixed response	Stable

FACTORS INFLUENCING TIME TO ADJUVANT CHEMOTHERAPY (TTAC): AN EVALUATION OF PATIENT CHARACTERISTICS IN NEW JERSEY.

P269

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Purpose/Background: In the United States, colorectal cancer is the second leading cause of cancer death annually. Adjuvant chemotherapy after surgical resection of stage III colon cancer has been associated with survival benefits. Timely initiation of adjuvant chemotherapy has been shown to have a positive effect on overall and disease-free survival in multiple retrospective analyses.

Identifying factors leading to delays in initiation of chemotherapy after diagnosis is critical to improve overall clinical outcomes in those with stage III colon cancer.

Methods/Interventions: A secondary analysis of data from the NJ Cancer Registry 2009-2014 for all adults who underwent definitive surgery for Stage III colon cancer with adjuvant chemotherapy was performed. The difference between time to adjuvant chemotherapy (TTAC) in patients with various sociodemographic characteristics was analyzed with the Wilcoxon rank sum and Kruskal-Wallis tests and multivariable generalized linear modeling (SAS GENMOD procedure with gamma model with log link) controlling for age, gender, race, marital status, insurance and income. Because of non-normal distribution, TTAC was presented as median with interquartile range (IQR). Only patients with one primary neoplasm were included in the analysis.

Results/Outcome(s): A total of 1670 patients who met the inclusion criteria were identified. TTAC in the oldest (75+ years) group (median 48 days, [IQR 37-64]) was greater than in the youngest (18-49 years) group (42 [34-53]; $P < 0.0001$). This was confirmed in the multivariable analysis (OR [odds ratio] = 1.14, 95%CI [confidence interval] 1.04-1.24). We did not find gender disparities in TTAC but found delay in TTAC in blacks (48 [34-64]) compared to whites (44 [35-56]), $P = 0.03$). Compared to patients with private insurance (42 [34-52]), those with Medicaid (50 [37-68]), Medicare (48 [36-63]) and uninsured patients (46.5 [32-64]) had greater TTAC ($P < 0.001$, $P < 0.0001$ and $P = 0.04$, respectively), that was also found in the multivariable model. Compared to married patients (43 [34-55]), single counterparts (46 [34-62], $P = 0.03$), widowed (49 [35-64], $P = 0.01$), and separated/divorced (48 [35-62], $P = 0.014$) had delayed TTAC as well. The latter was also found statistically significant in the multivariable analysis (OR = 1.07, 95%CI 1.001-1.148). TTAC steadily increased with increasing poverty, from 43 days (34-56) in richest patients to 49 days (35-62) in poorest patients ($P = 0.02$); however, this was not confirmed in the multivariable analysis.

Conclusions/Discussion: TTAC has been identified as a key measure of the delivery of quality colon cancer care. While there are some uncontrollable factors like operative complications that delay TTAC, engaging the patient may help decrease the TTAC by increasing patient awareness of the importance of seeking aggressive postoperative care.

ENHANCED RECOVERY: AN OPPORTUNITY FOR IMPROVED CANCER OUTCOMES.

P270

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Purpose/Background: The positive impact of enhanced recovery after surgery (ERAS) protocols on postoperative outcomes, length of stay and morbidity, is well established. Postoperative complications are associated with delay in adjuvant chemotherapy and thus worse cancer-related outcomes in colorectal cancer patients. We hypothesized that an ERAS protocol would improve the time-to-adjuvant treatment in patients with colorectal cancer.

Methods/Interventions: An ERAS protocol was initiated at our institution on July 1, 2016. Two groups of patients with colorectal cancer who underwent elective colectomy or proctectomy were compared using a prospectively maintained database: one group pre-ERAS, from July 1, 2015, through January 31, 2016, and another group post-ERAS between July 1, 2016, and January 31, 2017. Oncologic data was obtained through retrospective chart review, and NSQIP data was used to determine the rate of postoperative complications. Patient and operative characteristics were compared between each group. Time-to-adjuvant treatment, factors for delay, and postoperative complications were determined for each patient and compared between groups.

Results/Outcome(s): Over the study period, 177 patients (94 pre-ERAS and 81 post-ERAS) were identified. Type of operation (46% segmental colectomy, 43% LAR, 4% APR, 6% total), surgical approach (laparoscopic 39%, robotic 17%, open 44%), and cancer stage were similar between groups. Compliance with the ERAS protocol was 70% in the post-ERAS group, and postoperative complications decreased significantly after ERAS was initiated (22% vs. 5%, $p=0.007$). Of patients with stage III and IV disease, adherence to adjuvant chemotherapy was 77% ($n=79$). Adjuvant chemotherapy was initiated at a median of 48 days (IQR 35-59) after surgery in the pre-ERAS group and 42 days (IQR 35-64) in the post-ERAS group ($p=0.49$).

Conclusions/Discussion: Initiation of an enhanced recovery protocol has significantly decreased postoperative morbidity. Despite this improvement, delays in adjuvant chemotherapy persist. This suggests that factors other than postoperative complications influence initiation of chemotherapy. ERAS patients may represent an opportunity for process improvement toward better time-to-chemotherapy benchmarks.

IMPACT OF TUMOR DEPTH AND NODAL POSITIVITY ON 30-DAY OPERATIVE OUTCOMES FOLLOWING DESCENDING COLECTOMY.

P272

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Purpose/Background: Anastomotic leak after colectomy is associated with worsened oncologic outcomes, including reduced overall survival. Patient and operative factors are associated with anastomotic leak; however, the role of tumor depth and nodal disease on perioperative outcomes remains poorly elucidated. We aim to evaluate the impact of tumor grade and lymph node involvement on postoperative outcomes following oncologic resection of descending colon malignancies.

Methods/Interventions: The 2012-2016 National Surgical Quality Improvement Program (NSQIP) Colectomy Procedure-Targeted database was queried for patients with descending colon malignancies. Patients with disseminated cancer, preoperative chemotherapy, preoperative radiation, or steroid use were excluded. Multivariate analysis (MVA) models were constructed to adjust for confounding factors including known predictors of anastomotic leak such as obesity, emergent status and surgical approach.

Results/Outcome(s): 12,234 patients (mean age of 65.6 ± 13.2 years and BMI 28.7 ± 6.8 kg/m²) met inclusion criteria for subsequent analysis. Major complications occurred in 23.0%, minor complications in 36.3%, and anastomotic leak in 3.3% of all patients. Overall 30-day mortality was 1.6%. Patients were separated into cohorts based on pathologic tumor and node classifications. On univariate analysis, patients with T4 lesions had similar rates of anastomotic leak compared to T0-3 lesions. Increased rates of major (33.4%vs.21.9%, $p<0.0001$) and minor complications (49.0%vs.35.0%, $p<0.0001$) occurred in T4 patients compared to $\leq T3$. Higher 30-day mortality rates were also demonstrated in T4 lesions (2.9%vs1.3%, $p<0.02$). On MVA, T4 stage was independently associated with increased major complications (OR 1.5; 95%CI 1.140-1.961), minor complications (OR 1.5; 95%CI 1.200-1.929) and 30-day mortality (OR 2.4; 95%CI 1.317-4.246). Conversely, patients with pathologic nodal involvement (N1/N2) had lower rates of anastomotic leak than N0 disease (3.0%vs.3.8%, $p<0.03$). On MVA, nodal disease was associated with lower rates of anastomotic leak (OR 0.65; 95%CI 0.471-0.908) and 30-day mortality (OR 0.44; 95%CI 0.240-0.806). Use of a minimally invasive approach had a protective effect on anastomotic leakage (OR 0.65; 95%CI 0.477-0.880), major complications (OR 0.63; 95%CI 0.511-0.785) and reduced 30-day mortality (OR 0.54; 95%CI 0.310-0.949).

Conclusions/Discussion: In our analysis of patients undergoing descending colectomy, T4 lesions were associated with higher rates of major complications, minor complications, and 30-day mortality. Interestingly, N1/N2 disease was not associated with major or minor complications, but was associated with lower rates of anastomotic leak. Further, nodal involvement was associated with lower 30-day mortality. Given these disparate findings, further research is needed to delineate the specific interactions between tumor depth and nodal disease on postoperative complications.

THE IMPACT OF PATIENT DEMOGRAPHICS VS TUMOR FACTORS ON THE PROGNOSIS OF ANAL SQUAMOUS CELL CARCINOMA TREATED WITH STANDARD CHEMORADIATION THERAPY.

P273

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Purpose/Background: Previous population based literature has shown that although tumor characteristics and staging affect prognosis of anal squamous cell carcinoma (A-SCC), patient demographics, such as gender, race, and socioeconomic status, are also important prognostic factors. We hypothesized that, when patients are appropriately treated, tumor factors represent the main drivers of

the overall survival outcomes. We therefore evaluated the impact of patient and tumor characteristics on prognosis of A-SCC in individuals receiving treatment according to the current standard of care.

Methods/Interventions: The National Cancer Database was queried to identify patients diagnosed with A-SCC from 2004 to 2015. Analyses were limited to patients who did not undergo abdominoperineal resection and received both chemo and radiation therapy (dose 45-59 Gy). Data were examined using simple summary statistics, Kaplan-Meier analysis, and Cox proportional hazards regression analysis.

Results/Outcome(s): A total of 17,002 patients with A-SCC were identified from the NCDB. Seventeen percent were classified as Stage I, 45% as Stage II, 34% as Stage III, and 3% as Stage IV according to the American Joint Committee on Cancer (AJCC) staging system. Five-year overall survival (OS) decreased with increasing AJCC stage: Stage I OS was 86%, Stage II 77%, Stage III 66%, and Stage IV OS 37%. In the multivariate analysis, factors independently associated with significant worse survival were male gender, older age, not having private insurance, treatment in non-academic facilities, higher number of comorbidities, higher T stage, positive lymph node status, and distal metastases (Table 1). Race, education, and income were not associated with lower OS.

Conclusions/Discussion: These data validate our hypothesis that when patients with A-SCC are treated with the current standard of care, tumor factors are the main variables determining the overall survival. This likely

P273 Multivariate regression analysis for factors independently associated with anal squamous cell carcinoma survival

Risk factor	HR	95%CI	p-value
Gender, male	1.54	1.41-1.67	<0.001
Age, years	1.03	1.02-1.03	<0.001
Insurance, medicare		Reference	
Insurance, private	0.64	0.53-0.76	<0.001
Insurance, none	0.97	0.81-1.16	0.765
Institution, academic facility		Reference	
Institution, comprehensive center	1.10	1.00-1.20	0.047
Institution, community based	1.33	1.16-1.53	<0.001
Comorbidities, none		Reference	
Comorbidities, 1	1.23	1.09-1.38	<0.001
Comorbidity, ≥2	1.77	1.55-2.04	<0.001
AJCC T 1		Reference	
AJCC T 2	1.48	1.30-1.69	<0.001
AJCC T 3	2.46	2.13-2.84	<0.001
AJCC T 4	2.65	2.22-3.17	<0.001
AJCC N+	1.50	1.37-1.63	<0.001
AJCC +	2.44	2.078-2.87	<0.001

HR = hazard ratio (HR >1 indicates better survival); CI = Confidence Interval.

suggests that the lower OS previously observed among non-Caucasian patients and those with lower socioeconomic status were a reflection of disparities in accessing healthcare rather than secondary to tumor characteristics and/or biology.

ELIGIBILITY ANALYSIS OF THE EXTENT OF PEDIGREES TO SCREEN AND DIAGNOSE LYNCH SYNDROME: COMPARISON OF THE SIMPLIFIED AND EXTENDED PEDIGREE.

P274

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Purpose/Background: Obtaining a pedigree is the first step for recognizing a patient with hereditary colorectal cancer (CRC). However, obstacles exist in obtaining accurate genealogy including time restraints, clinician's underestimation of family history and lack of established standard for pedigrees. This cross-sectional study aimed to determine the size of pedigrees needed to be obtained for high risk screening and diagnosing Lynch Syndrome.

Methods/Interventions: Data was collected from a prospectively registered cohort of 2,040 pedigrees, of which the probands underwent operation for CRC from 2003 to 2017. The diagnostic yield for those at risk including only 1st degree relatives (simplified pedigree) and a more extensive pedigree including clinical information of cancer, survival status, and endoscopy data from 1st and 2nd degree relatives covering at least three generations (extended pedigree) were compared for each of the following guidelines for hereditary cancers; the American Cancer Society (ACS) guideline, the Revised Bethesda guideline, the Suspected Hereditary Non-Polyposis Colorectal Cancer (HNPCC) criteria, and the Amsterdam II criteria.

Results/Outcome(s): By applying the ACS guideline, comparing the 196 (196/2040; 9.6%) families already at risk using simplified pedigrees, two (2/198; 1.0%) more families were at risk using the extended pedigree. Analysis of the revised Bethesda guideline, 308 (308/2040; 15.1%) families met the guideline with simplified pedigrees, and no additional families (0/308; 0.0%) fulfilled the guideline with extended pedigrees. For the Suspected HNPCC criteria, 66 (66/2040; 3.2%) showed positive results using simplified pedigrees and no additional families (0/66; 0.0%) fulfilled the criteria for extended pedigrees. Applying the Amsterdam II criteria, four (4/2040; 0.2%) families met the criteria using simplified pedigrees and six (6/10; 60%) more families met the criteria with extended pedigrees.

Conclusions/Discussion: This study is one of the first studies to evaluate the contribution of extent of obtained family history for eligibility assessment for high risk screening. This study suggests that usage of a simplified

pedigree could be acceptable for recommending genetic counseling in daily clinical practice, while an extended pedigree is still required for precise recognition of new patients with hereditary CRC.

ONCOLOGIC OUTCOMES FOR ANAL MELANOMA FOLLOWING LOCAL EXCISION VERSUS ABDOMINOPERINEAL RESECTION: A NATIONAL CANCER DATABASE ANALYSIS.

P275

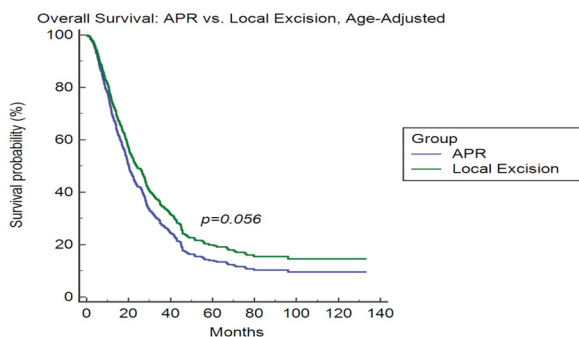
A. Fields, J. Goldberg, J. Senturk, R. Bleday,
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Purpose/Background: Anal melanoma is a rare disease with a poor prognosis. The optimal surgical management of anal melanoma remains unknown as most studies have limited patient populations from single institutions. We aim to investigate overall survival and operative oncologic outcomes in anal melanoma patients who underwent local excision compared to abdominoperineal resection (APR).

Methods/Interventions: The National Cancer Database (2004-2013) was used to identify patients with nonmetastatic anal melanoma who underwent local excision or APR. The database was queried for patient demographics, tumor characteristics, and surgical outcomes. The primary outcome was overall survival. Chi-square and Wilcoxon rank-sum tests were carried out for bivariate analysis and a Cox Proportional-hazards model was used to determine the effect of surgery type on survival.

Results/Outcome(s): 439 patients were included in the local excision group and 214 patients were included in the APR group. Patients in the APR group were older (70 years vs. 65 years, $p < 0.001$) and had larger tumors (40mm vs. 25mm, $p < 0.001$). Following resection, APR patients were more likely to have positive lymph nodes (65.7% vs. 12.5%, $p < 0.001$) and less likely to have positive margins (10% vs. 29.8%, $p < 0.001$). There was no significant difference in 30-day mortality between the APR and local excision patients (1.6% vs. 0.8%, $p = 0.38$). There was no significant difference in overall survival between the APR and local excision patients (HR: 0.82, 95% CI: [0.67-1.01], $p = 0.06$). In patients undergoing local excision, there was a significant survival advantage for individuals with negative margins (HR: 0.70, 95% CI: [0.53-0.93], $p = 0.009$). In patients undergoing APR, there was a significant survival advantage for individuals with negative nodes (HR: 0.50, 95% CI: [0.35-0.69], $p = 0.002$) and negative margins (HR: 0.34, 95% CI: [0.15-0.77], $p < 0.001$).

Conclusions/Discussion: The overall survival of anal melanoma patients is similar following local excision and APR. Positive margins and nodes at time of surgery have a significant negative impact on overall survival.



SURGICAL OUTCOMES IN PERSISTENT VERSUS RECURRENT ANAL SQUAMOUS CELL CARCINOMA: IS THERE A DIFFERENCE IN SURVIVAL?

P276

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Boston, MA

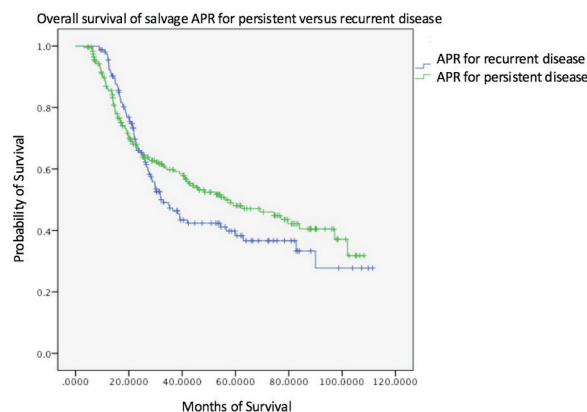
Purpose/Background: Anal squamous cell carcinoma is an uncommon gastrointestinal tract malignancy. The standard first line treatment for nonmetastatic disease is chemoradiotherapy. A small percentage of patients will fail neoadjuvant therapy and have persistent disease while others will have an initial therapeutic response with disease recurrence. The goal of this study is to investigate overall survival and operative outcomes in anal squamous cell carcinoma patients who fail first-line treatment and have persistent disease compared to those with disease recurrence.

Methods/Interventions: The National Cancer Database (2004-2013) was used to identify patients with nonmetastatic anal squamous cell carcinoma who underwent neoadjuvant chemoradiation and subsequently required abdominoperineal resection. Patients were considered to have persistent disease if APR occurred within 6 months of neoadjuvant therapy and recurrent disease if APR occurred after 6 months of neoadjuvant therapy. Patient demographics, tumor characteristics, and surgical outcomes were analyzed. The primary outcome was overall survival. Chi-square and Wilcoxon rank-sum tests were carried out for bivariate analysis and a Cox Proportional-hazards model was used to determine the effect of timing of APR on survival.

Results/Outcome(s): There were 256 patients who had salvage APR within six months of neoadjuvant therapy and were placed in the persistent disease group while there were 181 patients who had salvage APR after six months of neoadjuvant therapy and were placed in the recurrent disease group. There were no significant differences in patient demographic, tumor grade, or pathologic stage of disease ($p > 0.05$). Patients with persistent disease had an APR at a median of 128 days from radiation compared to patients in the recurrent disease group who had an APR at

a median 234 days from radiation ($p < 0.001$). Both groups of patients had similar tumor size (45mm vs. 50mm, $p = 0.07$) and rate of positive margins (21.5% vs. 15.6%, $p = 0.13$) at the time of APR, but patients in the persistent disease group were significantly more likely to have positive lymph nodes (19.9% vs. 11%, $p = 0.05$). There was no significant difference in overall survival between salvage APR for persistent or recurrent disease (HR: 0.87, 95% CI: [0.65-1.16], $p = 0.34$).

Conclusions/Discussion: The overall survival of anal squamous cell carcinoma patients is similar following salvage APR for persistent disease and recurrent disease.



HEALTH ECONOMIC ANALYSIS IN A RANDOMIZED TRIAL OF EARLY CLOSURE OF A TEMPORARY ILEOSTOMY AFTER RECTAL RESECTION FOR CANCER (EASY TRIAL).

P277

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Purpose/Background: A temporary ileostomy may reduce symptoms and clinical consequences of an anastomotic leakage after rectal cancer resection. The EASY trial compared early (8-13 days) vs. late closure (>12 weeks) of a temporary ileostomy. Primary results showed that early closure was associated with significantly fewer post-operative complications up to 12 months after rectal resection. The aim of the present study was to perform a health economic evaluation of early and late closure of a temporary ileostomy within the framework of the EASY trial.

Methods/Interventions: Early closure (8-13 days) of a temporary stoma was compared to late closure (>12 weeks) in the randomized controlled trial EASY (NCT01287637). The study period and follow-up was 12 months after rectal resection. Inclusion of participants was made after index surgery. Exclusion criteria were signs of anastomotic leakage, diabetes mellitus, steroid treatment or signs of postoperative complications at clinical evaluation 1-4 days after rectal resection. Clinical effectiveness and resource use were derived from the trial and unit costs from Swedish

sources. Costs were calculated for the year 2017 and analysed from the perspective of the healthcare sector.

Results/Outcome(s): The study included 55 patients who underwent early closure of a temporary ileostomy and 57 patients who underwent late closure in eight Swedish and Danish hospitals during the period February 2011 to November 2014. For the health economic evaluation data for 82 patients were complete. The difference in mean cost per patient between early and late closure was statistically significant (p-value=0.012) with 4061 USD (95% CI 899; 7222) in favour of early closure.

Conclusions/Discussion: The significant cost reduction in this study, together with results of safety and efficacy from the randomized controlled trial, support the routine use of early closure of a temporary ileostomy after rectal resection for cancer in patients without radiological or clinical signs of anastomotic leakage.

TRENDS IN RECTAL ADENOCARCINOMA: THE IMPACT OF AGE AND HISTOLOGY.

P278

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Purpose/Background: The incidence of colorectal cancer in younger patients has increased in recent years. The reason for this increase is unknown and likely multifactorial. The goal of this study is to investigate rectal adenocarcinoma in younger patients to better understand survival and oncologic factors that may be related to age of diagnosis.

Methods/Interventions: The National Cancer Database (2004-2013) was used to identify patients with rectal adenocarcinoma. Patients were stratified into two groups based on age (<40 years old and >40 years old). The primary outcomes were oncologic factors such as stage of disease and tumor histology as well as overall survival.

P278 Patient demographics and characteristics

Variable	age < 40 (N=3,246)	age > 40 (N=93,612)	p value
Age, years (median)	35 (32-38)	64 (55-74)	<0.001
Female sex, n (%)	1,523 (46.9%)	37,373 (39.9%)	<0.001
Race, n (%)			<0.001
White	2,709 (83.5%)	81,668 (87.2%)	
Black	292 (9.0%)	7,271 (7.7%)	
Charlson Score, n (%)			<0.001
0	3,008 (92.7%)	71,233 (76.1%)	
1	220 (6.8%)	17,410 (18.6%)	
2	18 (0.6%)	4,969 (5.3%)	
Insurance Type, n (%)			<0.001
None	260 (8.0%)	3,302 (3.5%)	
Private	2,383 (73.4%)	41,064 (43.9%)	
Medicaid	411 (12.7%)	4,423 (4.7%)	
Medicare	84 (2.6%)	42,453 (45.3%)	
Median Income, n (%)			<0.001
<38,000	520 (16.0%)	16,261 (17.4%)	
38,000-47,999	774 (23.8%)	22,787 (24.3%)	
48,000-62,999	860 (26.5%)	25,057 (26.8%)	
>63,000	1,056 (32.5%)	28,259 (30.2%)	
Pathologic Stage			<0.001
Stage 1	886 (27.3%)	35,738 (38.2%)	
Stage 2	621 (19.1%)	22,300 (23.8%)	
Stage 3	1,355 (41.7%)	28,133 (30.1%)	
Stage 4	384 (11.8%)	7,441 (7.9%)	
Histology			<0.001
Adenocarcinoma signet cell	80 (2.5%)	547 (0.6%)	
Adenocarcinoma mucinous	246 (7.6%)	6,640 (7.1%)	
Adenocarcinoma	2,920 (90.0%)	87,425 (93.4%)	

Chi-square and Wilcoxon rank-sum tests were carried out for bivariate analysis.

Results/Outcome(s): There were 96,858 patients identified who had rectal adenocarcinoma. Younger patients were more likely to have lower Charlson comorbidity scores ($p < 0.001$) and be uninsured ($p < 0.001$). Patients under the age of 40 were more likely to present with stage 3 or 4 disease compared to older patients who had higher rates of stage 1 disease ($p < 0.001$). Patients under the age of 40 had an incidence of signet cell histology of 2.5% compared to 0.58% for patients over the age of 40 ($p < 0.001$). The tumor size was larger in younger patients (45mm vs. 40mm, $p < 0.001$) and more lymph nodes were harvested in these patients (16 vs. 13, $p < 0.001$). Younger patients had better overall survival in all stages of disease ($p < 0.001$). Patients with signet cell histology had the worst overall survival ($p < 0.001$).

Conclusions/Discussion: Younger patients have better overall survival than older patients and signet cell histology is associated with decreased survival. Patients under the age of 40 were significantly more likely to have signet cell histology. Given that younger patients have higher rates of signet cell histology and this subtype of rectal adenocarcinoma is associated worse survival, comprehensive evaluation in young patients with symptoms of rectal cancer is imperative.

UPDATED OUTCOMES AFTER LOCAL EXCISION VERSUS RADICAL RESECTION IN RECTAL CANCER: A NATIONAL POPULATION-BASED STUDY USING NATIONAL CANCER DATABASE.

P279

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Purpose/Background: With the demonstration of worse locoregional control with its use in most circumstances, local excision of rectal cancer is currently very selectively used. Whether the addition of modern chemotherapy and radiotherapy allows the expansion of local excision to other indications has not been adequately assessed.

Methods/Interventions: All patients with rectal cancer without regional (N0) and distant (M0) disease in the National Cancer Database from 2009 to 2014 were included. Data were analyzed on patient demographics, procedure performed (local excision vs. radical resection), pathological details, chemoradiotherapy, perioperative outcomes, and survival. Propensity score matching and multivariate cox proportional hazards model were used to compare outcomes between two procedure groups.

Results/Outcome(s): Of the 47,004 patients, 15,828 (33.7%) underwent local excision, and 31,176 (67.3%) underwent radical resection. Patients who underwent local excision were more likely to be female (46.0% vs. 39.9%),

black (14.3% vs. 8.0%), receive care in metropolitan area (83.5% vs. 78.2%), and less likely to have T stages of 3 or 4 (4.7% vs. 44.7%). Propensity-score matching (PSM) was performed on age, sex, race, primary payor, Charlson comorbidity score, receipt of neoadjuvant chemotherapy and/or radiotherapy, and T stage. PSM analysis demonstrated significantly lower length of stay (1.9 ± 8.4 vs. 6.9 ± 7.9 days), and lower unplanned readmission rates (2.3% vs. 6.3%) for local excision compared to radical resection. Local excision was associated with significantly higher R2 surgical margins (14.4% vs. 1.5%). After adjusting for variables included in the PSM model, local excision was associated with equivalent overall survival compared to radical resection (HRs = 0.95, $P = 0.14$) (Table).

Conclusions/Discussion: Overall survival after local excision was equivalent to radical resection when controlling for patient, tumor and treatment factors. These data suggest that the use of local excision can be re-evaluated in specific situations within the context of modern chemotherapy and radiotherapy use.

BOWEL FUNCTION AFTER ULTRA-LOW PELVIC ANASTOMOSIS FOR RECTAL CANCER.

P280

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Purpose/Background: Restorative reconstruction has been proposed as a marker for optimized surgical treatment of rectal cancer. The bowel functional effects of restorative reconstruction with ultra-low pelvic anastomosis is largely unknown due to the lack of baseline bowel function data. The purpose of this study is to evaluate the effects of ultra-low pelvic anastomosis after proctectomy for rectal cancer on bowel function.

Methods/Interventions: All patients with rectal cancer who underwent proctectomy with an ultra-low pelvic anastomosis, either coloanal or ileoanal, and subsequent diverting loop ileostomy reversal were included over a 1.5 year period. The Colorectal Functional Outcome (COREFO) questionnaire was administered prospectively to patients during the initial visit and at follow-up after ileostomy reversal. The questionnaire assesses bowel function in five domains (incontinence, frequency, social impact, need for medication and stool related aspects) and total score; scores for each range from 0 (best function) to 100 (poorest function). The null hypothesis was that there would be no difference in bowel function scores in any domain or total score. Demographic, operative, and questionnaire results were linked and analyzed. Paired t-test analysis was used to evaluate the score changes following ileostomy reversal.

Results/Outcome(s): A total of eight patients were included in the study. Mean (SD) age was 60(8) years with two women; all patients were symptomatic at time

of presentation. By rectal tumor location, there were four patients with a lower third malignancy and four with a middle third. By baseline MRI and CT staging, three patients were stage I, one patient stage II, three patients stage III, and one patient stage IV. Six patients underwent neoadjuvant chemoradiotherapy, one with short-course and five with long-course. Four patients underwent a robotic low anterior resection, two patients

underwent a minimally-invasive total proctocolectomy with ileoanal pouch, one patient underwent an open low anterior resection, and one patient underwent a taTME; all patients had a diverting loop ileostomy constructed. The level of the anastomosis was at the dentate line in three cases, 1cm proximal to the dentate line in two cases, and 2cm proximal in three cases. Five patients underwent adjuvant chemotherapy. Bowel function scores are shown

P279 Multivariate cox proportional hazards model for time to death following local excision versus radical resection. Hazard ratio that is statistically significant ($p < 0.05$) are marked by asterisks

Variables	Hazard Ratio	95% Confidence Interval
Procedure type		
Local excision	0.95	0.89-1.02
Radical resection	Ref	Ref
Sex		
Male	1.23*	1.16-1.29
Female	Ref	Ref
Race		
White	1.37*	1.19-1.58
Black	1.51*	1.28-1.77
Other	Ref	Ref
Primary Payor		
Private	0.66*	0.52-0.83
Government	0.88	0.69-1.11
Not insured	1.09	0.82-1.43
Other	Ref	Ref
Age	1.05*	1.05-1.05
Charlson-Deyo Score	1.47*	1.42-1.42
Neoadjuvant chemotherapy and/or radiation	0.87*	0.81-0.93
T stage		
Tx	1.07	0.71-1.6
T0	0.76	0.45-1.29
Tis	0.7	0.47-1.06
T1	0.71	0.48-1.07
T2	0.9	0.6-1.35
T3	1.17	0.78-1.75
T4	2.38*	1.57-3.62
Not available	Ref	Ref

P280 Bowel Function after Ultra-Low Pelvic Reconstruction for Rectal Cancer (n=8)

	Mean (SD) Baseline Score	Mean (SD) After Ileostomy Reversal Follow-up Score	p
Incontinence	13.2 (9.1)	42.0 (23.4)	<0.05
Social Impact	29.8 (28.5)	43.4 (25.2)	<0.05
Frequency	23.4 (15.6)	39.1 (10.4)	<0.05
Stool Related Aspects	30.2 (28.8)	28.1 (27.1)	NS
Need for Medication	16.7 (18.4)	51.0 (28.3)	<0.05
Total COREFO Score	22.1 (17.1)	41.7 (17.8)	<0.05

A higher score indicates worse function

in the Table. Median (IQR) number of days between initial to after-ileostomy reversal follow-up questionnaire completion was 380 (300-448) days. Mean bowel function scores were significantly poorer in every domain and Total COREFO score except for stool-related aspects.

Conclusions/Discussion: Bowel function significantly worsens after ultra-low restorative reconstruction for rectal cancer. Ultra-low restorative reconstruction after proctectomy for rectal cancer may not be the optimal treatment.

INTRADURAL ANESTHESIA AND ITS IMPACT ON ONCOLOGIC OUTCOMES IN COLON CANCER.

P281

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Purpose/Background: Intradural anesthesia is considered effective at reducing postoperative pain of patients with colon cancer who undergo a colorectal resection. Anesthesia and surgery itself entail an inflammatory response, which causes a transient immunosuppression during a period in which cancerous cells are released into the blood and lymphatic system. This might negatively affect oncologic outcomes. Intradural anesthesia decreases the need of opioids as well as perioperative stress, and immunosuppression is minimized. The aim of this study is to analyze the impact of intradural anesthesia on recurrence in patients who underwent a colonic resection due to colon cancer.

Methods/Interventions: A retrospective study was performed using a prospective collected database between 2003 and 2016. Patients with locoregional colon cancer who underwent to laparoscopic curative resection with at least 6 months of follow up were included. Patients were divided into two groups: G1 (patients who received intradural and general anesthesia); G2 (general anesthesia only). Recurrence rate was measured in both groups and stratified by stage of disease. Demographic and oncologic variables were analyzed and compared.

Results/Outcome(s): Four hundred and eighty patients were operated due to locoregional colon cancer (stages I, II and III). Seventy eight (16.2%) were lost during follow up. Four hundred and two patients were included in the study. Average age was 66.6 (± 12.6) years. There were two hundred and eight (51.6%) patients in G1, and 195 (48.4%) in G2. No statistically significant differences as regards recurrence were observed between both groups when considering age, sex, and adjuvant treatment. Mean follow up was 53.3 (± 11.2) months. Fifty seven patients (14.4%) presented with recurrence. There were no differences when locoregional and systemic recurrence were

compared [G1: 32/208 (15.3%) vs. G2: 25/195 (12.8%); $p = 0.4$]. When results were stratified by stage, no differences were found between groups (Stage I: $p = 0.11$; Stage II: $p = 0.6$; Stage III: $p = 0.8$).

Conclusions/Discussion: The use of intradural anesthesia would have no impact on oncologic outcomes in patients operated due to colon cancer.

ANASTOMOTIC LEAK: IMPACT ON DISEASE RECURRENCE IN COLON CANCER.

P282

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Purpose/Background: Anastomotic leak could have a negative impact on overall and disease-free survival in patients with colon cancer. This complication is associated with a greater inflammatory response and/or a delay in the implementation of adjuvant treatment that could negatively affect oncologic outcomes. The aim of this study is to analyze the impact of anastomotic leak on the rate of local and distant recurrence in patients who underwent an elective colonic resection due to colon cancer.

Methods/Interventions: A retrospective study was performed using a prospectively collected database between 2003 and 2016. Patients with colon cancer stages I, II and III who underwent an elective laparoscopic resection with at least 6 months of follow up were included. Patients with rectal cancer, colon cancer stage IV and patients lost during follow up were excluded. The series was divided into two groups: GI (patients with anastomotic leak); GII (patients without anastomotic leak).

Results/Outcome(s): Four hundred and eighty patients were included [Stage I: 142 (35.3%); Stage II: 128 (31.8%); Stage III: 132 (32.8%)]. Seventy eight (16.2%) were lost during follow up; that is, four hundred and two patients were analyzed. The average age was 66 (± 12.5) years. After a mean follow-up of 53 (± 37.6) months, 57 patients (14%) presented disease recurrence: 7 belonged to GI (12.2%), and the remaining 50 to GII (87.7%). No statistically significant differences as regards recurrence were observed between both groups when considering age, sex, and adjuvant treatment ($p = 0.14$). When the results were stratified by stage, no differences were found between the groups [Stage I: 1 vs 2 (14.29% vs. 1.48%), $p = 0.14$; Stage II: 1 vs 18 (9.09% vs. 15.38%), $p = 0.49$; Stage III: 5 vs 30 (35.7% vs. 25.42%), $p = 0.29$].

Conclusions/Discussion: Anastomotic leak would have no impact in oncologic outcomes in colon cancer.

DOES THE DIFFERENCE OF SURGICAL DIFFICULTY IN COLON CANCER ACCORDING TO THE LOCATION AFFECT SURVIVAL?: SURGEON'S PERSPECTIVE.

P283

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Purpose/Background: Recently, there have been many studies that the survival outcome varies according to the location of the colon cancer, due to tumor biology. Among surgeons, left colectomy has been known to be more difficult procedure because it is subjected to occur intraoperative complication, such as splenic injury. However, right colectomy necessitates ligation of two arteries at its origin and advanced cancer invades pancreas or duodenum, which makes difficult to get negative margin. Based on hypothesis that difference of anastomosis leakage (AL), number of harvested LN, and R1 resection rate according to location would impact the long term outcomes, this study attempts to explore whether the difference in survival rate comes from the different surgical quality or from the biological characteristics of the tumor itself.

Methods/Interventions: Patients who underwent curative resection for stage I, II, III colon cancer from November 2005 to March 2008 (n=789) were included in the cohort. Clinical, perioperative outcomes were compared between right colon cancer (RCC) and left colon cancer (LCC). The impact of tumor location and perioperative outcome on overall survival (OS) was analyzed in a multivariable analysis.

Results/Outcome(s): 52% of all cases were treated with minimal invasive surgery. RCC was associated with lower prognostic nutritional index, larger tumor size, higher histologic grade, longer resection margin, more harvested LN, longer operation time, higher conversion rate. Anastomosis leakage (AL) was common about 4

times in RCC, but not reached to statistical significance (1.5 vs 0.4 %; P=0.127). There was no difference of 5 years OS between RCC and LCC at whole stage (88.7 vs 90.8%; P=0.857). But as stage advances, tendency of difference becomes more pronounced (stage I, 96.5 vs 94.7%; P=0.954; stage II, 93.8 vs 91.6 %; P=0.312; stage III, 78.8 vs 86.5 %; P=0.209). Older age (HR, 1.030; 95% CI, 1.01-1.05; P=0.008), history of extra-colonic cancer (HR, 2.08; 95% CI, 1.06-4.10; P=0.034), high Charlson comorbidity index (HR, 2.98; 95% CI, 1.21-7.33; P=0.018), stage III (HR, 4.834 95% CI, 1.82-12.80; P=0.002) were recognized as risk factor of OS in Cox regression.

Conclusions/Discussion: OS according to location of tumor didn't show difference in overall stage. But RCC showed tendency of worse survival in stage III. And RCC showed better results in terms of resection margin, number of harvested LN than LCC, and similar AL, R1 resection rate. However, these perioperative outcomes fail to prove that they are independent prognostic factors for OS. We need further investigation about fundamental features of RCC which makes survival difference.

IMPACT OF POSTOPERATIVE COMPLICATIONS ON ONCOLOGIC OUTCOMES IN RECTAL CANCER.

P284

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Purpose/Background: Laparoscopic approach for rectal cancer remains controversial. Surgery for mid and low rectal cancer is technically challenging and the rate of postoperative complications is not insignificant. Some studies suggest that postoperative complications could have a negative impact on oncologic outcomes, especially

P283 Perioperative outcomes, Adjuvant chemotherapy

	Perioperative outcomes, Adjuvant chemotherapy		P
	RCC (n=341), %	LCC (n=448), %	
Overall morbidity	44 (18.6)	36 (11.6)	0.023
Clavien-Dindo grade \geq 3	10 (2.9)	7 (1.6)	0.183
AL	5 (1.5)	2 (0.4)	0.127
Operation time (min) (IQR)	211 (90)	196 (92)	0.04
Blood loss > 200ml	36 (16.7)	48 (19.0)	0.503
Conversion to laparotomy	6/177 (3.7)	1/254 (0.5)	0.023
Hospital stays (d) (IQR)	10 (6)	10 (5)	0.005
Adjuvant chemotherapy			0.881
None	110 (33)	142 (32.2)	
Incomplete (0~5months)	17 (5.1)	26 (5.9)	
Complete (\geq 5months)	206 (61.9)	273 (61.9)	

in early stages of the disease. The aim of this study was to evaluate the impact of postoperative complications on oncologic outcomes in patients who underwent a laparoscopic low anterior resection (LAR) due to rectal adenocarcinoma stages I and II.

Methods/Interventions: A retrospective study based on a prospectively collected database was performed from patients who underwent a LAR due to rectal adenocarcinoma between 2004 and 2016. Patients with stages I and II with at least 6 months of follow up were included. The sample was divided into two groups: those who presented postoperative complications (G1) and those without complications (G2). Complications were classified according to the Dindo-Clavien score. Demographic, clinical, surgical and postoperative data was analyzed in both groups, as well as disease-free (DFS) and overall survival (OS)

Results/Outcome(s): During the period analyzed 93 LAR were performed. Fifty patients (54%) were classified as stages I and II and were included in the present study (G1:22 and G2 : 28). In G1, 64% suffered complications grades I/II, and 36% complications grades III/IV. There were no differences between groups regarding age, sex, BMI, ASA or previous surgeries. No significant differences were found between groups in terms of neoadjuvant treatment, intraoperative complications, and surgical time. In G2 there was a higher incidence of patients with stage I disease. (G1: Stage I 11 (50%) patients and stage II 11 (50%) vs. G2: stage I 25 (89%) patients and stage II 3 (11%); $p = 0.002$). No differences were found in number of patients underwent adjuvant therapy between the groups. After a mean follow up of 51(6-150) months the recurrence rate was higher in G1 (G1: 41% vs G2: 11%, $p = 0.02$). No differences were observed in DFS and OS. When the series was stratified by stage, patients with stage I had a higher recurrence rate in G1 (G1: 36% vs. G2: 8%, $p = 0.035$) while no differences were found in stage II patients. When all complications were considered, patients with stage I showed no significant differences on DFS and OS, although a trend towards a higher DFS was found in G2 ($p=0.075$). When only major complications were considered, DFS was significantly higher in G2 ($p = 0.01$). No differences were found in stage II patients between the groups.

Conclusions/Discussion: Postoperative complications could have a negative impact on recurrence of disease and disease-free survival in patients with stage I who underwent a LAR due to rectal cancer.

UNMET NEEDS IN COLORECTAL CANCER SURVIVORS AFTER TREATMENT FOR CURATIVE-INTENT.

P285

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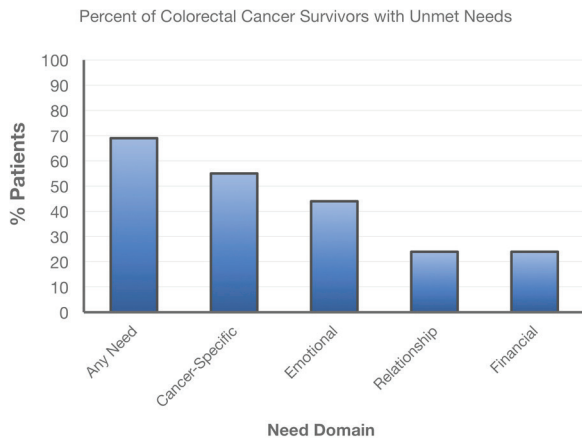
Purpose/Background: With improving survival from colorectal cancer (CRC) there is a rapidly growing population of patients in surveillance after curative-intent treatment. The American College of Surgeons Commission on Cancer and other national accreditation organizations mandate formal survivorship care planning, but there is little to guide the design of such programs. Qualitative studies indicate CRC survivors have psychosocial and symptomatic needs, but the prevalence of these needs is not well-described.

Methods/Interventions: As a needs assessment among CRC survivors, we surveyed patients undergoing surveillance after curative-intent therapy in the CRC Multidisciplinary Clinic of a large academic cancer center. The 35-question validated survey evaluated needs and desire for assistance in the preceding month, across emotional (stress, concerns about recurrence), relationship (fertility, interpersonal), financial, and cancer-specific (neuropathy, bowel function, ostomy care) domains. Our goal was to describe and quantify the degree of unmet needs and desire for assistance. We used multivariable negative binomial regression analysis to identify association between reported needs and cancer type (colon versus rectal), adjusting for age, time from diagnosis, and stage.

Results/Outcome(s): Of 55 respondents, 24 had rectal cancer and 31 had colon cancer. Median age was 60 years (range 29–87). Median time from diagnosis was 36 months (range 10–91). 38 (69%) patients had at least one unmet need, and 23 (61%) of those patients desired more assistance. Emotional needs were unmet for 24 (44%) of patients, while 13 (24%) reported unmet relationship needs, 13 (24%) had unmet financial needs, and 30 (55%) had unmet cancer-specific needs. Rectal cancer patients had higher rates of emotional (Incidence Rate Ratio [IRR] 4.46; $p=0.003$), relationship (IRR=5.62; $p=0.017$), and cancer-specific needs (IRR=3.56; $p<0.001$) than colon cancer patients, and were more likely to desire help ($p<0.001$). Age, stage, and time from diagnosis were not associated with the likelihood of unmet needs.

Conclusions/Discussion: Over two-thirds of CRC survivors reported unmet needs at a median of three years after diagnosis. Over half of patients reported unmet needs specific to treatment, including bowel function, neuropathy, and surveillance-related. Rectal cancer patients were significantly more likely to have unmet needs, indicating

that these patients may need special attention and care during survivorship. Further investigation of the severity of and risk factors for unmet needs after CRC treatment may help prospectively identify patients who would benefit from greater coordination of care and assist in the design of patient-centered survivorship programs. With increased national focus on survivorship care, our results indicate that survivorship programs for the majority of patients should incorporate psychosocial and symptom care in addition to facilitating ongoing surveillance.



THE SAFETY OF OUTPATIENT STOMA CLOSURE: ON THE VERGE OF A PARADIGM SHIFT?

P286

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Purpose/Background: Controversy exists as to the safety of ambulatory management of stoma closures. The purpose of this study was to review the trends in outpatient stoma closure (OSC), assess safety, and identify appropriate candidates for outpatient stoma closure.

Methods/Interventions: Patients undergoing closure of an enterostomy were queried from the American College of Surgeons National Surgical Quality Improvement Program database (2005-2016). The main outcomes included Clavien-Dindo (C-D) III-V class surgical complications (cardiac complication, shock/sepsis, unplanned intubation, renal complication, being on ventilator>48 hours, organ space SSI, mortality or reoperation) and readmission. Outpatient stay was defined as a hospital stay of 0 or 1 day. Timing and reasons for readmission were assessed. Multivariable logistic regression analysis was used to identify risk factors for C-D III-V complications and readmission.

Results/Outcome(s): Of 24,393 patients, 668 (2.74%) underwent OSC. OSC has increased over the last decade (3.16% in 2005-2006 to 4.14% in 2016, p<0.001). OSC patients had significantly lower ASA class and fewer comorbidities than inpatient cases (IC). Outpatient C-D

III-V surgical complication rate was low at 2.99% and was significantly lower than the inpatient rate of 7.25% (p<0.001). Readmission rates were comparable (8.92% OSC vs. 9.77% IC, p=0.539). Patients were readmitted at median of 5 days post-discharge (OSC 6 days, IC 5 days; NS). The three leading causes for readmission include intestinal obstruction without hernia (25.37%), complications of surgical procedures or medical care (16.94%), and surgical site infection (11.24%). Patient factors associated with significantly increased risk of C-D III-V complications and readmission were similar and are listed in figure 1. Patients without any of risk factors represented 42.56% of the sample and had lower C-D III-V complication rate (4.75%) and readmission rate (8.09%) in comparison to those with these ≥ 2 (11.5% complication and 13.07% readmission rate, p<0.001). Predicted risk mirrored these results.

Conclusions/Discussion: There is an increasing trend in the percentage of OSC's being performed. Patients undergoing OSC are healthier and have less comorbidities. The data suggests that there is no significant difference in readmissions and significantly less morbidity associated with OSC. We have found that highly selective performance of OSC is safe and acceptable, and identified risk factors help predict readmission and complications.

FIGURE 1. Multivariable Logistic Regression Analysis: Risk Factors for Clavien-Dindo III-V Surgical Complications and Readmission

Factors	Clavien-Dindo III-V*		Readmission	
	OR (95% CI)	p	OR (95% CI)	p
Setting				
Inpatient	Reference			
Outpatient	0.43 (0.28-0.68)	<0.001		
Age group, years				
<65	Reference		Reference	
≥65	0.98 (0.87-1.10)	0.744	0.90 (0.79-1.02)	0.103
Male	-		-	
Race				
White	Reference		Reference	
Black	1.36 (1.16-1.59)	<0.001	1.13 (0.94-1.35)	0.312
Other†/Unknown	1.03 (0.88-1.20)	0.727	0.96 (0.82-1.13)	0.682
ASA classification				
I-II	Reference		Reference	
III	1.53 (1.37-1.71)	<0.001	1.22 (1.09-1.37)	0.001
IV-V	2.74 (2.10-3.57)	<0.001	1.50 (1.08-2.10)	0.017
BMI ≥30 kg/m ²			0.90 (0.79-1.02)	0.102
Current smoker	1.17 (1.03-1.32)	0.012	1.00 (0.88-1.15)	0.952
Diabetes	0.90 (0.77-1.05)	0.188	0.94 (0.79-1.11)	0.486
History of COPD	1.66 (1.17-1.81)	0.001	1.47 (1.14-1.90)	0.003
Hypertension	1.10 (0.99-1.24)	0.074	1.07 (0.95-1.21)	0.258
Dyspnea	1.31 (1.08-1.59)	0.005	0.94 (0.73-1.21)	0.623
Steroid use	1.71 (1.44-2.02)	<0.001	1.60 (1.33-1.92)	<0.001
Bleeding disorder	1.41 (1.13-1.76)	0.002	1.81 (1.43-2.29)	<0.001
Partial total dependency	1.85 (1.45-2.35)	<0.001	1.45 (1.06-1.99)	0.019

Abbreviations: OR, Odds Ratio; CI, Confidence Interval; ASA, American Society of Anesthesiology; COPD, Chronic Obstructive Pulmonary Disease.

Models adjusted for variables with p<0.25 from unadjusted analysis.

*Cardiac complication, renal complication, organ space surgical site infection, reoperation (III); shock/sepsis, unplanned intubation, on ventilator>48 hours (IV); mortality (V).

†Asian, Native Hawaiian/Pacific Islander, or American Indian/Alaska Native.

Multivariable Logistic Regression Analysis: Risk Factors for Clavien-Dindo III-V Surgical Complications and Readmission

THE EFFECT OF SEX ON TREATMENT STRATEGY FOR ULCERATIVE COLITIS.

P287

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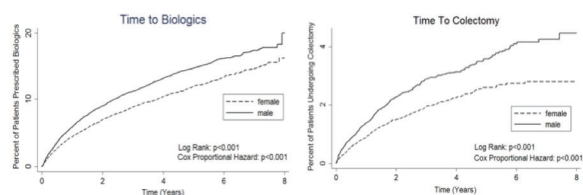
Purpose/Background: Ulcerative colitis is a chronic gastrointestinal disease affecting over 900,000 Americans. Treatment strategies vary widely across patients, but it is unclear what factors influence these variations. We investigated the relationship between sex and treatment

strategies for ulcerative colitis. Based on preliminary work, we hypothesized that females are less likely than males to be treated with strategies consistent with achieving long-term disease remission, including immunosuppressive medication and surgical therapy. We tested this hypothesis using a national insurance claims database.

Methods/Interventions: We performed a retrospective cohort analysis using a nationally representative commercial insurance claims database (Truven MarketScan) from 2007-2015. We identified a cohort of newly diagnosed ulcerative colitis patients aged 12-64 (ICD codes 556*/K51*) using strict inclusion criteria. We analyzed inpatient, outpatient, and pharmaceutical claims to identify differences by sex in the medications prescribed for ulcerative colitis, and rates and type of index ulcerative colitis operations. Descriptive statistics, bivariate and multivariate analyses, and Kaplan-Meier survival analyses were performed using Stata v14.2.

Results/Outcome(s): We identified 38,851 patients with a new diagnosis of ulcerative colitis (males 18,489, females 20,362). Females in this cohort were slightly older (mean age 43 vs. 42.1 years, $p < 0.001$) and were slightly more likely to have a comorbid disease (grouped Charlson index 0.64 vs. 0.61, $p < 0.001$). Males were more likely to be prescribed maintenance medications including biologics, immunomodulators, and 5-aminosalicylates ($p < 0.001$ for all). Females were more likely to be prescribed corticosteroids ($p = 0.002$) and opioids ($p < 0.001$). Compared to females, males had a 1.51 higher odds of undergoing surgical treatment for ulcerative colitis (2.94% vs. 1.97%, $p < 0.001$). Among these surgically treated patients, there was no sex-related difference in the type of index operation performed (total abdominal colectomy versus total proctocolectomy with ileostomy or ileal pouch) between male or female patients.

Conclusions/Discussion: Males with ulcerative colitis are more likely to undergo treatment strategies consistent with achieving long-term disease remission or decisive cure, including maintenance medications and definitive surgery. Females are more likely to undergo treatment strategies consistent with short-term management of symptoms, including steroids and pain medications. It is unclear whether this phenomenon is related to differences in disease behavior, provider biases, or patient factors. Further studies to explore patient and provider influences on treatment strategies and disease trajectories are critical to ensure effective disease management for both male and female patients with ulcerative colitis.



Kaplan-Meier Time-to-Event Analyses for 1) Treatment with Biologic Therapy and 2) Index Ulcerative Colitis Operation

WHAT ARE THE OUTCOMES OF PATIENTS UNDERGOING MULTIPLE PROCEDURES DURING A SINGLE ABDOMINAL OPERATION?

P288

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Purpose/Background: Each year, approximately 51 million surgical procedures are performed in the United States with that number increasing yearly. Commonly, multiple procedures are carried out simultaneously for different intra-abdominal pathologies. Currently, there is a paucity of studies examining combined abdominal procedures during a single operation. Some retrospective studies indicate higher morbidity when combined procedures are performed. The aim of our study was to determine if performing multiple procedures during a single operation was safe when compared to a single procedure alone.

Methods/Interventions: This was a retrospective study from January 2009 to January 2012 utilizing the National Inpatient Sample (NIS) database. Subjects included female patients 18yr of age or older who underwent elective colorectal procedures individually and those that underwent colorectal procedures combined with a gynecological procedure during the same operation. Patients undergoing a single colorectal procedure were then propensity matched to patients undergoing a colorectal procedure combined with a hysterectomy and/or oophorectomy. Outcomes, length of stay and peri-operative complications were then compared.

Results/Outcome(s): Of those meeting inclusion criteria, 8497 patients were identified in the NIS database. Of these patients, 1372 patients were identified undergoing colorectal procedures combined with a hysterectomy and/or oophorectomy. These were subsequently propensity matched to similar patients undergoing a colorectal procedure alone. Of the propensity matched group, outcomes were remarkably similar. The length of stay between the two groups was found to be significant with combined patients having a slightly longer length of stay of 7 days compared to 6 in the standalone group ($p = 0.048$). There was a significant difference in patient disposition with 57.8% of patients in the combined group being discharged to home when compared to 54.5% in the standalone group ($p = 0.010$). Post-operative complications were noted to otherwise be similar between the two groups.

Conclusions/Discussion: Performing combined procedures during a single operation appears to be safe with little difference in outcome on morbidity and mortality and only a small increase in the length of hospital stay. Patient's undergoing combined procedures were also more likely to have a favorable discharge disposition.

IMPACT OF PREOPERATIVE BOWEL PREPARATION ON THE RISK OF CLOSTRIDIUM DIFFICILE AFTER COLORECTAL SURGERY: A PROPENSITY WEIGHTED ANALYSIS.

P289

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Purpose/Background: The impact of bowel preparation on the risk of *Clostridium difficile* infection (CDI) after colorectal surgery has not been well established. The primary aim of this study was to evaluate the effect of bowel preparation on CDI following colorectal resections. The secondary aim was to assess the impact of CDI on length of stay and readmission in this cohort.

Methods/Interventions: After institutional review board approval, patients who underwent colorectal surgery in the American College of Surgeons-National Surgical Quality Improvement Program database's colectomy specific files (2015-16) were selected. Patients were excluded if they had a preoperative diagnosis of CDI or had missing exposure or outcome data. Risk of postoperative CDI was examined using a logistic regression model with inverse probability weighting and regression adjustment to account for the probability of receiving preoperative bowel preparation. The impact of postoperative CDI on length of stay and readmission was evaluated using propensity score weight adjusted linear and logistic regression models respectively.

Results/Outcome(s): Of 30,514 patients who met the inclusion criteria, 39%, 5%, 18% and 38% had combined oral/mechanical, oral, mechanical or no bowel preparation, respectively. The incidence of postoperative CDI in each group was 1.1%, 1.5%, 2.2% and 1.8% respectively, with an overall incidence of 1.6% (490 patients). The median length of stay was 8 (5,14) vs. 5 (3,7) days for patients who had CDI compared to those who did not ($p<0.01$). The readmission rate was greater for patients who had postoperative CDI (30% vs. 9%, $p<0.01$). On inverse probability weighted adjustment regression analysis adjusted for covariates including emergency surgery, indication, and preoperative infections, combined oral and mechanical bowel preparation decreased the probability of postoperative CDI by 33% compared to no bowel preparation ($p=0.03$). This decreased risk was not observed for the other bowel preparation groups. After adjusting for differences in exposure between patients with and without CDI using propensity weights, a linear regression accounting for postoperative cardiorespiratory, infectious complications and reoperation revealed that CDI resulted in a 9.7 (95%CI 4.5-20.7) days increase in length of stay. In a propensity score weighted logistic regression model adjusting for the same covariates, the odds of readmission for patients with a postoperative diagnosis of CDI was 3.39 (95%CI 2.8-4.1) times higher compared to patients without CDI.

Conclusions/Discussion: In this large multicenter dataset using weighted analyses to minimize bias associated with a nonrandomized treatment design, the probability of postoperative CDI was significantly decreased for patients with combined oral and mechanical bowel preparation. Although rare, postoperative CDI significantly increased length of stay and risk of readmission.

INFLUENCE OF THE USE OF PUPILLOMETRY IN POSTOPERATIVE ANALGESIC CONTROL IN PATIENTS WITH LAPAROSCOPIC COLORECTAL SURGERY.

P290

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Purpose/Background: Postoperative control of pain in colorectal surgery is essential for patients well-being and as a predictor of possible complications. Nowadays Fast-Track Surgery programs has been introduced, in which the right control of postoperative analgesia before surgery is necessary, to make easier walking in the first days and to reduce the use of opioids and their side effects. The aim of the study was to evaluate if monitoring of the intraoperative analgesia by pupillometry has influence in pain intensity and the use of analgesics in the immediate postoperative in patients with laparoscopic colorectal surgery.

Methods/Interventions: We analyzed 81 elective laparoscopic colorectal resections (64 colectomies and 17 proctectomies) between August 2012 and October 2015 in which we performed intraoperative analgesic control by pupillometry. We registered postoperative pain using a Visual Analogue Scale (VAS) during the first 24 hours, the use of analgesics and the appearance of complications.

Results/Outcome(s): The mean in the VAS score in the first 24 postoperative hours was 2. During this period the patients do not use more than 3 conventional intravenous analgesics (diclofenac, dexketoprofen or paracetamol) and in no case opioid administration was necessary during the stay in the hospital. In patients without a right control of postoperative analgesia we observed the appearance of postoperative surgical complications. In no case we observed complications because of the anesthetic technique.

Conclusions/Discussion: The intraoperative analgesic control by pupillometry is a reliable, safe, painless, non-invasive and easily reproducible technique that could help to reduce immediate postoperative pain and the use of analgesics in this period, decreasing side effects. In addition a bad control of the analgesia in patients in which we have used this technique could help to predict possible surgical complications.

BOWEL FUNCTION OUTCOMES IN RECTAL CANCER PATIENTS MANAGED BY A WATCH-AND-WAIT STRATEGY AFTER NEOADJUVANT THERAPY: A CROSSMATCH STUDY.

P291

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Purpose/Background: A Watch-and-wait strategy (WW) has been introduced as an alternative to total mesorectal excision (TME) for patients with locally advanced rectal cancer who have a clinical complete response (cCR) after neoadjuvant therapy (NAT). However, information documenting the benefits in bowel function and quality of life of this organ-preserving alternative compared to a TME is limited. In this study we compare bowel function in rectal cancer patients managed with a WW strategy or TME.

Methods/Interventions: This is a retrospective study of 28 patients treated with NAT and WW and 28 cross-matched controls who had NAT and TME. Patients in the TME group were matched 1:1 to the WW group using the variables of age, gender, tumor height, type of NAT, time from beginning of follow-up to survey and clinical stage. Patients with stage IV disease, surgical complication or missing data were excluded. All patients completed the previously validated Memorial Sloan Kettering Cancer Center Bowel Function Instrument (MSKCC BFI) questionnaire at median time of 16.38 (range 1 to 77) months after NAT (WW group) or at median time of 14.5 (range 3 to 37) months after surgery (TME group). Univariate analysis was performed with chi-square test for categorical variables, and non-parametric tests for continuous variables.

Results/Outcome(s): Number of bowel movements, MSKCC BFI subscale scores, and total MSKCC BFI scores are summarized in **Table 1**. Compared to the TME group, patients in the WW group had significantly less sensation of incomplete evacuation, fewer incontinence events, less clustering, better discrimination between gas and stool, less soiling, were less likely to require diet modification, used fewer incontinence pads and had fewer alterations of normal activities secondary to bowel dysfunction (all $p < 0.05$).

Conclusions/Discussion: Bowel function outcomes are significantly better in rectal cancer patients managed by a WW strategy compared to patients treated by TME. Data from prospective, randomized trials are needed to further validate these findings.

FACTORS ASSOCIATED WITH READMISSION IN NEW ILEOSTOMATES.

P292

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Purpose/Background: Unplanned 30-day hospital readmission following ileostomy creation is common, and results in increased cost and decreased patient satisfaction. Dehydration is often cited as a major cause for readmission, but risk factors are poorly described. We herein sought to identify the 30-day rate of unplanned hospital readmission following ileostomy formation and determine risk factors for readmission.

Methods/Interventions: All patients who underwent first time ileostomy creation between 9/1/2015 and 4/30/2017 at our institution by the Colon and Rectal Surgery department were included in the study. Patient demographics and 30-day postoperative outcomes related to their surgery were abstracted. Primary outcome was 30-day readmission rate following ileostomy creation. Risk factors for readmission were analyzed with univariate and multivariable analysis.

Results/Outcome(s): A total of 340 patients were included with a median age of 53 years (range 18-89). 52% of patients were male with a median BMI of 25.9 (range 13.0-58.5). Diagnoses at time of ileostomy creation were colorectal cancer (39%), inflammatory bowel disease (31%), diverticulitis (17%), and other (13%). The overall readmission rate was 20.6%; leading diagnoses for readmission were dehydration (30%) and partial small bowel obstruction (PSBO)/ileus (29%). Multivariable analysis identified ASA class III and IV and use of proton pump inhibitor (PPI) at discharge were associated with unplanned 30-day hospital readmission ($P < 0.05$). Univariate analysis identified older age and outpatient use of diuretics, ACE-I/ARB and Beta-Blocker were significant predictors of readmission with a primary diagnosis of dehydration ($P < 0.0001$).

P291 Table 1

Variable, median (range)	WW (n=28)	TME (n=28)	p value
Number of bowel movements per day	2 (1 to 7)	4 (1 to 10)	0.004
MSKCC BFI Score* - Dietary Sub-Item	16 (6 to 20)	13 (6 to 20)	0.05
MSKCC BFI Score* - Frequency Sub-Item	24 (11 to 30)	21 (0 to 29)	0.005
MSKCC BFI Score* - Urgency Sub-Item	19 (0 to 20)	12 (0 to 20)	<0.001
MSKCC BFI Score* - Total	73.5 (30 to 89)	56 (16 to 74)	<0.001

* Higher scores are associated with better outcomes.

Conclusions/Discussion: Dehydration and PSBO/ileus were the leading causes for readmission following ileostomy creation. Decreasing the discharge prescription use of PPI may be targeted for decreasing unplanned 30-day hospital readmission. Patients who are older and take ace inhibitors, beta-blockers, and diuretics in the outpatient setting should be carefully counseled about dehydration risk after discharge, and may require a lower target volume of ileostomy output prior to discharge or be more closely monitored following discharge.

PROGNOSTIC NUTRITION INDEX IS A SIGNIFICANT PREDICTOR OF POST-OPERATIVE COMPLICATIONS AMONG PATIENTS UNDERGOING COLORECTAL SURGERY.

P293

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Purpose/Background: Patients undergoing major colorectal procedures are at significant risk for postoperative complications, and identifying those at high risk can be challenging. While malnutrition is a major risk, commonly used markers including albumin and Body Mass Index (BMI) lack precision. Prognostic Nutrition Index (PNI, calculated as $10 \times \text{albumin} + 0.05 \times \text{total lymphocyte count}$) has shown promise in predicting postoperative complications, with PNI<45 classified as high risk. The aim of this study was to identify predictors of complications including PNI and to establish an optimal cutoff value for colorectal surgery.

Methods/Interventions: We conducted an IRB approved, single institution retrospective cohort study of all patients undergoing major colorectal surgery over a 3-year period. Cases were identified from administrative data and merged with local NSQIP data, supplemented via the electronic medical record, for complete complication data. Using SAS 9.4, a multivariate, logistic regression model was used to identify risk factors for postoperative complications and a ROC curve with Youden's Index to determine the optimal cut off for PNI.

Results/Outcome(s): From 2014-2016, 604 patients were included, mean age was 59.6 (SD 17) years, 45% were male, and mean BMI was 27.6 (SD 7.5). The majority of cases were elective (71.4%) and done in an open fashion (53%). Complications were identified in 28.6% and the 30-day mortality was 1.3%. On multivariate analysis, PNI was a significant predictor of postoperative complications in addition to ASA, maximum postoperative blood glucose level, renal failure, surgical approach, and presence of colorectal cancer (Table 1). The optimal cut off for PNI to predict complications was 31 (area under the curve = 0.65), with rates of 43.7% below and 24% above ($p < 0.0001$). Subdividing patients into 3 groups (PNI <29,

29-33 and >34) identified high, moderate and low-risk groups with complication rates of 47.7%, 33% and 21.9% ($p < 0.001$) respectively.

Conclusions/Discussion: PNI is significantly associated with postoperative complications after colorectal surgery. It is one of few potentially modifiable risk factors, and allows stratification of patients into low, moderate and high-risk groups. Using validated complication data from a single institution, we found the optimal PNI for identifying those at an increased risk of complications to be much lower than previously reported.

ANASTOMOTIC LEAK DECREASES QUALITY OF LIFE IN COLON CANCER SURVIVORS: 10 YEARS FOLLOW-UP OF A NATIONWIDE COHORT.

P294

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Purpose/Background: Survival after surgery for colon cancer treatment has improved significantly over the last decades. Factors influencing the well-being of colon cancer survivors are therefore of increasing interest. Anastomotic leak (AL) after colon cancer resection carries a high risk of perioperative morbidity and mortality as well as omission of adjuvant chemotherapy, increased risk of recurrence, impaired long-term survival and permanent intestinal diversion. The long-term health related quality of life (QoL) following AL remains unknown. In this study, the influence of AL on QoL and patient reported intestinal symptoms were investigated in colon cancer survivors.

Methods/Interventions: This was a population based retrospective study on patients undergoing curatively intended surgery with primary anastomosis for AJCC I to III colonic adenocarcinoma between 2001 and 2008. Nationwide data from the Database of the Danish Colorectal Cancer Group were merged with data on QoL and intestinal symptom scores, obtained by questionnaire between 2015 and 2016. The primary outcome was QoL assessed by EORTC-QLQ-C30. Intestinal symptom scores included LARS scores, the Cleveland Clinic Incontinence

P293 Predictors of postoperative complications

Risk Factor	Odds ratio	95% confidence interval
PNI	0.955	0.927-0.985
ASA	1.653	1.191-2.296
Maximum glucose	1.006	1.001-1.010
Renal failure	0.483	0.253-0.922
Colorectal cancer	2.426	1.403-4.196
Surgical approach	2.232	1.486-3.354

score and the Bristol stool scale. Multivariable logistic regression and multiple linear regression were used to adjust for confounding.

Results/Outcome(s): From the original cohort of 9329 patients, 2490 surviving patients were included in this study. Median age was 75 years (IQR 68-81 years), and the median time from surgery to completion of the questionnaire was 9.9 years (IQR 8.4-11.8 years). The rate of AL was 126/2490 (5.1%). There was a statistical association between AL and decreased EORTC-QLQ-C30 subscale scores of physical-, role-, cognitive- and social functioning and increased symptom scale scores of fatigue, nausea and pain. This was confirmed after adjustment for confounding. Of 178 (7.1%) patients receiving a stoma after the index operation, 102 (57.3%) had their stoma reversed. In all patients with bowel continuity, AL was associated with increased risk of major LARS, adjusted OR = 1.71, 95% CI 1.05-2.81, $P = 0.032$. While there were no associations between AL and Cleveland Clinic incontinences scores or Bristol Stool scale, patients with AL had an increased rate of moderate to major life alterations because of incontinence problems, 10/83 (12%) vs. 130/2308 (5.6%), $P = 0.014$. In addition, there was a significant relationship between major LARS and impaired EORTC-QLQ-C30 scores. After correction of the interaction between AL and LARS on EORTC-QLQ-C30 scores, the significant associations between AL and EORTC-QLQ-C30 subscales and symptoms scales disappeared.

Conclusions/Discussion: In colon cancer survivors, anastomotic leak continues to influence QoL 10 years after surgery, possibly through increased intestinal symptoms. Surgeons need to acknowledge the long-term implications of AL in order to identify and help these patients.

A PROPENSITY SCORE-MATCHED COMPARISON OF INTRACORPOREAL AND EXTRACORPOREAL TECHNIQUES FOR ROBOTIC-ASSISTED SIGMOIDECTOMY IN AN ENHANCED RECOVERY PATHWAY.

P295

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Purpose/Background: Recent advances in technology allow consideration of minimally invasive options for a greater number of surgeon skill sets. This has led to studies demonstrating the benefit of intracorporeal techniques for minimally invasive right colectomy. The benefit of intracorporeal options for minimally invasive sigmoid resection has not yet been established. This study was designed to assess outcomes comparing intracorporeal and extracorporeal techniques for robotic-assisted sigmoid resection.

Methods/Interventions: This is a retrospective propensity score-matched comparison of intracorporeal and extracorporeal techniques for robotic-assisted sigmoid resection for diverticulitis and neoplasia between February 14, 2012 and August 31, 2017. Unadjusted outcomes were presented for all demographics, pre-existing morbidities, surgery variables, and postoperative complications. Operative time, incision size and length of hospital stay (LOS) were analyzed for cases that were not converted-to-open. Propensity score-matching was performed for age, BMI, pre-existing comorbidities, prior abdominal procedures, tobacco and alcohol use as predictors of outcomes in the propensity score models.

Results/Outcome(s): 167 cases met inclusion criteria. After propensity score-matching, 116 cases were available for analysis (IA 58, EA 58). There were no significant differences in any patient characteristics between groups. Almost 90% of cases were for diverticulitis in each group. Operative time was significantly longer in the IA group (191.4 vs. 164.1 min, $p < 0.001$). There was no significant difference between groups for conversion rates ($p = 0.40$), time to flatus and bowel movements, hospital LOS, postoperative 30-day complications, and readmission rates. There were significantly more midline extraction incisions in the EA group ($p = 0.002$) and more hernias in midline extraction sites ($p = 0.009$).

Conclusions/Discussion: There were no significant differences in 30-day outcomes and operative times were longer for intracorporeal compared to extracorporeal techniques for sigmoid resections for benign and malignant disease in an established Enhanced Recovery Pathway. However, there were fewer intracorporeal midline extraction site incisions at risk for radiation hernias, likely because the intracorporeal technique does not require stretching the specimen to an extraction site for the more difficult cases.

Table	Variable	Label	Unadjusted		P Value	Propensity Score Matched		P Value
			Intracorporeal (N = 60)	Extracorporeal (N = 107)		Intracorporeal (N = 58)	Extracorporeal (N = 58)	
	Incision size in cm, Mean (SD)	5.571 (0.96)	5.415 (1.44)	0.471	5.566 (0.961)	5.578 (1.423)	0.962	
	Operative Time, Mean (SD)	193.158 (31.32)	160.691 (27.84)	<.001	191.889 (31.103)	164.118 (32.058)	<.001	
	LOS, Mean (SD)	3.982 (4.92)	2.892 (4.72)	0.05	4 (4.088)	3.285 (2.277)	0.327	
	Conversion, N (%)	No 57 (95%)	94 (87.85%)	0.218	54 (94.74%)	51 (88.47%)	0.49	
	Yes	3 (5%)	13 (12.15%)	0.15	4 (6.93%)	6 (10.53%)	0.76	
	Benign/Malignant Neoplasia	8 (13.33%)	20 (18.69%)	0.501	7 (12.08%)	5 (8.77%)	0.76	
	Diverticulitis, N (%)	52 (86.67%)	87 (81.31%)	0.001	50 (87.72%)	52 (91.23%)	0.002	
	Extraction Site, N (%)	Midline 1 (1.67%)	2 (1.89%)		1 (1.72%)	1 (1.72%)		
	Off midline Planumetel	54 (90%)	71 (66.98%)		51 (89.47%)	36 (64.23%)		
	Time to First Flatus, N (%)	35 (61.8 (22.413))	35 (604 (17.817))	0.997	35 (969 (22.167))	38 (875 (18.977))	0.492	
	Time to First Bowel Movement, N (%)	36 (888 (22.962))	36 (212 (20.249))	0.75	37 (446 (22.661))	41 (145 (20.628))	0.453	
	Number of Complications, Mean (SD)	0.6 (1.123)	0.688 (1.138)	0.653	0.592 (1.146)	0.737 (1.218)	0.635	
	Ileus, N (%)	2 (3.33%)	5 (4.67%)	>0.999	2 (3.51%)	4 (7.02%)	0.679	
	Any SSI, N (%)	1 (1.67%)	8 (7.48%)	0.159	1 (1.75%)	3 (5.26%)	0.618	
	Sepsis, N (%)	1 (1.67%)	1 (0.93%)	>0.999	1 (1.75%)	1 (1.75%)	>0.999	
	Anastomotic Leak, N (%)	2 (3.33%)	0 (0%)	0.128	2 (3.51%)	0 (0%)	0.406	
	C Diff, N (%)	0 (0%)	2 (1.87%)	0.537	0 (0%)	1 (1.75%)	>0.999	
	AKI, N (%)	2 (3.33%)	1 (0.93%)	0.293	2 (3.51%)	0 (0%)	0.406	
	Dehydration, N (%)	1 (1.67%)	1 (0.93%)	>0.999	1 (1.75%)	1 (1.75%)	>0.999	
	Urinary Retention, N (%)	4 (6.67%)	2 (1.87%)	0.189	4 (7.02%)	1 (1.75%)	0.364	
	UTI, N (%)	1 (1.67%)	7 (6.54%)	0.261	1 (1.75%)	5 (8.77%)	0.206	
	CHF, N (%)	0 (0%)	1 (0.93%)	>0.999	0 (0%)	0 (0%)	NA	
	Pneumonia, N (%)	0 (0%)	2 (1.87%)	0.537	0 (0%)	1 (1.75%)	>0.999	
	DVT, N (%)	1 (1.67%)	1 (0.93%)	>0.999	1 (1.75%)	0 (0%)	>0.999	
	PE, N (%)	0 (0%)	1 (0.93%)	>0.999	0 (0%)	0 (0%)	NA	
	Discharged Not Home, N (%)	2 (3.33%)	2 (1.87%)	0.619	2 (3.51%)	0 (0%)	0.406	
	Readmission, N (%)	5 (8.33%)	7 (6.54%)	0.758	5 (8.77%)	4 (7.02%)	>0.999	
	Reoperation, N (%)	1 (1.67%)	2 (1.87%)	>0.999	1 (1.75%)	2 (3.51%)	>0.999	
	Hernia, N (%)	0 (0%)	8 (7.48%)	0.052	0 (0%)	3 (5.26%)	0.243	

Note: No recorded cases of mortality. P-values for categorical outcomes from chi-square and Fisher exact tests. P-values for continuous outcomes from independent samples t-tests. AKI = acute kidney infection; SSI = surgical site infections; DVT = deep vein thrombosis; PE = pulmonary embolism; UTI = urinary tract infection.

Variable	Unadjusted		Propensity Score Matched		
	Off Midline (N = 128)	Midline (N = 42)	Off Midline (N = 91)	Midline (N = 25)	
Hernia, N (%)	1 (0.78%)	8 (20%)	<0.001	3 (12.5%)	0.009

Note: p-value for hernia from Fisher exact test.

QUALITY IMPROVEMENT IN ILEOSTOMY PATIENTS AFTER IMPLEMENTATION OF ILEOSTOMY-SPECIFIC NOVEL PROTOCOLS.

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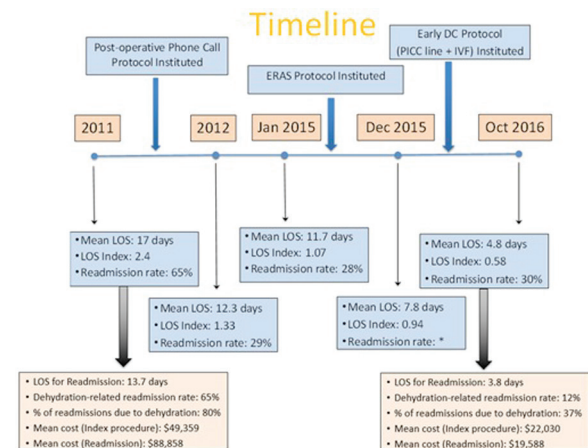
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Purpose/Background: With the Affordable Care Act, healthcare resource utilization-metrics are increasingly being used to assess the quality of care provided and determine reimbursement. Patients with ileostomies have the highest morbidity, with dehydration being the most common cause of readmission. We have instituted several ileostomy-specific protocols at our institution to address this issue. We aimed to show the efficacy of implementation of ileostomy-specific quality improvement protocols at an academic institution, by comparing postoperative outcomes for ileostomy patients before and after institution of these protocols.

Methods/Interventions: Patients who underwent elective ileostomy creation at UF Health from 2011-2016 were included in this IRB approved study. Three ileostomy-specific standardized quality improvement protocols were implemented sequentially over this timeframe: a 'Postoperative phone call', 'Enhanced recovery after surgery' (ERAS) and 'Early discharge' protocol (Figure 1). Postoperative outcomes for our institution were compared with a matched cohort nationally, based on the Vizient dataset (formerly called UHC). Outcomes were measured at baseline (prior to 2011), and before and after implementation of each protocol. 'Postoperative phone call' protocol included daily phone calls by a provider for 21 days after discharge with counseling and medication adjustments for high ileostomy output. 'Early discharge' protocol mandated a PICC line for home IV fluids (1,000 ml/night), irrespective of ileostomy output. Home IV fluids were discontinued when patients were in positive fluid balance with oral intake on daily phone calls.

Results/Outcome(s): A total of 180 patients with a new ileostomy were included. Institution of the 'Postoperative phone call' protocol in 2011 led to a significant improvement in LOS (17 days vs 12.3 days, $p < 0.001$), LOS index (2.4 vs 1.33, $p < 0.001$) and readmission rate (65% vs 29%, $p < 0.0001$) from baseline. Institution of the 'ERAS' protocol in 2015 further improved the parameters significantly bringing the LOS index down to 0.94 (Figure 1). Finally, institution of the 'Early discharge' protocol improved the mean LOS from baseline (17 days vs 4.8 days, $p < 0.0001$) and from before institution of this protocol but after ERAS (7.8 days vs 4.8 days, $p < 0.04$). The current LOS index for ileostomy patients at UF has decreased to 0.58 without an increase in the readmission rate. No PICC line-related infection or DVT were noted during the study period. A significant reduction in the mean hospital cost for the index procedure (\$49,359 vs \$22,030) and for the readmissions (\$88,858 versus \$19,588) was observed.

Conclusions/Discussion: Implementation of ileostomy-specific standardized protocols significantly improved quality and decreased cost for ileostomy patients with final LOS being nearly half of national average.



A timeline of protocol implementation & post-ileostomy outcomes

AN ANALYSIS OF INCISIONAL HERNIA RATES AFTER ABDOMINAL COLECTOMY.

P297

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Purpose/Background: Incisional hernia after abdominal colectomy has been reported as high as 20% and is associated with significant morbidity including pain, bowel obstruction, incarceration, decreased quality of life, and the need for repeat operations. Identifying risk factors for hernia development and understanding predisposition to hernia occurrence can help decrease hernia rates. This multi-institutional study analyzes the incidence of hernia rates for colectomy based on disease process and surgical approach.

Methods/Interventions: An IRB-approved retrospective study was performed using patient data extracted from the Medstar Hospital database. We included in this analysis all abdominal colectomies performed from 2010-2015 across Medstar hospitals. Exclusion criteria included patients who had concomitant procedures, HIPEC treatment, transplant surgery, patients under 18 years old, and patients who died during the same admission. Incisional hernia rates (IHRs) were determined according to diagnosis, laparoscopic vs. open surgery, and elective vs. urgent/emergent surgery.

Results/Outcome(s): A cohort of one thousand two hundred and seventy two patients was analyzed. The overall IHR after colectomy was 5%. IHR after colectomy for benign disease was significantly higher than IHR after colectomy for neoplastic disease (7.8% vs. 2.6%, $p < 0.05$).

Hernia rates were statistically similar across all diagnoses, except for diverticulitis (8.6%, $p < 0.05$). IHR was lower for laparoscopic surgery compared to open, but was not statistically significant (1.8% vs. 6.3%, $p > 0.05$). IHR after elective surgery were similar to IHR after urgent/emergent surgery (4.3% vs. 4.3%, $p > 0.05$)

Conclusions/Discussion: There is a higher risk of incisional hernia after colon surgery for benign disease as compared to neoplastic disease. This difference can be primarily attributed to patients undergoing colectomy for diverticular disease. This multi-institutional study shows that diverticular disease is an independent risk factor for the development incisional hernia after colon surgery. This may be secondary to a connective tissue disorder underlying the pathogenesis of both diverticula and hernias.

TRAUMATIC RECTAL INJURIES: "GETTING TO THE BOTTOM OF IT".

P298

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Purpose/Background: The management of rectal injuries is complex and various management strategies exist. We sought to characterize the presentation, management strategies, and outcomes of rectal injuries in adult patients.

Methods/Interventions: The National Trauma Database was queried for patients (age ≥ 16 years) with rectal injuries from 2012-2014. Outcomes were stratified by mechanism of injury and management strategy. Statistical analysis was conducted using t-test and ANOVA for continuous variables as well as chi-square for continuous variables.

Results/Outcome(s): Of 2149 patients who sustained a rectal injury, 84% were male. 1173 (54.6%) patients sustained penetrating rectal injuries, 800 (37.2%) patients sustained blunt rectal injuries, and 176 (8.2%) patients sustained unspecified injuries. The most frequent penetrating and blunt etiologies were firearms injuries (90.2%, $n=1058$) and motor vehicle crashes (54.5%, $n=436$), respectively. Compared to penetrating trauma, blunt trauma was associated with higher mortality (6.6%, $n=53$; vs.

3.1%, $n=36$), higher complication rates (27.6%, $n=221$; vs. 19.3%, $n=226$), and longer ICU (mean 13 vs. 6 days) and hospital stays (mean 19 vs. 13 days), $p < 0.05$. In terms of associated injuries, patients in the penetrating group had a significantly higher incidence of colonic, small bowel, and bladder injuries, while those in the blunt group had a higher incidence of splenic and pelvic injuries. The associated injury data is summarized in Table 1. The overall laparotomy rate was 62.2% (1337/2149). The overall fecal diversion rate was 32.8% (705/2149). In patients that underwent laparotomy, 52.7% (705/1337) underwent fecal diversion, and 47.3% (632/1337) underwent operative repair or resection. Patients that underwent fecal diversion had a higher median ISS (14 vs. 12), and were more likely to have a SBP < 90 mmHg on admission (13.2% vs. 7.8%). Although diverted patients had longer average ICU and total LOS (10 and 19 days, vs. 8 and 13 days) and a higher complication rate (31.1% vs. 17.0%), they had a significantly lower mortality (3.0% vs. 5.0%, $p = 0.03$).

Conclusions/Discussion: Blunt rectal injuries are associated with higher mortality, complication rates, ICU and hospital stays. Rectal injuries managed with fecal diversion, while associated with higher complication rates, have a lower mortality compared to repair or resection.

TRANSANAL ENDOSCOPIC MICROSURGERY (TEMS) FOR MUCOSAL EXCISIONAL BIOPSY OF RECTAL TUMORS OF UNCERTAIN BEHAVIOR – A RETROSPECTIVE CASE SERIES.

P299

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Purpose/Background: Introduction: Transanal local excision is an excellent treatment choice for benign rectal lesions. For rectal cancer, however, local full-thickness excisions are fraught with high local recurrence rates - even if limited to early and best selected lesions. This is likely caused by a combination of missed nodal disease and direct implantation of tumor cells into the mesorectum, which upstages even early T1 lesions to at least a T3 lesion. The

P298 Rectal Trauma and Associated Injuries

Associated Injury	Penetrating Trauma n=1173		Blunt Trauma n=800		Pearson Chi-Square p value
	n	Frequency	n	Frequency	
Liver	80	6.8%	55	6.9%	.061
Spleen	23	2.0%	60	7.5%	<0.001
Kidney	41	3.5%	43	5.4%	.052
Bladder	246	21.0%	28	3.5%	<0.001
Pelvis	342	29.2%	346	43.3%	<0.001
Small Bowel	437	37.3%	61	7.6%	<0.001
Colon	268	22.8%	85	10.6%	<0.001

treatment of choice for invasive adenocarcinoma consists of an oncologic total mesorectal resection, possibly with other modalities. Rectal tumors of uncertain behavior or with conflicting diagnostic results can present a treatment dilemma between over-treatment vs under-treatment. **Concept:** If the nature of a lesion is not certain or if contradictory results have been obtained, we propose a superficial local excision as a mucosal excisional biopsy to establish the diagnosis while avoiding interference with subsequent definitive treatment modalities by preserving the integrity of the external rectal wall and mesorectum. A benign final pathology concludes the treatment, whereas detection of invasive cancer prompts subsequent oncologic resection.

Methods/Interventions: Methods: Retrospective analysis of all patients from 2014-2017 with rectal tumors of diagnostic uncertainty, who underwent complete TEMS-assisted excisional mucosal biopsy for further stratification. Lesions were dissected off the underlying muscularis, leaving the rectal wall and mesorectum untouched. Data collection: preoperative diagnostic results, final pathology, and follow-up procedures.

Results/Outcome(s): Results: 11 patients (M:F ratio 8:3) were identified and analyzed. 4 out of 11 cases (36%) revealed cancer and underwent oncologic resection. 1 patient with a pT1 lesion had positive lymph nodes prompting oncologic resection. 7 cases (64%) revealed benign pathology requiring no further intervention. This included patients who had negative preoperative biopsies but imaging suggestive of stage I or II rectal cancer; based on the benign pathology, they avoided an unnecessary radical resection.

Conclusions/Discussion: Conclusion: TEMS mucosal excisional biopsy for rectal tumors of uncertain behavior allows for a less invasive diagnostic clarification to stratify the definitive treatment without risk to upstage an early tumor by violating the rectal wall and mesorectum: a) no further intervention is needed for benign lesions, or (b) for cancers, an oncologic resection. Limiting the excisional biopsy to the mucosa rather than a full-thickness excision avoids a negative impact on the oncologic resection and multimodality treatment.

THE IMPACT OF INTRAOPERATIVE HYPOCAPNIA ON POSTOPERATIVE COMPLICATIONS IN LAPAROSCOPIC SURGERY FOR COLORECTAL CANCER.

P300

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Purpose/Background: In laparoscopic surgery (LS) for colorectal cancer (CRC), extensive pneumoperitoneum with carbon dioxide could cause hypercapnia. Intraoperative hypercapnia is considered worrisome for

circulation or ventilation, and therefore, the anesthesiologist prefer to keep hypocapnia relatively. On the other hand, intraoperative hypocapnia undergoing various surgical procedures (except pediatric and cardiac surgery) under general anesthesia is reported that increase in postoperative mortality rate and extend length of hospital stay. The relationship between intraoperative hypocapnia and surgery related complications remains unclear in LS for CRC. In this study, we attempted to clarify the impact of intraoperative hypocapnia on postoperative complications in LS for CRC based on our clinical experiences.

Methods/Interventions: Of 1086 patients with colorectal cancer Stage I to III who underwent LS for CRC with curative intent in our hospital from January 2000 to December 2015, 154 patients were excluded due to double cancer and insufficient data, and consequently 932 patients were enrolled into this analysis. The value of end tidal carbon dioxide concentration (EtCO₂) was basically plotted every 15 minutes during anesthesia. The data of the blank was estimated from the former or latter value. The EtCO₂ value less than 35 mmHg was defined as hypocapnia, and the relationship between the duration of hypocapnia (DOH) and the postoperative complication was analyzed statistically.

Results/Outcome(s): The median (\pm range) of DOH was 120 (136 \pm 495) minutes. The complications with Clavien-Dindo Grade 2 or higher were observed in 215 cases (23.1%), which included anastomotic leakage in 38 cases, wound infection in 91 cases, bowel obstruction in 25 cases. The prolongation of DOH was significantly correlated with total complications ($p = 0.012$) and wound infection ($p = 0.003$). Multivariate analysis adjusted with tumor location (rectum vs colon), dissection degree (high vs low ligation), BMI, ASA, maximum size of tumor and tumor depth showed that prolongation of DOH was still an independent risk factor for postoperative wound infection (OR: 1.004, 95% confidence interval [CI]: 1.001 - 1.006, $p = 0.003$).

Conclusions/Discussion: Our study revealed that hypocapnia is a risk factor for wound infection in LS for CRC, as reported previously in other type of surgery. Hypocapnia reduce the oxygen or circulation in the peripheral tissue, which may lead to the delay of wound healing and cause wound infection. Although no significant difference was observed in this study, higher rate of wound infection might lead to extend postoperative stay as previously reported. Comparing to hypercapnia, hypocapnia had better to be paid much attention in management of perioperative duration. Intraoperative hypocapnia may be a risk factor for wound infection in LS for CRC.

UNDERSTANDING COLONOSCOPY DECISION-MAKING: APPLYING ECONOMIC THEORY.

P301

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Purpose/Background: Despite the benefits of screening colonoscopy, there is stagnation nationally in increasing the rates of screening. All states fall below the American Cancer Society goal to screen 75% of eligible patients. While certain demographic and socioeconomic groups are less likely to undergo screening, there is a lack of data regarding the individual motives that spur patients to follow through with screening. This study attempts to identify and measure the relative importance of motives deduced in relationship economic theory of those who have chosen to undergo colonoscopy screening or not.

Methods/Interventions: We produced a web-based questionnaire hosted by Amazon's Mechanical Turk and administered it to a diverse subject pool. Survey data were validated by giving the questionnaire to patients immediately prior to a screening colonoscopy. The survey consisted of demographic questions, insurance coverage and a multi-voting process that asked respondents to assign a weight from 0 to 100 to each of 5 motives (selfishness of preference [own consumption], need for self respect, need for connectedness or belonging, need for external validation, and empathy). These motives have been previously used to understand consumption of commodities and relational goods, but prior to this study have not been used to analyze medical decision-making.

Results/Outcome(s): We surveyed 50 patients waiting for a colonoscopy and 1019 online participants. Of the online cohort, 551 had a previous colonoscopy, 468 had not, and 27 were planning to undergo colonoscopy. The waiting room cohort responded similarly to the online participants who had a prior colonoscopy, suggesting the reliability of the online cohort. Those who had not undergone a colonoscopy responded significantly differently on motives involving own consumption, self-respect and less so with belonging, and empathy (table 1). Of those that had a colonoscopy, 95.4% (n=531) had insurance coverage compared to 77.6 % (n=363) who had not have a colonoscopy.

Conclusions/Discussion: This study uniquely identifies a large cohort of those who have not had a colonoscopy and demonstrates that they view the procedure differently than those who have had one. The predominant motive to avoid colonoscopy is one of own consumption, treating the procedure as a commodity similar to purchasing a tangible good. This is further explained by the association between lack of insurance coverage among those who declined a colonoscopy. Although own consumption was a major factor in those who had a colonoscopy, many viewed it as an intangible relational good motivated by the need for self-respect and the desire to reduce the health concerns of persons with an empathetic connection. Understanding that many who avoid screening view colonoscopy as a commodity suggest that strategies to improve colonoscopy rates via a monetary benefit, for example, may be beneficial.

A RANDOMIZED CONTROLLED TRIAL FOR TREATMENT OF FECAL INCONTINENCE USING ALLOGENEIC ADIPOSE-DERIVED MESENCHYMAL STEM CELLS.

P302

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Purpose/Background: Fecal incontinence may cause psychological depression and social isolation from recurrent uncontrolled passage of fecal material. Recently, regenerative treatment has been developed using mesenchymal stem cells. In this study, we aimed to investigate the safety and efficacy of using allogeneic-adipose-derived mesenchymal stem cells (ALLO-ASCs) in the treatment of the anal sphincter of patients with fecal incontinence.

Methods/Interventions: This study was a randomized, prospective, dose escalation, placebo-controlled, single-blinded, single-center, phase I clinical trial with two parallel groups. It was conducted in Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea from December 2014 to November 2017. The patients who received previous treatments for fecal incontinence more than 2 months with Wexner score ≥ 8 were enrolled. However, the patients who had anal injuries and underwent anorectal surgeries within previous 6 months

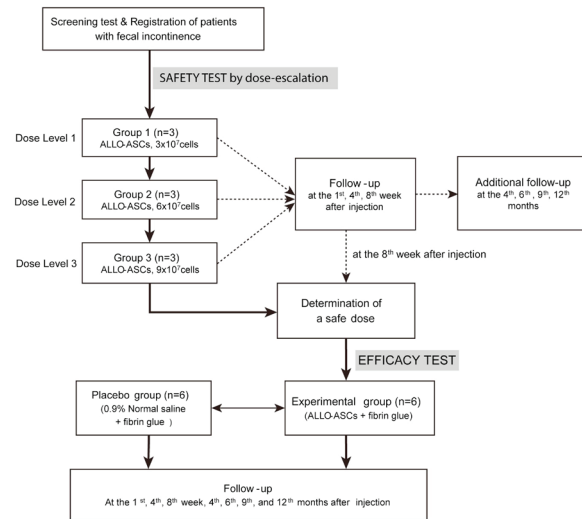
P301 Table A: Statistical Measures of the difference of motive

	Mean difference between colonoscopy vs no colonoscopy cohort	P-Value	Mean difference between colonoscopy vs waiting area cohort	P-Value
Own Consumption	-23.30	<0.01	13.63	0.38
External validation	0.59	0.106	-1.90	0.48
Self-respect	12.31	<0.01	-6.85	0.26
Belonging	2.41	<0.01	-3.35	0.45
Empathy	8.0	<0.01	-1.54	0.72

were excluded. The safety test was performed by an injection ALLO-ASCs into the anal sphincter with dose escalation (3×10^7 , 6×10^7 and 9×10^7 cells, sequentially). The efficacy test was performed by the determined dose from the safety test. A total of 12 patients randomly allocated between the experimental and placebo group. The experimental group received ALLO-ASCs mixed with fibrin glue into the anal sphincter, and the placebo group received 0.9% normal saline injection mixed with fibrin glue. The primary end point was to assess the safety of ALLO-ASCs after the injection into the anal sphincter, and the secondary end point was to compare the efficacy of ALLO-ASC injection with fibrin glue in patients with fecal incontinence. Detailed study protocol was published in *BMJ Open* 2016;17;6(2):e010450 (NCT02384499).

Results/Outcome(s): According to the safety test, 3×10^7 cells of ALLO-ASCs were determined as a safe dose with the most effective outcomes for Wexner score and anal manometry. There were adverse events that patients with 6×10^7 cells of ALLO-ASCs had erythroderma and patients with 9×10^7 cells had headache. In the efficacy test, each group was composed five females and one male. The mean age of the experimental group was 72.2 ± 8.8 years old, which was older than placebo group of 69.5 ± 3.8 years old ($p=0.018$). The changes of Wexner score before and after intervention were not significantly different between two group: 5.9 ± 2.1 vs. 4.3 ± 1.7 , experimental vs. placebo groups ($p=0.737$). In addition, both resting and squeezing pressure, which were measured by the anal manometry had no significant differences between two groups. The results of FIQL were also similar between two groups.

Conclusions/Discussion: There was no clinical improvement after ALLO-ASCs injection into anal sphincter in patients with fecal incontinence. It is questionable for regenerative effects of ALLO-ASCs to treat fecal incontinence in patients without anal injury.



Trial schema.

CAN A FITBIT WITH REMINDER ALARMS MOTIVATE PATIENTS TO INCREASE POSTOPERATIVE AMBULATION? A RANDOMIZED CONTROLLED TRIAL.

P303

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Purpose/Background: Early mobilization after surgery is considered an important component of enhanced recovery after surgery (ERAS) protocols. However, despite guideline recommendations, measuring ambulation is inconsistently applied and non-standard. The extent to which patient motivation can improve postoperative ambulation and the types of interventions which can be successful remain unknown. Activity trackers offer opportunities to assess both of these problems. Our aims were to evaluate

P303 Recorded Steps by Postoperative Day (POD)

POD	Intervention arm - n	Intervention arm - Median		Control arm - Median		p-value
		Steps (IQR)	Control arm - n	Steps (IQR)		
0	20	8.5 (0-34.5)	23	35 (0-95.5)	0.6398	
1	20	504.5 (146.75-1452.25)	22	1203 (799-2621.5)	0.0247	
2	19	765 (318.5-1379)	19	677 (231-1014)	0.3543	
3	17	1014 (302-1381)	13	1031 (376-1430)	0.7729	
4	11	1443 (485.5-2029)	12	994.5 (105-4270.75)	0.9759	
5	6	2266.5 (701.5-4180.25)	9	1611 (117-3522)	0.9546	
6	4	1380.5 (442.75-2573.5)	7	1725 (260.5-3736.5)	1.0000	
7	2	475.5 (413.25-537.75)	4	3173.5 (1086.5-5660)	0.5333	
8	2	2192.5 (1136.75-3248.25)	3	3202 (1657-3438)	1.0000	
9	2	1974 (1234.5-2713.5)	1	3202 (3202-3202)	1.0000	

Intervention arm with activity tracker and alarms versus control arm with activity tracker alone. p-values calculated by two-sided Wilcoxon Rank Sum test.

whether the Fitbit® (an activity tracker) with alarms could be integrated into postoperative care to objectively measure ambulation and increase ambulation with an alarm-based behavioral intervention in a cohort of patients on an ERAS protocol.

Methods/Interventions: 48 patients undergoing elective colorectal procedures were enrolled in an established ERAS program. The study was powered to detect an increase of 150 steps per day, requiring 24 patients per arm. Patients were randomized to receive either a Fitbit® with an intervention of five daily reminder alarms (n=24), or to a control arm with a Fitbit® alone without daily reminder alarms (n=24). All patients were educated on postoperative ambulation, received activity trackers immediately following surgery, and wore them until discharge or postoperative day 9. Quantitative step data from the activity trackers was recorded continuously using Fitbit Charge® activity trackers.

Results/Outcome(s): Over 223 total patient-days, the activity trackers recorded a complete data set for 216 patient-days (96.86%). Data was collected for 97.17% of patient-days in intervention arm and 96.58% of patient-days in the control arm (Two-tailed T-test, $p = 0.8023$). The median number of daily steps across all days in the intervention arm was 495 (IQR 104.5-1449.5) and in the control arm was 1014 (IQR 355-2852.5), with no statistically significant difference between groups (Two-sided Wilcoxon rank sum test, $p = 0.4254$). Step counts by day listed in Table 1. Linear mixed-effects models were used to assess the effect of the intervention on daily steps while controlling for multiple variables. The use of activity trackers with five daily alarms did not significantly affect number of daily steps compared to activity tracker alone (ANOVA, $p = 0.9287$). There were no differences between groups in length of stay, in-hospital venous thromboembolism, pulmonary complications, or ileus.

Conclusions/Discussion: Our study demonstrated a strategy to operationalize the use of activity trackers into postoperative care. The Fitbit Charge® was found to be a reliable in tracking daily step counts with a failure rate of <5% of patient-days, but reminder alarms did not increase ambulation. Future studies will explore how these devices can be used to quantitatively measure and increase postoperative ambulation.

LONG-TERM FUNCTIONAL AND QUALITY OF LIFE OUTCOMES AFTER TATME FOR RECTAL CANCER.

P304

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Purpose/Background: Advances in surgical technique and adjuvant therapy have improved rectal cancer oncologic outcomes, and put focus on functional outcomes.

Impaired function after low anterior resection (LAR) is a common problem with great impacts on quality of life (QoL). Transanal total mesorectal excision (TaTME) has potential to improve functional outcomes and QoL; however, there is little study on these results after TaTME, and none evaluating long-term outcomes. Our goal was to assess the long-term functional outcomes and QoL after TaTME for rectal cancer.

Methods/Interventions: A single tertiary referral center's data recorded on the International Transanal TME Registry was reviewed for functional outcomes and QoL in consecutive rectal cancer patients undergoing LAR with TaTME. Results were collected from patient self-reported surveys before surgery and 12-24 months after surgery. Tumor demographics, anorectal function, self-perceived health status, quality of life, fecal urgency and incontinence, and gender specific sexual outcomes were evaluated using standardized instruments. Descriptive statistics compared results for preoperative and ≥ 1 year periods.

Results/Outcome(s): 23 patients were evaluated. The mean tumor size was 3.2cm (SD 1.5), and 74% involved ≥ 2 quadrants. Eight patients (34.8%) received neoadjuvant therapy. The abdominal phase was performed laparoscopically with a temporary stoma in all index procedures; all stomas were closed by follow-up assessment. The mean tumor height from the anal verge (AV) was 5.9cm (SD 2.2), and from the anorectal junction 3.1cm (SD 1.8). The mean anastomosis distance from the AV was 3.2cm (SD 1.5, range 0-6cm). From the EQ-5D-3L, self-perceived health status was overall improved and similar along all 5 dimensions, with most patients having no problems. All QLQ-C30 functional and symptom scores were comparable or improved. The QLQ-CR29 colorectal cancer-specific module found small improvements in sexual interest, micturition, and embarrassment with bowel movements; moderate improvements in anxiety and defecation; and worse outcomes for sore skin. The IPSS found the impact on postoperative sexual function was mild, with both the overall score and QoL improved. The Vaizey scores for fecal incontinence were similar. The IIEF found improvement in male QoL and impotence, with a small increase in erectile dysfunction. The LARS score found similar outcomes in the pre and postoperative periods, with improvement over time for all categories except major LARS. Still, only 4 patients (17.4%) reported major LARS at long-term follow-up.

Conclusions/Discussion: This initial report of long-term functional and QoL outcomes after TaTME for rectal cancer demonstrates minimal symptoms and improvement in most functional results. The continued improvements over time demonstrate further promise for both oncologic and overall patient outcomes with this emerging technology.

Test and Outcome Variable	Preoperative Mean (SD)	≥1 Year Mean (SD)	Test and Outcome Variable	Preoperative Mean (SD)	≥1 Year Mean (SD)
EQ5D			QLQ-CR29		
VAS*	79.3 (17.4)	83.0 (18.2)	Anxiety	35.5 (16.9)	20.4 (20.7)
Mobility	1.1 (0.4)	1.1 (0.3)	Body Image*	87.5 (17.9)	86.1 (17.1)
Self care	1.1 (0.4)	1.0 (0.2)	Sexual interest male*	37.6 (32.3)	44.9 (29.6)
Usual activity	1.2 (0.5)	1.2 (0.5)	Micturition	25.3 (13.8)	15.8 (12.8)
Pain/Discomfort	1.3 (0.5)	1.2 (0.4)	Abdominal	3.4 (7.0)	3.3 (5.2)
Anxiety/Discomfort	1.2 (0.4)	1.3 (0.5)	Defecation no stoma	26.1 (14.7)	10.2 (8.4)
QLQ-C30			Incontinence no stoma	18.9 (17.6)	19.6 (19.8)
Global Health QoL*	78.2 (18.0)	85.5 (19.2)	Bloated	11.5 (19.0)	10.1 (18.6)
Physical Function*	92.7 (21.7)	92.7 (14.8)	Dry mouth	11.5 (16.1)	14.5 (26.4)
Role Function*	90.6 (20.0)	92.0 (23.5)	Hair loss	5.7 (12.8)	10.1 (25.5)
Emotional Function*	79.4 (20.3)	88.4 (17.2)	Taste trouble	8.7 (18.0)	4.3 (15.3)
Cognitive Function*	92.6 (10.0)	90.5 (12.1)	Sore skin, no stoma	10.5 (18.5)	20.2 (21.9)
Social Function*	85.6 (23.1)	86.9 (16.7)	Embarrassed BM, no stoma	20.2 (28.0)	15.9 (28.2)
Fatigue	16.8 (17.3)	20.2 (25.0)	Impotence, Dyspareunia	21.7 (27.7)	36.3 (40.2)
Nausea/vomiting	2.2 (5.9)	4.3 (11.4)	IPSS		
Pain	10.2 (18.0)	7.9 (14.0)	Total score	5.6 (3.8)	4.2 (2.7)
Dyspnea	1.4 (6.9)	5.8 (16.4)	QoL	31.2 (24.2)	22.4 (16.3)
Insomnia	25.9 (24.5)	17.3 (22.2)	Vaizey Score	4.3 (4.2)	5.3 (4.8)
Appetite	8.6 (14.8)	4.3 (11.4)	IIFF		
Constipation	5.8 (16.4)	7.2 (13.9)	Male QoL	39 (31.3)	42 (28.9)
Diarrhea	18.8 (28.1)	18.7 (22.1)	Impotence	21.7 (27.7)	33 (36.3)
Financial problem	8.7 (18.0)	7.2 (22.3)	Erectile function	11.1 (10.6)	8.5 (9.8)
LARS	20 (10.6)	20.7 (11.4)			

*. Higher score indicates better functional outcome
 EQ-5D-3L- EuroQol Group self-reported quality of life; EORTC QLQ-C30- European Organization for Research and Treatment of Cancer quality of life questionnaire; EORTC QLQ-CR29- European Organization for Research and Treatment of Cancer module for colorectal cancer; IPSS-International Prostate Symptom Score; IIFF- International Index of Erectile Function; LARS- Low Anterior Resection Syndrome Score

ORAL ANTI-BIOTICS AS BOWEL PREPARATION REDUCE, NOT INCREASE, THE RISK OF CLOSTRIDIUM DIFFICILE INFECTION AFTER COLECTOMY.

P305

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Purpose/Background: While the use of oral antibiotic (OA), as a bowel preparation, is gaining popularity, it is unclear whether it increases the risk of Clostridium Difficile (CD) infection. This study aimed to evaluate the impact of OA on the development of CD infection after colectomy.

Methods/Interventions: Patients who underwent colectomy from the ACS-NSQIP data (2015 and 2016) were included. Emergency procedures; pre-existing surgical site infection, open/infected wound, sepsis, septic shock, pneumonia and urinary tract infection (UTI) were excluded. Patients who received OA, as bowel preparation, were compared to others for demographics, comorbidities, primary diagnosis; procedure type and approach and 30-day postoperative complications. Multivariable analysis was performed to characterize the association between OA and 30-day CD infection after colectomy.

P305 Multivariable analysis of factors associated with Clostridium Difficile infection after colectomy

Variable	Odds Ratio	Confidence interval	p-value
Preoperative oral antibiotic use	0.6	0.5 – 0.8	<0.0001
Mechanical bowel preparation	1.1	0.9 – 1.4	0.2
Age (≥ 65 years)	1.4	1.2 – 1.8	0.001
Functional status (dependent vs. independent)	1.7	1.1 – 2.7	0.02
BMI (overweight+obese vs. underweight+normal)	1.1	0.9 – 1.4	0.3
ASA class (III-IV vs. I-II)	1.2	0.9 – 1.4	0.2
Primary diagnosis (malignant vs. benign)	0.8	0.7 – 1.0	0.1
Smoker	1.3	1.01 – 1.63	0.04
Diabetes	0.7	0.57 – 0.99	0.04
Hypertension	1.0	0.8 – 1.2	1.0
Dyspnea or ventilator dependent	1.1	0.8 – 1.5	0.7
Congestive heart failure	1.1	0.5 – 2.4	0.8
Disseminated cancer	0.9	0.6 – 1.4	0.7
Bleeding disorder	1.2	0.7 – 1.8	0.5
Preoperative transfusion	0.9	0.5 – 1.6	0.7
Weight loss > 10%	1.1	0.7 – 1.6	0.7
Preoperative WBC, ×10 ⁹ /L	1.04	1.02 – 1.06	<0.0001
Preoperative Hematocrit, %	0.99	0.97 – 1.01	0.4
Wound class (III-IV vs. I-II)	0.9	0.7 – 1.1	0.4
Surgical approach (Open vs. others)	1.3	1.05 – 1.6	0.02
Conversion to open approach	1.2	0.8 – 1.6	0.4
Operative duration (≥ 180 minutes)	1.2	1.02 – 1.5	0.03

ASA: American Society of Anesthesiologists score, BMI: Body mass index, WBC: White blood cell count, OR: odds ratio, CI: Confidence interval

Results/Outcome(s): Of 36,374 included patients, 18,177 (50%) received OA and 527 (1.4%) developed CD infection. OA group had more younger (Age<65 years: 58% vs. 53.1%, $p<0.0001$), functionally independent (98.4% vs. 97.4%, $p<0.0001$) and obese (BMI \geq 30 kg/m²: 36% vs. 34.1%, $p<0.0001$) patients but with lower American Society of Anesthesiologists (IV: 3% vs. 6.3%, $p<0.0001$) and wound (IV: 5.9% vs. 7%, $p<0.0001$) class. Smoking, diabetes, hypertension, dyspnea or ventilator-dependence, congestive heart failure, disseminated cancer, bleeding disorder and perioperative transfusion were significantly higher for non-OA group. Mechanical bowel preparation, laparoscopy, conversion to open and operative duration \geq 180 minutes were associated with OA. The occurrence of CD infection (1.1% vs. 1.8%, $p<0.0001$); superficial (2.5% vs. 5.1%, $p<0.0001$), deep (0.3% vs. 0.8%, $p<0.0001$) and organ space (3% vs. 4.9%, $p<0.0001$) infections; wound disruption (0.5% vs. 0.9%, $p<0.0001$) anastomotic leak (2.2% vs. 3.4%, $p<0.0001$), sepsis (1.6% vs. 2.8%, $p<0.0001$), septic shock (0.7% vs. 1.3%, $p<0.0001$), pneumonia (0.9% vs. 2.2%, $p<0.0001$), UTI (1.5% vs. 2.1%, $p<0.0001$) and reoperation (3.5% vs. 4.8%, $p<0.0001$) were significantly lower for OA. On multivariable analysis, OA reduced the odds for CD infection after colectomy (OR=0.6, CI=[0.5–0.8]). For patients who did not develop infectious postoperative complications, OA continued to be preventive against CD infection (OR= 0.7, CI= [0.5 – 0.9]). While complications, reoperation and readmission were the same, postoperative ileus and hospital stay were significantly reduced for those who developed CD infection after receiving OA when compared to non-OA.

Conclusions/Discussion: The use of oral antibiotics as bowel preparation conversely reduces the risk of CD infection after colectomy. This effect may partly be due to the other recovery advantages indirectly associated with oral antibiotics. These data further strengthen the use of oral antibiotics before colectomy.

ANASTOMOTIC LEAK IN LEFT COLECTOMY: DOES THE ANASTOMOTIC TYPE AFFECT THE RESULTS?

P306

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Purpose/Background: Anastomotic leak is the most relevant complication after left colectomies, affecting between 2% to 15% of these patients. Double stapled anastomosis is the technique of choice for this procedure. There is some controversy about the risk of overlapping the circular stapler through the linear stapler at the rectum. For that reason, many surgeons try to avoid this situation using the terminolateral (TL) technique. The

main objective was to assess the feasibility of performing a TL anastomosis, and secondly to evaluate the impact of terminoterminal (TT) versus terminolateral (TL) anastomosis on leak rate.

Methods/Interventions: A prospective, non-randomized study was performed using a prospectively collected database between 2003 and 2016. Patients who underwent a laparoscopic left colectomy were included. Whenever possible a TL anastomosis (circular stapler though the anterior or posterior face of the rectum) was tried to perform. If this could not be achieved for any reason, a TT anastomosis (circular stapler across the linear stapler) was done. Patients were divided into two groups: TT anastomosis (G1), and TL anastomosis (G2). Other risk factors for anastomotic dehiscence such as sex, age, BMI, benign vs. malignant disease, comorbidities, conversion to open surgery or emergency surgery were also investigated.

Results/Outcome(s): Two hundred and thirteen patients underwent a left colectomy and were included in the study. Average age was 60.7 (\pm 12.7) years. In the majority of patients, it was feasible to perform a TL anastomosis [G1: 161 (75.6%) vs. G2: 52 (24.4%)]. Thirty one patients (14.5%) presented an anastomotic leak. There were no statistically significant differences in the leak rate between the groups (G1: 9 (17.3%) and G2: 22 (13.6%). No association was found between the other investigated risk factors and a higher anastomotic leak rate.

Conclusions/Discussion: Performing a TL anastomosis is feasible in the majority of cases. Even so, if a TT anastomosis has to be performed, this does not increase the risk of anastomotic leak.

TREATMENT OF OBSTRUCTIVE SIGMOID FECALOMA WITH COCA-COLA ENEMAS IN AN ADULT PATIENT: CASE REPORT AND LITERATURE REVIEW.

P307

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Purpose/Background: Anorectal dysfunction occurs in up to 42% of population in geriatric wards.¹ Colonic fecal impaction (CFI) is a common cause of gastrointestinal (GI) discomfort and can ultimately lead to small or large bowel obstruction. As a result, it can be associated with a significant risk of morbidity and mortality.³ There are several causes of CFI such as chronic constipation, anatomic anorectal abnormalities and functional anorectal abnormalities. A systematic review of CFI in BMC Geriatrics broke down the three main complications of longstanding CFI. They state that CFI can lead to increased intraluminal pressure which can cause capillary perfusion and eventually lead to colitis, ulceration and perforation.⁴ CFI also leads to increased secretion from mucosal cells in the

colon; this leads to paradoxical diarrhea and irritation of the mucosa. Lastly, if the colon is distended for a long enough period of time, it can lead to toxic megacolon.⁴ In the case of chronic constipation; the treatment can be as simple as diet modification. However, severe cases may require a total colectomy.⁵ Our research showed us that the mainstay treatment for a fecaloma is generally limited to mechanical disimpaction, laxatives, stool softeners, and enemas.⁶

Methods/Interventions: We report the case of a 68-year-old-female with extensive psychiatric history, who was admitted to the medical service for acute abdominal pain. She had been experiencing constipation over the past two years, however, on CT scan, she was found to have a large fecal mass in the sigmoid colon. The GI service attempted to disimpact with colonoscope, however, they were unable to get past the obstruction. Eventually, general surgery was consulted, and we recommended Coca-Cola enemas to dissolve the fecaloma.

Results/Outcome(s): After two days of 8oz coca cola enemas TID, the fecaloma had completely dissolved. On repeat colonoscopy, there was no evidence of obstructing fecaloma and we were able to traverse the colon 1.1 meters from the anal verge without any evidence of other obstructing mass.

Conclusions/Discussion: There are very few papers that describe the use of Coca-Cola enemas to treat fecalomas.^{7,8} In general, the use of Coca-Cola is limited to dissolution of bezoars in the upper GI tract. After an exhaustive literature search, there are currently no papers published in the United States that showed the use of Coca-Cola to treat large bowel obstruction secondary to fecal impaction. It is important to explore all options of non-operative management before surgical intervention is considered. We propose that Coca-Cola enemas be used for quick relief in patients with CFI. Total abdominal colectomy in the emergent setting is associated with

ELECTIVE LAPAROSCOPIC SIGMOID COLECTOMY FOR DIVERTICULITIS — AN UPDATED LOOK AT RECURRENCE AFTER SURGERY.

P308

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Purpose/Background: Diverticulitis remains a common problem now affecting more people of younger age. Elective sigmoidectomy is offered to prevent future episodes of disease. However the reported recurrence rate is variable and the elective surgical indications are not standardized. The purpose of this study is to measure the rate of recurrent diverticulitis after elective sigmoid colon resection and identify the risk factors for its occurrence.

Methods/Interventions: The medical records of all patients undergoing elective sigmoidectomy for diverticulitis by the colon and rectal surgery service in a tertiary referral center from 2002 to 2016 were reviewed. Recurrence data were obtained from eligible patients by a combination of chart review, questionnaire and telephone interview. The primary endpoint was the incidence of recurrent diverticulitis as documented by symptoms or CT scan findings. The effect of patient demographics, comorbidities, preoperative diagnoses and treatment, type of surgery, final pathologic diagnoses and length of resected specimen on recurrence was evaluated.

Results/Outcome(s): Six hundred eighty patients met the inclusion criteria, of whom 234 (34.4%) had long term follow up data available. The mean follow-up was 83 (range, 17 -190) months. Sixty percent (140 patients) were female, with a mean age of 58.3 (range, 31-83). Preoperative diagnoses included uncomplicated recurrent episodes (65.4%, 153 patients), localized perforation with or without abscess (20%, 46 patients), fistula (9%, 21 patients) and stricture (6%, 14 patients). A standardized laparoscopic approach was used in 231 cases (99%), with a conversion rate of 12.6% (29 patients). Mean specimen length was 17.57 ± 4.2 cm. Recurrent diverticulitis developed in 14 patients (6%), documented predominantly by CT scan (11 patients, 78.6%). Mean time to recurrence was 63 (range, 21-161) months. Of these, 5 patients (35.7%) underwent subsequent colon resection for treatment and all had documented diverticulitis or diverticular disease on pathology during both initial and subsequent surgeries. Patients with recurrence after initial surgery were significantly younger, with a mean age of 52 years vs 58 for those without recurrence ($p = 0.028$). Preoperative uncomplicated recurrent diverticulitis and treatment with oral antibiotics alone were the only factors associated with higher risk for recurrence ($p = 0.018$ and $p = 0.005$).



Conclusions/Discussion: The rate of recurrent diverticulitis is low but can develop several years after surgery. Younger age and uncomplicated recurrent diverticulitis were associated with higher recurrence after elective sigmoidectomy. Further investigations on whether uncomplicated diverticulitis especially those managed with oral antibiotics only represent a disease process different from complicated diverticulitis may be warranted.

RIGHT- VERSUS LEFT-SIDED DIVERTICULITIS IN KOREA: CLINICAL MANIFESTATION AND TREATMENT.

P309

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Purpose/Background: A proportion of right colonic diverticulitis in Asia was known to be more than in Western world. Clinical manifestation of right-sided diverticulitis might be different from left-sided one. Moreover, the Hinchey classification can be applied for left-sided diverticulitis, not for right-sided one. The aim of the study was to compare the clinical feature, imaging findings, and treatment outcomes of right-sided diverticulitis with left-sided diverticulitis, and to provide appropriate treatment options.

Methods/Interventions: Medical records were reviewed retrospectively between July 2006 and December 2016. The patients were diagnosed with colonic diverticulitis by clinical manifestation and imaging studies (i.e computer tomography or ultrasonography) at Kyung Hee University Hospital at Gangdong, Seoul, Korea.

Results/Outcome(s): Of 507 patients, 452 (89.1%) were diagnosed with right-sided diverticulitis and 55 (10.8%) with left-sided diverticulitis. Mean age was lower in the right group than the left group (40.6 vs. 59.5 years, $P<0.001$). Grade 1a of the modified Hinchey classification were mostly found in the both groups with significant difference (84.5% vs. 38.2%, $P<0.001$). 12 patients (2.7%) underwent surgery in the right group, whereas 20 (36.4%) patients underwent surgery in the left group ($P<0.001$). Intravenous antibiotics were given to the patients shorter in the right group than the left group, while oral antibiotics in reverse (5.4 vs 9.8 days, $P<0.001$, 7 vs. 5 days, $P<0.001$, respectively). Fasting period was shorter in the right group than in the left group (3.4 vs. 5 days, $P=0.006$).

Conclusions/Discussion: There was more right colonic diverticulitis than left one in Korea. Right-sided diverticulitis appeared to be milder than left-sided one based on better modified Hinchey grade, more non-surgical treatment, shorter duration of antibiotics use, and shorter fasting period. Different approach and management should be applied for right-sided diverticulitis compared with

left-sided diverticulitis including surgery, antibiotics, and disease classification.

FISTULECTOMY, SPHINCTEROPLASTY AND ANOPLASTY (FISA) TO TREAT LOW TRANS-SPHINCTERIC PERIANAL FISTULA.

P310

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Purpose/Background: Perianal fistula is a common disease whose treatment is aimed at eradicating the pathology while preserving sphincter function. Despite the surge of no-cutting techniques, fistulectomy with lay open is still considered the gold standard for low, inter-sphincteric and trans-sphincteric fistulas. If it is true that for low inter-sphincteric fistulas the risk of impaired continence, soiling and anal deformity is minimal, it is not for low trans-sphincteric fistulas. For patients presenting with the latter form of fistulas, after total fistulectomy and eventual abscess removal we perform reconstruction with sphincteroplasty, anoplasty and closure of residual cavity. In the present study we analyze our experience on this procedure against traditional fistulectomy with lay open.

Methods/Interventions: We retrospectively studied prospectively enrolled patients presenting at our Department with low trans-sphincteric fistula (<30% sphincters involvement) in between 2011 to 2017. A specific consent was obtained from each patient. Patients were either treated with fistulectomy with lay open alone (Group A) or with Fistulectomy, Sphincteroplasty and Anoplasty (FISA)(Group B). Primary end-points were post-operative (PO) soiling rate and major incontinence; secondary end-points were operative time, healing time, PO anal deformity (as follow 0: no deformity,-1: light,-2: medium,-3: heavy), wound dehiscence and rate of recurrences.

Results/Outcome(s): We treated a total of 59 patients, 25 with fistulectomy/lay open (Group A) and 34 with FISA (Group B). Soiling occurred in 13/25 (52%) patients following fistulectomy/lay open and in 5/34 (14,7%) following FISA; in the Group A 1 patient experienced a single episode of major faecal incontinence. Wound dehiscence occurred in 4 patients treated with FISA, and all of these complained of soiling. Fistulectomy/lay open compares to FISA as follow: mean operative time 30 minutes versus 41 minutes; mean healing time was 49 days in Group A versus 25 days in Group B; mean PO anal deformity was -1,8 in Group A and -0,5 in FISA. At a median follow-up of 24 months there were no recurrences in both groups.

Conclusions/Discussion: The most important arguments against fistulectomy for the treatment of low trans-sphincteric anal fistula are the long healing time and the possibility of continence impairment. In this study we report the results with FISA, that seems to combine the advantages of classical fistulectomy, i.e. eradicating the fistula, with the benefits of reconstruction, mainly: a preserved sphincter function, faster healing time and minimal anal deformity. These results suggest FISA deserves to be evaluated in a prospective study.

LOOP ILEOSTOMY CLOSURE: COMPARISON BETWEEN EXPERIENCE OF SURGEON AND METHODS OF ANASTOMOSIS.

P311

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Purpose/Background: Loop ileostomy closure can be performed either by hand-sewn or stapler. This study is intended to compare operative time and postoperative complication between anastomosis performed by an expert surgeon and anastomosis by fellow group.

Methods/Interventions: Medical records of patients undergoing ileostomy closure were reviewed retrospectively. We classified patients into two groups. One group was operated by expert surgeon (having career over 15 years after getting board of surgery) with hand-sewn anastomosis, and the other by surgical fellows (one to two years with surgery board) with either hand-sewn or stapler. Operative time, hospital course and postoperative complications were analyzed between the two groups.

Results/Outcome(s): Total 114 patients were included in this study. Fifty four ileostomy closure were performed by expert surgeon and 60 cases by fellows. Overall, operation time was 65(\pm 24.8) minutes, vs 88(\pm 37.7) minutes, being significantly shorter in expert surgeon group ($p < 0.001$). Expert's hand-sewn anastomosis was also significantly faster than double stapling method performed by fellows (65 vs 82 min, $p = 0.001$). First flatus was passed on 2.5 and 2.9 postoperative days ($p = 0.01$). Liquid was permitted on 2.5 and 3.5 days ($p = 0.006$), diet was proceeded on 3.5 and 4.7 days ($p = 0.003$). In expert surgeon group postoperative hospital stay was also significantly shorter than in fellows group (5.5 vs 8.4 days, $p < 0.001$). There was no significant difference in complication rate. (25.9 vs 25%, $p = 0.91$) Comparing patients' characteristics on multivariate analysis, age, steroid use, previous abdominal procedure, chemotherapy and radiation therapy were not associated with operation time and postoperative complications. Experience of surgeon was the significant factor reducing operation time by multivariate analysis ($p = 0.002$).

Conclusions/Discussion: This study showed that hand-sewn anastomosis by expert surgeons is faster, and resulted in earlier diet intake and less hospital stay than hand-sewn/stapler anastomosis performed by the fellows. However, there were no difference in postoperative complication rate.

LAPAROSCOPIC VENTRAL RECTOPEXY: A VIABLE OPTION FOR PROCIDENTIA IN NORTH INDIAN POPULATION WITH BULKY SIGMOID COLON.

P312

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Purpose/Background: Laparoscopic ventral mesh rectopexy (LVMR) is increasingly being used in the western world as a procedure of choice for rectal prolapse. However there are few reports of its use from this part of world. The objective of the study was to evaluate the feasibility and results following LVMR in patients of complete rectal prolapse with bulky sigmoid colon in a subset of North Indian population.

Methods/Interventions: Retrospective analysis of the records of 25 patients undergoing LVMR for procidentia at our centre since 2013 was done. All patients routinely underwent sigmoidoscopy and barium enema. All patients having sigmoid colon diameter > 5 cm on barium enema were considered as having bulky sigmoid colon. Primary endpoints included evaluation of constipation and fecal incontinence. Wexner score was used to quantify constipation while St Mark's fecal incontinence score (SMIS) was used to quantify fecal incontinence. Qualitative and quantitative values were analysed using chi-square and t-test respectively. p value < 0.05 was considered as significant.

Results/Outcome(s): Twenty five patients with a median age of 38 years underwent LVMR over 4 years. Out of them, 88% ($n = 22$) patients had a bulky colon. There was a significant improvement in Wexner score in the postoperative period as compared to preoperative scores ($p < 0.0001$). In patients who presented with fecal incontinence, significant improvement in postoperative SMIS (mean preoperative: 17.8 vs mean postoperative: 7.33; p value: < 0.0001) was observed. Median follow up of 33.5 months (range: 6-82). One recurrence was noted during this period.

Conclusions/Discussion: This is the first report of LVMR which has shown it as an effective surgical procedure for complete rectal prolapse with bulky sigmoid colon in North Indian population. It provides good functional results with acceptable recurrence rates and improves pre-existing constipation as well as fecal incontinence in these patients.

PNEUMATOSIS INTESTINALIS: FACTORS THAT INFLUENCE SURVIVAL.

P313

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Purpose/Background: Pneumatosis intestinalis (PI) and portal venous (PV) gas are associated with a broad range of pathologies, most of which are associated with high mortality rates. Unfortunately, patient diagnosis and management is often based on small case series or outdated findings. The purpose of this study was to compare survival in patients with Computed Tomography (CT) evidence of PI and/or PV gas.

Methods/Interventions: Following IRB approval, a retrospective review of all patients demonstrating CT evidence of PI and/or PV gas from March 2011 to September 2017 was performed. Patient demographics, clinical presentation, laboratory data, CT findings, clinical diagnosis and management, outcomes, and follow-up information were studied. Univariate analysis was performed comparing survivors with non-survivors.

Results/Outcome(s): Fifty patients with PI and/or PV gas were identified; 26 (52%) were male. 47 (94%) had evidence of PI and 24 (48%) had evidence of PV gas. 32 (64%) survivors were identified with mean follow-up of 1.9 years. 28 (56%) patients underwent operative management, while 19 (38%) were managed non-operatively and 3 (6%) were offered palliative care. The most commonly presumed causes for development of PI/PV gas were preceding hypotension (24 patients, 48%) and bowel obstruction (21 patients, 42%). Medical history of survivors and non-survivors are listed in Table 1. There was no significant difference in heart rate (97.8 ± 15.5 vs. 100.6 ± 23.5 ; $p=0.73$), mean arterial blood pressure (87.2 ± 19.8 vs. 75.6 ± 17.2 ; $p=0.053$), leukocyte count (13.3 ± 7.6 vs. 15.4 ± 8.6 ; $p=0.38$), or the presence of portomesenteric venous gas (43.8% vs. 55.6%; $p=0.42$). Survivors were younger (59.1 ± 13.5 years vs. 67.4 ± 12.3 years; $p=0.0171$), with lower creatinine (1.72 ± 1.4 vs. 2.71 ± 2.4 ; $p=0.035$) and venous lactate levels (2.66 ± 2.05 vs. 4.64 ± 3.44 ; $p=0.013$) at the time of CT. Survivors were also more likely to present with bowel obstruction (53.1% vs. 22.2%; $p=0.042$). Non-survivors were more likely to present with GI bleeding (38.9% vs. 6.3%; $p=0.007$), temperature $>38^{\circ}\text{C}$ (44.4% vs. 12.5%; $p=0.017$), and history of recent hypotensive episode (66.7% vs. 37.5%; $p=0.048$).

Conclusions/Discussion: Pneumatosis intestinalis and portal venous gas are increasingly encountered on cross-sectional imaging, but management of these findings remains unclear. In our series, the most common presentations associated with PI and PV were hypotension and bowel obstruction. Given the complex decision making involved, CT findings alone appear insufficient for prediction of outcomes. Further study is required to determine

contribution of demographics, disease process and imaging to better predict outcomes.

Table 1: Medical History of Patients With Pneumatosis or PV Gas

	Survived	Died	p value
Diabetes	28.1%	44.4%	0.242
Hypertension	68.8%	94.4%	0.072
Tobacco use	25.0%	29.4%	0.746
Heart disease	18.8%	38.9%	0.18
A-fib	15.6%	38.9%	0.089
Liver disease	9.4%	22.2%	0.236
Prior Mesenteric Ischemia	12.5%	11.1%	0.885
Peripheral Vascular Disease	21.90%	50.00%	0.041

COMPARISON OF PREOPERATIVE AND POSTOPERATIVE MRI AFTER COMPLEX FISTULA-IN-ANO SURGERY.

P314

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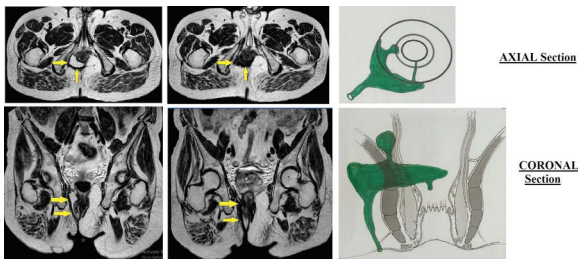
Purpose/Background: Efficacy of preoperative MRI in fistula patients is well established. However the need, indication, utility and evaluation of doing MRI scans after fistula-in-ano surgery (postoperative period) has never been done in the literature. This is the first study to evaluate the utility of MRI in assessing postoperative healing and complications after fistula surgery

Methods/Interventions: Preoperative MRI was done in all the patients presenting with fistula-in-ano. Postoperative MRI was done to assess the healing after the surgery, when postoperative complication was suspected or in cases in which there were issues with the healing. The postoperative MRI were compared with preoperative MRI and correlated with clinical picture.

Results/Outcome(s): 1090 MRI were done in 833 patients suffering from fistula between Jan 2014 to October 2017. Out of these, 511 patients underwent surgery for the fistula. 257 post operative MRI scans were done in 148 patients. There were 138 recurrent fistula, 104 had an associated abscess, 259 had multiple tracts, 94 had horseshoe tract and 56 had supralevator fistula. As per St James hospital university classification (SJUH), there were 104 grade I, 68 grade II, 73 grade III, 197 grade IV and 56 grade V fistula. The requirement and utility of postoperative MRI was significantly higher in higher SJUH grades (IV & V) than lower SJUH grades (I,II, III) [38/245 patients of early grades and 107/253 patients of higher grades required postoperative MRI, $p<0.0001$, Fisher test-two tailed]. Lessons learnt in interpreting postoperative MRI scans MRI was quite accurate to assess healing as well as complications after fistula surgery. However expertise was required to interpret postoperative scans. Granulation tissue (healing tissue) and inflammation in tissues (post surgery) looked hyperintense on T2 and

STIR and was difficult to differentiate from active fistula tract/ pus. Therefore MRI done upto 8 weeks post surgery should be interpreted with great care. After complete healing, the complete tract and internal opening becomes hypointense on T2 and STIR (Figure-1) The complete radiological healing takes at least 10-12 weeks. So getting MRI scan for assessment of healing should be done after 12 weeks. MRI is very accurate to identify and diagnose postoperative complications like abscess formation, missed tract during surgery or non-healing of a tract. MRI detects such complications even in clinically healed tracts. By early intervention, it helps to prevent delayed recurrence, abscess formation and further spread of tracts. Closure/healing of internal opening and intersphincteric tract are assessed quite accurately by MRI and they correlate well with the fistula healing.

Conclusions/Discussion: MRI is highly useful to assess healing and detect complications after fistula surgery especially in higher grades of fistula (SJIH). MRI scan for assessment of healing should be done at least after 12 weeks of surgery.



Supralelevator recurrent fistula at 9 o'clock position in a 62 year old male patient.

Axial section (Upper row). Fistula tract from 6 to 9 o'clock position seen hyperintense on T2 image (Upper left panel), healed tract seen hypointense on T2 (upper middle panel), Schematic diagram-axial section (upper right panel).

Coronal section (Lower row). Fistula tract on left side extending to supralelevator region seen hyperintense on T2 image (lower left panel), healed tract seen hypointense on T2 (lower middle panel), Schematic diagram-coronal section (lower right panel).

NSQIP ANALYSIS OF RISK FACTORS FOR POSTOPERATIVE COMPLICATIONS FOLLOWING COLECTOMY FOR COLONIC VOLVULUS.

P315

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Purpose/Background: The epidemiology and outcomes following colectomy for colonic volvulus are poorly described, as most reports are from small single-institution studies. We hypothesized that a large population database review would more readily identify the morbidity and mortality associated with colectomy for this condition. The aim of this study was to describe the volvulus

patient population utilizing the National Surgical Quality Improvement Program (NSQIP) database and describe outcomes and risk factors for postoperative complications.

Methods/Interventions: Patients were identified from the NSQIP database and Targeted Colectomy Module from 2012-2015 using Current Procedural Terminology (CPT) code 560.2 for volvulus. Univariate and multivariate analysis was performed. The primary outcome was overall morbidity and mortality. Multivariable logistic regression models were fit for the outcomes death, readmission, any complication, discharge destination, and ileus. The multivariable model included age, BMI, sex, diabetes, smoking status, history of COPD, hypertension requiring medication, sepsis, emergency, wound class, and ASA class as covariates. P values of <0.05 were considered significant.

Results/Outcome(s): 2,233 patients met inclusion criteria (Table 1). Overall morbidity rate was 46.8%, mortality 3.6%, and readmission 10.7%. Minimally invasive approaches were utilized in 18.6% of patients. On multivariable regression analysis, significant risk factors for mortality were increasing age, sepsis, and ASA class ≥ 3 .

P315 Demographic Characteristics of Patients Undergoing Colectomy for Volvulus

Variable	n(%) or mean \pm SD
Age	65 \pm 16.9
BMI (kg/m ²)	23.1 \pm 8.7
Gender (female)	1235 (55.3)
Smoker	214 (9.6)
Diabetes	253 (11.4)
COPD	161 (7.2)
CHF	32 (1.5)
Hypertension requiring medications	996 (44.6)
Renal Failure	18 (0.8)
On Dialysis	21 (0.9)
On Chronic Steroids	89 (3.4)
Preoperative Sepsis	421 (18.9)
Emergent Case	1252 (56.1)
Wound class ≥ 3	519 (23.2)
Operative Time (minutes)	104.0 \pm 52.6
Operative Approach	
Open	1731 (77.5)
Laparoscopic	406 (18.2)
Laparoscopic with Unplanned Conversion to Open	80 (3.6)
Robotic	8 (0.4)
Robotic with Unplanned Conversion to Open	2 (0.09)
Other	6 (0.3)

BMI = body mass index; COPD = chronic obstructive pulmonary disease; CHF = congestive heart failure; ASA = American Society of Anesthesiology;

Significant risk factors for the development of any complication were increasing age, sepsis, wound class \geq 3, and ASA class \geq 3, and male gender. The most common complications were ileus (25.5%), superficial surgical site infection (6.8%), and pneumonia (6.4%). Significant risk factors for ileus were increasing age, sepsis, wound class \geq 3, ASA score \geq 3, and male gender. Mean length of stay was 8.7 ± 9.1 days and most patients (68.7%) were discharged to home. Significant risk factors for increased level of discharge destination were: age, BMI, male, preoperative sepsis, wound class \geq , and ASA class \geq 3.

Conclusions/Discussion: This is one of the first NSQIP database studies to examine outcomes following colectomy for volvulus. This study demonstrates that postoperative mortality rates for volvulus are low, but that surgical intervention carries a high rate of morbidity.

USE OF URETERAL STENTS IN COLORECTAL RESECTIONS.

P316

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Purpose/Background: Prophylactic placement of ureteral stent in colorectal resections aids in localization of ureters and early detection of ureteral injury. This study's purpose was to assess the use of and complications associated with ureteral stent placement during colorectal resections.

Methods/Interventions: A retrospective review of descending, anterior, sigmoid and rectal resections over a 10 year period was carried out. The students T test and chi square, where appropriate, were used for data analysis.

Results/Outcome(s): 980 patients were analyzed. Ninety nine (10.1%) of patients had ureteral stents placed (mean age 61 years old, male:female, 1:1). The indications for surgery in these patients were: diverticulitis, 64%; cancer, 28%; benign polyps/other, 8%. A greater percentage of patients who received stents underwent an open procedure (57% vs 34%). Unilateral stents were placed in 20 (20%) patients and bilateral stents in 80 (80%) patients. In 81 (81.8%) patients ureteral stents were placed preoperatively and in 18 (18.2%) were placed intraoperatively. Of the stents placed intraoperatively, 13 (72.2%) were placed due to overlying fibrotic tissue or inability to locate the ureter, 5 (27.8%) were placed due to concern for ureteral injury. Urology was consulted on the latter patients and it was determined that 2 patients had ureteral injuries (repaired and stented), in 1 an injury was suspected but not confirmed, and 2 did not have injuries. Postoperative ureteral complications occurred in 9 (9.1%) of the stented patients; ureteral obstruction presumably secondary to blood clots was noted in 8 (6 had hydronephrosis) and in 1 a ureteral stricture was noted. In all 9 patients the problem was noted after stent removal.

All 9 patients required return to the operating room for stent replacement and/or removal then replacement. In those patients who were not stented at surgery, 6 (0.7%) were later found to have ureteral injuries; 2 required ureteroureterostomy, 1 required ureteral reimplantation, 1 required nephrostomy tube placement and 2 required double J stent placement.

Conclusions/Discussion: Overall, the use of ureteral stents was well tolerated among patients undergoing colorectal resections. Intraoperative placement of ureteral stents should be considered for difficult dissection due to extensive inflammation or fibrosis of overlying tissue as well as concern for ureteral injury. In 9% of stented patients ureteral obstruction, presumably from blood clots, developed and was treated with cystoscopy and placement of double J stents. The use of stents in uninjured patients was not associated with long term complications.

AFTER ELECTIVE SIGMOID COLECTOMY FOR DIVERTICULITIS – DOES RECURRENCE-FREE MEANS SYMPTOM-FREE?

P317

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Purpose/Background: Elective colon resection is often offered as a treatment for diverticulitis with an expected recurrence rate of less than 10%, however, reports of patients suffering from persistent symptoms after surgery was not uncommon. The purpose of this study is to determine the incidence and characteristics of persistent symptoms in patients who had no reported recurrence after elective sigmoid colectomy for diverticulitis.

Methods/Interventions: The medical records of all patients who underwent elective sigmoid resection for diverticulitis using a standardized laparoscopic approach by the colon and rectal surgery service in a tertiary referral center from 2002 to 2016 were reviewed. Data regarding recurrence (as documented by symptoms or CT scan findings) and the presence and characteristics of persistent symptoms after surgery were obtained by a combination of chart review, questionnaire and telephone interview. Among patients without documented recurrence after surgery, those who reported persistent symptoms (PS) were compared to those with no symptoms (NS). The chi-squared test was used to identify any significant relationships between the presence of persistent symptoms and such variables as patient demographics, preoperative diagnoses and treatment, type of surgery, final pathologic diagnoses and length of resected specimen.

Results/Outcome(s): Six hundred eighty patients met the inclusion criteria, of whom 234 (34.4%) had long term follow up data available for analysis. The mean follow-up was 83 (range, 17 -190) months. Recurrent diverticulitis

developed in 14 patients (6%) at a mean of 63 (range, 21-161) months. Among the 220 patients with no documented recurrence after surgery, 132 (60%) were female, the mean age was 58.3, and 140 patients (63.6%) had uncomplicated recurrent diverticulitis preoperatively. Fifty percent reported persistent symptoms, the most prevalent of which was irregular bowel habit (70%), followed by frequent constipation with routine use of stool softener (60%). Persistent or new left lower abdominal pain or cramps was reported in 44.5% (49 patients). The PS group was comparable to the NS group in terms of age, ASA class, preoperative diagnoses, final pathology and specimen length. However, the PS group were more likely to be female (67.3% vs 52.7%, $p = 0.028$) and had preoperative treatment other than oral antibiotics alone (66.4% vs 52.7%, $p = 0.039$). A trend of decreased percentage of patients with persistent symptoms was observed as follow-up duration increased (54.1%, 53.0% and 38.5% in ≤ 5 years, 6-10 years and ≥ 11 years follow-up), although it did not achieve statistical significance ($p = 0.16$).

Conclusions/Discussion: In patients with no documented recurrence after elective sigmoid resection for diverticulitis, 50% reported persistent symptoms and they were more likely to be female and required more than oral antibiotics treatment preoperatively.

PERIRECTAL ABSCESS; A COMMON SURGICAL PROBLEM WITH SIGNIFICANT MORBIDITY.

P318

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Purpose/Background: Patients with a perirectal abscess are a commonly encountered clinical problem by the practicing surgeon. Most patients can be treated on an ambulatory setting; however, there is a subset of patients who will present with sepsis resulting in poor postoperative outcomes. The aim of this study was to identify the factors associated with the development of postoperative sepsis in patients who undergo an operation for a perirectal abscess.

Methods/Interventions: The 2015 American College of Surgeons National Surgical Quality Improvement Program database was queried. Patients with a diagnosis of perirectal abscess were selected for analysis. Multivariable logistic regression model was created to assess the influence of independent variables in the development of postoperative sepsis.

Results/Outcome(s): A total of 1,777 patients who underwent an operation for the treatment of a perirectal abscess at NSQIP participating institutions were identified during the study year. 34.4% of patients had sepsis on admission, while another 7.9% developed sepsis postoperatively. Septic shock occurred in 1.2% of all patients with a perirectal abscess. The most common types of operations performed included: incision and drainage (I&D) of perirectal abscess 1,343 (75.6%), I&D with seton placement 196 (11.0%), transrectal I&D of abscess 82 (4.6%), I&D of subcutaneous abscess 64 (3.6%), I&D of perirectal abscess with wide debridement of subcutaneous tissue 61 (3.5%), and I&D of a supralelevator abscess 31 (1.7%). A total of nine patients (0.5%) underwent stoma creation in association with the drainage procedure. On univariate analysis, factors associated with the development of postoperative sepsis were: an abnormal WBC on admission (10.4% vs. 3.2%; $P < .0001$), emergency operation (10.4% vs. 2.0%; $P < .0001$), steroid use (14.8% vs. 7.3%; $P < .0001$), and surgical procedure performed more than 24 hours after admission (14.0% vs. 7.3%, $P < .003$). Multivariable logistic regression on these significant univariate factors demonstrated that the need for an emergency operation, steroid use and an abnormal WBC on admission were associated with the development of postoperative sepsis. Patients who had had an operation within 24 hours of admission had a lower risk of developing postoperative sepsis. Model fitting was statistically significant with a $P < .0001$ and pseudo R Square of 0.70

Conclusions/Discussion: The development of postoperative sepsis in patients with a perirectal abscess is quite rare, and mortality is very low. Those patients with chronic use of steroids or with an abnormal WBC on admission are at a significantly higher risk for developing postoperative sepsis. The presence of these variables should trigger a

P318 Multivariable logistic regression analysis of factors associated with the development of postoperative sepsis in patients undergoing an operation for perirectal abscess.

N=1,777	Odds Ratio	95% Confidence Interval	P value
Abnormal WBC on admission	3.6	2.2-6.0	<.0001
Emergency operation	5.0	2.7-9.5	<.0001
Admission time to operation < 24 hours	0.6	0.4-0.8	<.0001
Chronic steroid use	2.4	1.4-4.1	<.0001
Congestive heart failure	0.6	0.5-5.6	.32
Dialysis	1.9	0.6-5.8	.56

more expeditious surgical drainage of the perirectal abscess with the clinical intention that early intervention may protect against the subsequent development of postoperative sepsis.

DUMBBELL SHAPED PELVIC LIPOMAS: CLINICAL PRESENTATION AND SURGICAL OUTCOMES.

P319

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Purpose/Background: Lipomas that originate in the pelvis may traverse foraminal spaces or other anatomical canals creating both intra- and extra-pelvic components. These dumbbell-shaped tumors are technically challenging to remove and often require a multidisciplinary team approach. The aim of this study was to assess completeness of resection and surgical outcomes.

Methods/Interventions: All patients who underwent an operation for a dumbbell-shaped lipomatous pelvic tumor between 2001 and 2017 were reviewed. Operative approach, completeness of resection, intraoperative and postoperative complications, resolution of symptoms and recurrence were assessed.

Results/Outcome(s): Fourteen patients, 10 female, with median age of 55 years, underwent resection of a benign pelvic lipoma traversing either the sciatic (n=9) or obturator (n=2) foramen, or femoral canal (n=3). Twelve of 14 patients had symptoms at presentation, while two patients' tumors were incidental imaging findings. Symptoms at presentation included pelvic, buttock, and/or leg pain, a palpable mass, swelling, bladder or bowel dysfunction, and numbness or paresthesia. All tumors were benign, with a median size of 18.3 cm (range 9.2-29 cm). All but one operation was performed by 2 or more surgical specialists. A two-incision approach was necessary in 10 of 14 patients to achieve tumor resection. All patients had a complete resection, and no intraoperative injury to viscera or major neurovascular structures was seen. Median blood loss was 250 ml (range, 100 – 2050). Postoperative complications occurred in 4 patients. One patient developed a surgical site infection which required drainage, and one had transient urinary retention. Two patients developed lower extremity functional deficits – one had leg weakness/pain for two months, and one had a mild limp that resolved at 6 months. Preoperative symptoms resolved following surgery in all patients. In the patients available for follow-up (n= 14), no tumor recurrence was seen at last follow-up (median 4.5 months, range 1-62 months).

Conclusions/Discussion: Surgical resection of benign lipomatous pelvic tumors that grow through pelvic foramina or the femoral canal can be performed safely and with a low recurrence rate. Resolution of preoperative symptoms can be expected with complete resection.

MYCOBACTERIUM TUBERCULOSIS IN 638 SAMPLES OF FISTULA-IN-ANO: LESSONS LEARNED IN 40 TB FISTULA PATIENTS.

P320

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Purpose/Background: Little data is published on Mycobacterium Tuberculosis (TB) complicating fistula-in-ano and a lot remains desired to be known regarding diagnosis and management of TB in fistula-in-ano. We compared the sensitivity of Real time- polymerase chain reaction (RT-PCR) to histopathology (HPE) in detecting TB in fistula patients and analyzed the management aspects in the TB fistula patients.

Methods/Interventions: The examination, HPE of the tissue (fistula tract wall) and RT-PCR of the tissue and pus from fistula (if available), was done in all the operated fistula-in-ano patients. Positive patients were treated with anti-tubercular therapy.

Results/Outcome(s): 638 samples were tested in 414 patients at a specialized exclusive fistula center operated between January 2014 to July 2017. Tissue-HPE was done in 199, tissue-PCR was done in 318 and pus-PCR was done in 121 samples. 42 samples tested positive in 40 patients (in two patients, both tissue-PCR and pus-PCR tested positive). Out of these, the sample was positive for TB in 1/199 in tissue-HPE, 24/318 (7.5%) in tissue-PCR and 17/121 (14.0%) in pus-PCR samples. PCR(tissue & pus) was significantly more sensitive than tissue-HPE to detect TB (41/439 vs 1/199, p<0.0001). Amongst PCR, pus was significantly more sensitive than tissue to detect TB (17/121 vs 24/318, p=0.04, Fisher's exact test, two tailed). In simpler cases with TB where fistula tract could be laid open, standard four drug anti-tubercular therapy for 6 months (2HRZE + 4 HR)[H-Isoniazid, R-Rifampicin, Z-Pyrazinamide, E-Ethambutol] regimen was sufficient for treatment. However, for complex cases with TB (all tracts could not be completely laid open), standard four drug regimen was less effective. In such cases, addition of injection Streptomycin to the standard regimen (2HRZES + 4 HR) improved the treatment outcome. No TB fistula patient had associated active pulmonary TB or TB in any other part of the body, though history of past exposure was available in 80% of patients.

Conclusions/Discussion: This is the largest series of TB in fistula-in-ano till date. HPE has very low sensitivity and specificity to detect TB. RT-PCR has high sensitivity to detect TB. PCR of pus has higher sensitivity than PCR-tissue to detect TB. Pus sample, if available, should always be sent for PCR. TB should be suspected in non-healing fistulas (where wound healing doesn't starting at all) or delayed recurrence after 3-6 months after the initial wound has healed(as TB bacteria is slow growing). Multiple samples may be required to detect TB. Negative first sample doesn't rule out TB. In suspected patients,

repeated samples should be sent from the out-patient office. In complex cases with TB, injection Streptomycin should be added to the standard regimen.

SIMPLIFIED EASILY REPRODUCIBLE PUDENDAL NERVE BLOCK TECHNIQUE FOR ANORECTAL SURGERY (SEPTA).

P321

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Purpose/Background: Anorectal surgery done under Pudendal block (local anesthesia) has several advantages-early recovery, economical, early discharge from hospital, faster resumption of work and minimal morbidity (urinary retention and spinal headache). However the technique of pudendal block (PB) is technically demanding due to which major anorectal procedures are not done under PB in majority of centers across the world. We devised a simpler technique, SEPTA (Simplified Easily reproducible Pudendal nerve block Technique for Anorectal surgery), which is easy to administer and reproduce and is quite effective at the same time. In SEPTA technique, the anesthetic solution is simply injected into the center of both ischiorectal fossa without making any attempt to pinpoint pudendal nerve bundle. The latter is usually done by inserting the finger in the rectum and palpating the ischial spine. We feel that doing so not only makes the procedure difficult but also misplaces the solution. If the solution is injected in ischiorectal fossa, the fluid perlocates by gravity through the loose areolar fat at the bottom of the ischio-rectal fossa where the pudendal neurovascular bundle is situated (in lithotomy position) (Shown in Figure 1).

Methods/Interventions: The patient is positioned in lithotomy position. 5 ml of anesthetic solution (2% Lignocaine with 1 in 200,000 Adrenalin) is administered sub-cutaneously in peri-anal region. After this 5 ml of the anaesthetic solution is injected on either side of anus in each ischio-rectal fossa as discussed above. Subsequently about 3 ml of the anesthetic solution was injected posteriorly in pre-sacral area, and about 2 ml was injected anteriorly to complete the block.

Results/Outcome(s): SEPTA technique was done in 998 patients in a specialized anorectal center between March 2013 to August 2017. There were 709 (71%) males and 289 (21%) females. The procedures undertaken were surgery for fistula-in-ano 277 (27.7%), fissure-in-ano 216 (21.6%), stapler hemorrhoidopexy 276 (27.6%), excisional hemorrhoidectomy 71 (7.1%), STARR procedure 47 (4.7%), peri-anal abscesses 36(3.6%), sphincteroplasties 20 (2%), Altemeier's 10(1%) and other procedures 45 (4.5%), The average operating time was 23.42 minutes (range – 12-45 minutes). All major anorectal procedures were possible with this technique. No patient required conversion to spinal or general anesthesia. There was

no complication due to regional anesthesia in any of the patients.

Conclusions/Discussion: SEPTA (Simplified Easily reproducible Pudendal nerve block Technique for Anorectal surgery) is simpler, easily reproducible and highly effective technique to administer regional anesthesia. All anorectal surgery including major procedures like Altemeier's procedure and STARR procedure can be conveniently performed by SEPTA technique. By making pudendal block usage more widespread, the utility and economic benefits of SEPTA cannot be overemphasized.



Before injection of anesthetic solution mixed with contrast-Top left: Pelvis X-ray (AP view) showing tip of spinal needle in the center of ischio-rectal fossa away from ischial spine (location of pudendal canal harboring pudendal neurovascular bundle)

Immediately after injection of anesthetic solution mixed with contrast-Top right- Pelvis X-ray (AP view) contrast can be seen near the tip of the needle in the center of ischio-rectal fossa (away from ischial spine)

1 minute after injection of anesthetic solution mixed with contrast-Bottom left: Pelvis X-ray (Lateral view) Shows contrast percolating away from the needle tip and near the ischial spine. Bottom right: Transperineal ultrasound - Shows contrast near the pudendal vessels

PROGRESSION OF ANAL INTRAEPITHELIAL NEOPLASIA IN HIV-POSITIVE INDIVIDUALS: ARE THERE PREDISPOSING FACTORS?

P322

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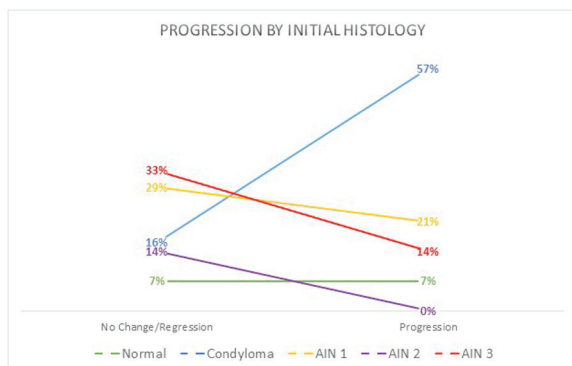
Purpose/Background: Background: Although rare, the incidence of anal carcinoma has increased over the past three decades. HIV-positive individuals have a higher risk of developing anal carcinoma compared to HIV-negative individuals, with HIV-positive men who have sex with men (MSM) having the highest incidence of anal carcinoma.

HPV is an identifiable source of approximately 93% of anal carcinomas. Anal intraepithelial neoplasia (AIN) is a known precursor to anal carcinoma. Although the natural history of anal carcinoma is not fully understood, it is suggested that anal carcinoma develops in a progressive manner from onset of low-grade dysplasia to high-grade dysplasia and then to anal carcinoma. However, factors influencing progression remain unclear. The purpose of this study was to evaluate patient factors that affect the progression of anal dysplasia in HIV-positive individuals.

Methods/Interventions: Methods: A retrospective chart review of consecutive HIV-positive patients identified with the anal dysplasia was performed. Patients were included if they had two excisions or one excision with an extended follow up showing no new lesions. Factors including demographics, high-risk serotypes, use of Gardasil, use of imiquimod, CD4 count, viral load, and grade of dysplasia were abstracted. Progression was defined as an increase in category of histologic dysplasia. Statistical analysis was performed with the Chi-square test.

Results/Outcome(s): Results: 162 patients met inclusion criteria and were included. 97% were male. Mean age was 40 years. 35% were African American and 48% were Caucasian. 15(9%) had progression of disease. A lower initial CD4 count was significantly associated with progression ($p=0.01$), with nearly a 200 point decrease in mean initial CD4 count between progressors and non-progressors (449 vs.644). Female gender ($p=0.01$) and initial histology of condyloma ($p=0.01$) (Figure) were also associated with progression while high-risk serotype was associated with no change or regression ($p=0.01$).

Conclusions/Discussion: Conclusion: In this large institutional cohort study, we demonstrated factors associated with AIN progression and regression. Most notably the CD4 count, while still with a mean near normal, is associated with progression when lower. High-risk serotypes were also associated with regression or stability and condyloma was found to progress to anal dysplasia. Identification of risk factors has important implications concerning postoperative surveillance schedules and counseling of HIV positive patients with anal condyloma/ AIN. This may ultimately lead to a decreased rate of progression to anal cancer.



MINIMALLY-INVASIVE TECHNIQUES IMPROVE OUTCOMES FOR TREATMENT OF COLOVAGINAL FISTULA.

P323

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Purpose/Background: Colovaginal fistula is a well-known but poorly studied disease process which is often treated with open or minimally-invasive surgical approach (laparoscopic or robotic-assisted). The benefit of a minimally-invasive technique compared to an open repair has not been extensively studied; especially considering the technical complexity such procedures can involve. We hypothesized that individuals who underwent a minimally-invasive procedure would demonstrate a shorter length of hospital stay compared to open operation, while maintaining no increase in mortality, complications, operative time, or re-operation.

Methods/Interventions: All patients 18 years and older who underwent operative intervention for colovaginal fistula (ICD-9 619.1, ICD-10 N82.3, N82.4) between 2006 and 2017 were reviewed via chart review of the institutional record. Data collected included demographic data, comorbid medical conditions, details regarding surgical treatment, and perioperative complications. Minimally-invasive and open surgical approaches were compared using Fischer's exact test, chi-squared test, and the Student's t-test.

Results/Outcome(s): Thirty-seven individual patients with colovaginal fistula undergoing surgical repair were identified. Twenty-three of these individuals underwent open repair. The remaining fourteen patients underwent minimally-invasive repair by laparoscopic ($n=6$) and robotic-assisted ($n=8$) approaches. The vast majority of cases were secondary to diverticulitis (81%). There was no difference in BMI (27.3 vs 28.3, $p=0.71$) or in age (68.3 vs 64.3, $p=0.41$) between selected groups. Preoperative use of steroids, chemotherapy, or radiation was rare (Steroid $n=4$; chemotherapy/radiation $n=1$). No significant differences in the rate of diabetes (13% vs. 7%, $p=0.375$) or tobacco use (52% vs. 50%, $p=0.26$) was seen. The length of stay for colovaginal fistula repairs successfully completed by minimally-invasive approaches was significantly shorter (5.4 days vs. 7.57 days, $p=0.036$). Colovaginal fistula repairs treated by minimally-invasive approaches unsuccessfully, requiring conversion to an open approach ($n=4$), had a trend towards longer length of stay compared to those with a successful minimally-invasive repair (8.75 days vs. 5.4 days, $p=0.22$).

Conclusions/Discussion: Patients with colovaginal fistula successfully treated by minimally-invasive approaches experience a shorter hospital length of stay than patients who undergo open repair. A minimally-invasive approach should be considered in appropriate patients with this pathology.

RESIDENT KNOWLEDGE OF BENIGN ANAL DISEASES: HOW GENERAL SURGERY COMPARES TO OTHER DISCIPLINES.

P324

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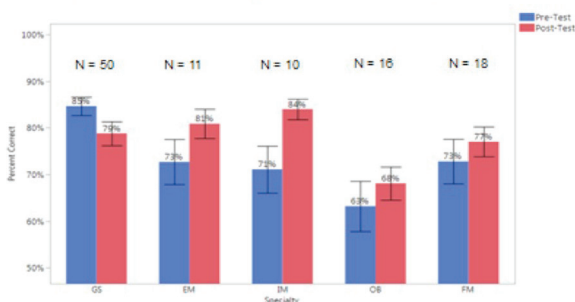
Purpose/Background: Benign anal diseases include hemorrhoids, fissures, abscesses, fistulas, condyloma, and, when combined, affect approximately 10-15% of our population. It is well known in colorectal literature that there is disparity among all specialties in identifying benign anal disease diagnosis. We hypothesized all trainees from all medical specialties who address these diseases would benefit from an educational session covering these topics at our institution.

Methods/Interventions: A ten-point pre- and post-test including the above diseases was designed and administered to medical subspecialties, including general surgery (GS), emergency medicine (EM), internal medicine (IM), obstetrics/gynecology (OB), and family medicine (FM) residents. The intervention was a 50-minute presentation highlighting anatomy, history and physical findings, and treatment of these diseases. Differences between groups were evaluated using ANOVA and $p < 0.05$ indicated significance.

Results/Outcome(s): In medical specialties, except GS, post-test scores improved. IM improved most significantly. (Figure 1.) GS residents scored better on the pre-test than other specialties; however, their post-test scores declined. Survey demonstrated residents with prior benign anal disease education scored better on the pre-test.

Conclusions/Discussion: Non-surgical residents have a limited knowledge on benign anal diseases, but demonstrate improvement after educational intervention. Surgery residents demonstrate regression to the mean, a common concept seen in test taking, but they may also require a more advanced lecture. Continued institutional, in addition to regional and national educational interventions, will advance the diagnosis of benign anal diseases and lead to timely colorectal referrals, decreased health care costs, and improved patient care.

Figure 1. Pre-test and post-test scores by specialty



ANORECTAL SQUAMOUS CELL CARCINOMA FOLLOWING RESTORATIVE PROCTOCOLECTOMY AND ILEOANAL ANASTOMOSIS: REPORT OF TWO CASES.

P325

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Purpose/Background: Squamous cell carcinoma (SCC) of the anal transition zone is a rare complication of inflammatory bowel disease (IBD) and few cases have been documented to date. The incidence of SCC after ileal pouch-anal anastomosis (IPAA) is even more infrequent and further complicates its diagnosis and treatment. Revital et al. found only three cases of SCC among 3203 patients following restorative proctocolectomy with ileal pouch.

Methods/Interventions: We present two patient who developed SCC following restorative proctocolectomy with IPAA and longstanding perianal CD.

Results/Outcome(s): A 64-year-old male with 16-year history of ulcerative colitis (UC) status post restorative proctocolectomy with IPAA developed perianal fistulas concerning for CD four years later. He refused medical treatment but allowed surgical drainage with Seton placement. He was subsequently diagnosed with prostate cancer three years later and was treated with brachytherapy bead radiation. The patient presented with worsening perianal bleeding and fistula disease ten years later. Pouchoscopy was performed which demonstrated pouchitis and ulcerated mucosa in the inferior aspect of the pouch. Computed tomography performed at the time demonstrated a presacral mass with extension into the sacrum. Biopsy of the lesion demonstrated well differentiated SCC and Nigro protocol was initiated. The second patient is a 51-year-old male with history of UC status post proctocolectomy with IPAA for 15 years. He developed perianal abscesses and fistulas five years later and was diagnosed with CD. He was treated and maintained with mesalamine, 6-mercaptopurine, and prednisone. Ten years following treatment, he presented with worsening drainage and bleeding from his chronic fistulas. Exam demonstrated perianal abscesses and a 2.5 x 1.7 cm inflamed and ulcerated mass. Excisional biopsy demonstrated well differentiated SCC. The patient underwent Nigro protocol but required diverting loop ileostomy for an episode of bowel obstruction during his course of chemoradiation therapy. He is currently tolerating chemotherapy.

Conclusions/Discussion: The understanding of the pathogenesis of IBD associated SCC is hindered by its low incidence and multitude of complicating factors associated with the treatment of IBD. A systemic review of 33 published cases by Slessor et al. suggests that there is a higher incidence of anal SCC, at an earlier age of presentation and poorer outcomes in patients with Crohn's disease. Patients with restorative proctocolectomy subsequently develop perianal CD suffer from symptoms resembling

pouchitis in addition to perianal fistulas and abscess. This confounding and complex presentation likely contributed to the delay in diagnosis of SCC in both of our patients. This review suggests that aggressive surveillance and frequent biopsies should be considered in CD patients with J-pouch and longstanding perianal disease.



Figure 1. Perianal fistulas and left sided anal verge mass on Patient 2.

TIME TO BUILD A BETTER BLOWHOLE? SINGLE PORT LOOP COLOSTOMY FOR MANAGEMENT OF ADVANCED GYNECOLOGIC MALIGNANCY WITH LARGE BOWEL OBSTRUCTION.

P326

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Purpose/Background: Advanced gynecologic cancers frequently present as malignant large bowel obstruction. The management of these patients is often complicated by the lack of further chemotherapy options as well as the increased morbidity and mortality associated with operating in the setting of previous treatment modalities and surgical fields. A multidisciplinary approach is recommended in the management of these patients to achieve the best outcomes with regards to symptom control and improved quality of life. The purpose of this study is to evaluate the patients that have undergone laparoscopic single port loop colostomy for malignant large obstruction secondary to advanced gynecologic cancer as a potential treatment option.

Methods/Interventions: We performed a retrospective review of a single surgeon conducting palliative surgery for stage IV gynecologic malignancies over a six month period from May 2017 to November 2017.

Results/Outcome(s): During the study period five surgeries were completed, all for a diagnosis of Stage IV ovarian or endometrial cancer. Four of the patients had undergone previous therapy including surgery in combination with chemotherapy and/or radiation. Two of the cases were able to have diagnosis of Stage IV malignancy confirmed via laparoscopic biopsy at the time of surgery. The average age of the patients was 77 years old (range 65-91 years old). Successful palliation, defined as the ability to tolerate a diet and be discharged from the hospital, was achieved in all patients. Single port laparoscopic diversion was attempted in all of the cases, with one requiring a mini-laparotomy due to previous adhesions and incisional hernia. The average discharge was on post operative day (POD) number eight (range POD#4-POD#13). Advancement to a regular diet was achieved by POD#3 in four of the cases. One patient required placement of a nasogastric tube due to post operative ileus, and resumed a regular diet on POD#7. Complications post operatively were observed in three patients and included; post operative emesis requiring IV fluid hydration, acute kidney injury and post operative ileus treated with nasogastric tube decompression. Only one patient required readmission since her surgery for nausea and emesis, she was also noted to have a deep venous thrombosis two months post operatively. A multidisciplinary approach with a specialized palliative care team was involved in three cases. The role of palliative care was to assist patients in decision making in addition to management of pre- and post-operative symptoms.

Conclusions/Discussion: The management of malignant colon obstruction in advanced gynecologic cancers is often complicated due to previous treatment modalities. Palliation should be accomplished with a multidisciplinary approach. Single port laparoscopic loop colostomy is a viable surgical option in this patient population.

THONG GONE WRONG – A CASE REPORT INVOLVING ANAL TRAUMA FROM A JET SKI ACCIDENT.

P327

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Purpose/Background: Blunt anorectal injury remains a relatively uncommon entity in trauma. We describe a case of a 34 year-old female who sustained a jet ski water propulsion injury while wearing a thong. She was found to have complete transection of her anal sphincter complex with an additional rectal laceration. In this case report,

we describe our management and in our discussion, perform a review of relevant literature pertaining to blunt anorectal trauma

Methods/Interventions: After performing ACLS protocol and stabilizing the patient, a CTAP was obtained excluding intraperitoneal injury. The patient was taken to the OR. DRE demonstrated absence of sphincter tone. Anoscopy demonstrated a full thickness laceration of the rectum and complete transection of the internal and external anal sphincters. Sigmoid loop colostomy and sphincteroplasty and proctoplasty were performed.

Results/Outcome(s): The patient's diet was advanced and tolerated and she was discharged with colostomy function. She has had outpatient follow up and plans are for reversal.

Conclusions/Discussion: Blunt perineal trauma may result in devastating anorectal injury. We describe a patient that experienced anorectal trauma during a jet ski accident which caused a complete disruption of the anal sphincter complex as well as an extraperitoneal rectal laceration. We propose that the likely mechanism of injury resulted from direct jet propulsion trauma to the anus. We also propose that the patient's thong contributed to her injury as this garment created exposure to render her vulnerable to injury due to lack of appropriate coverage of the perineum. Blunt anorectal trauma is broadly characterized into two types: intraperitoneal injury and extraperitoneal injury. Intraperitoneal injury can often be treated like colonic injury. Treatment of extraperitoneal injury includes fecal diversion with colostomy, presacral drainage, repair of the anorectal defect, washout and debridement. Anal sphincter involvement and extent of severity dictates management. Small defects can often be repaired primarily, but extensive sphincter involvement requires complex reconstruction and fecal diversion. With severe perineal injury, early mortality results commonly from massive blood loss, shock, open pelvic wound, or uncontrollable hemorrhage. After surviving the initial injury, the most common cause of morbidity and mortality is pelvic sepsis. Assessment of anorectal anatomy and function should be performed prior to reversal via anal manometry, concentric needle electromyography and anal endosonography. Blunt injuries to the anus and rectum are uncommon with few reported cases. We describe a unique case of anorectal trauma sustained during a jet ski accident, where a water propulsion injury in the setting of an exposed perineum is the likely culprit of complete disruption of the patient's anal sphincter complex. The patient was taken for diversion and primary repair with plans for future reversal.

CONDYLOMATA ACUMINATA OVER A PERIANAL FISTULA TRACT: CASE REPORT.

P328

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Purpose/Background: Educational objective 1: Upon completion of this presentation the participants will have more knowledge about the behavior of this rare condition, of which there are not many reports in the literature **Educational objective 2:** contribute and strengthen the limited knowledge that we have about this condition and its form of clinical presentation Summary. The most common forms of presentation of condylomata acuminata are in the anogenital area, we present a case of condylomata associated with a concomitant perianal fistula, which results in a case in which there was no recurrence or malignant lesions after treatment and histopathological analysis, according to our knowledge, there are very few similar cases reported in the literature.

Methods/Interventions: Case Report. A 42-year-old male patient presented at our service in March 2014, referring to the sensation of a foreign body in the perianal region as well as the presence of a muco-greenish discharge at the time of cleaning in the same area. Denies chronic-degenerative diseases, drugs, alcohol and tattoos. On physical examination, it presents multiple warty lesions, mostly greater than 5mm, which occupy the total circumference of the perianal area, accompanied by an outflow of greenish secretion through a secondary secondary orifice at 11 o'clock. palpating linear fistulous trajectory towards the posterior crypt at 12 o'clock radius. Standardized treatment was performed in our clinic for both diseases, starting with electrofulguration after trichloroacetic acid labeling of the wart lesions followed by curettage. Fistulectomy was performed, as well as sphincteroplasty of the internal anal sphincter. After the patient's 12-week follow-up, the presence of HPV infection in the verrucous lesions was confirmed by histopathological biopsy, discarding squamous cell carcinoma or dysplastic lesions; In addition to these findings, the presence of a perianal pathway of cryptoglandular origin was confirmed.

Results/Outcome(s): There was no recurrence of any of the two diseases until 3 months of patient follow-up. Currently the patient has not returned to the consultation of our service and it has not been possible to locate him by any means available.

Conclusions/Discussion: There are very few cases reported in the literature that describe this condition, therefore the relevance and importance of this work.

ASSESSING SURGICAL PRACTICE VARIATION FOR ACUTE MALIGNANT BOWEL OBSTRUCTION.

P329

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Purpose/Background: The acute management of malignant bowel obstruction lacks consensus but garners strong opinions with resulting practice heterogeneity. Many surgeons preference rank management strategies based on a number of competing factors such as survival, cost, and quality of life. The purpose of this study was to describe our historical series of recent malignant bowel obstructions with attention to two important oncologic measures of success: time to chemotherapy initiation and overall survival.

Methods/Interventions: We performed a retrospective chart review of all acute bowel obstructions resulting from colorectal cancer that were staffed by a colorectal surgeon at our institution from January 2010 to September 2015. Abstracting included collection of 69 variables including tumor biology, acute surgical therapy provided, surgical complications, timing to chemotherapy, and 1-, 3- and 5-year survival. Cases were grouped by whether the index case included an anastomosis. Bivariate analysis was performed comparing outcomes between groups using Fisher's exact test and Mann Whitney U test as indicated.

Results/Outcome(s): 40 patients presented for management of acute bowel obstruction during the study interval. 72% received a formal resection of the neoplasm with anastomosis while the remaining 28% received an ostomy. The median age for both subgroups was 65 years with an interquartile range (IQR) of 56-74 years ($p=0.4$); the median ASA classification of preoperative risk for both was 1 (IQR: 1-2, $p=0.9$). Each subgroup only contained one patient with perforation identified at time of index surgery. Gross metastatic disease was reported in every surgical case with peritoneal implants or carcinomatosis being universally present. Although not statistically significant, those receiving an anastomosis were more likely to be male (54% vs. 45%, $p=0.7$), less likely to have a distal obstruction (52% vs. 60%, $p=0.7$), and less likely to be poorly differentiated (32% vs. 38%, $p=1.0$). Each group's median length of stay was 7 days (IQR: 5-10 days, $p=0.6$). The median time to chemotherapy initiation following surgery was 9 weeks in both groups (IQR: 5-15 weeks, $p=1.0$). Overall mortality was lower in the anastomosis group (8% versus 55%, $p=0.009$) with nearly all of the increased mortality of the diversion group being demonstrated within the 1st year of follow-up.

Conclusions/Discussion: Our study demonstrates important differences in outcomes following acute malignant bowel obstruction for those receiving resection and anastomosis versus diversion during the index operation. Diversion did not appear to reduce time to postoperative

chemotherapy initiation or length of stay. Given similar short-term performance indicators and patient-specific risk factors, the worse outcomes in the diversion group are likely due to worse neoplastic disease at presentation. Formalizing recommendations may be useful to standardize therapeutic approaches given imaging and specific tumor biology.

COLORECTAL DEVICE DEVELOPMENT REPORTING USING THE IDEAL FRAMEWORK: 'DILUMEN' ENDOSCOPIC DOUBLE BALLOON PLATFORM.

P330

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Purpose/Background: Despite the clear benefits and utility of Flexible Endoscopy (FE) in the diagnosis and therapy of GI disease, inherent limitations exist in FE design, affecting the ability to perform advanced therapeutic actions effectively and efficiently. Here, we present a unique add-on technology in development – a double balloon platform that adds stability and improves endoscopic visualization within existing FE systems. Here we report the results of the first human clinical feasibility registry study using the IDEAL framework.

Methods/Interventions: In performing this study, we used the Prospective Development Study (PDS) format recommended by the IDEAL Collaboration (see image 1). The IDEAL framework was designed to encourage open reporting of procedural experience, accounting changes or modifications performed sequentially. Here we report the development of the double-balloon device (Dilumen, Lumendi LLC) by a two-operator team from the first human case onwards according to a defined clinical path. All 30 patients were scheduled to undergo routine surveillance colonoscopy. Key outcomes were prospectively reported for each patient sequentially. All changes to technique or indication were highlighted, showing when they occurred and explaining why they were instituted.

Results/Outcome(s): The first case was attempted in April 2017. Subsequently 29 colonoscopies were undertaken using the device. In 5 patients the cecum was unable to be reached, in 1 of those patients this was not possible with the FE alone. Inability to reach cecum was primarily due to long, tortuous colon anatomy. Time to reach cecum was on average 13.4 minutes. No obvious trends were noted in other outcomes. No clinically significant complications were observed. 7 polyps were treated using the device in 3 patients successfully. 5 deliberate technique changes occurred during the series, (1) After case 2, we adjusted the position of the patient to left lateral as opposed to lithotomy with leg stirrups, (2) after case 5, we altered our loading position of the device onto the FE to avoid device kinking, but (3) This was stopped after one case due to

increased mucosal abrasions observed, (4) From case 12 onwards we injected lubrication into the device sheath to improve mounting onto FE, and (5) from case 12, we advocated the use of a primary endoscopy prior to device use in order to assess intestinal anatomy, straighten out sigmoid colon and plan treatment as needed.

Conclusions/Discussion: The safety of the device was evaluated in this prospective study using the IDEAL framework at the 2A stage, with no major issues identified. We also report 5 procedural changes that occurred during the course of the study. The IDEAL framework provided a mechanism for open reporting of device development and this will be used to begin a formal registry study.

The IDEAL framework.				
Stage 1 idea	Stage 2a development	Stage 2b exploration	Stage 3 assessment	Stage 4 long term monitoring
<ul style="list-style-type: none"> Initial report Innovation may be planned, accidental or forced Focus on explanation and description 	<ul style="list-style-type: none"> " tinkering" (rapid iterative modification of technique and indications) Small experience from one centre Focus on technical details and feasibility 	<ul style="list-style-type: none"> Technique now more stable Replication by others Focus on adverse effects and potential benefits Learning curves important Definition and quality parameters developed 	<ul style="list-style-type: none"> Gaining wide acceptance Considered as possible replacement for current treatment Comparison against current best practice (RCT if possible) 	<ul style="list-style-type: none"> Monitoring late and rare problems, changes in use & quality of surgical performance

SHORT-TERM OUTCOMES OF LAPAROSCOPIC MULTIVISCERAL RESECTION FOR LOCALLY ADVANCED COLON CANCER.

P331

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Purpose/Background: Laparoscopic surgery for colorectal cancer has been widely performed as a surgical treatment option. However, the laparoscopic approach for locally advanced colon cancer invading or adhering to adjacent organs or structures is controversial because of oncological and technical issues. The aim of this study was to evaluate the feasibility of laparoscopic multivisceral resection of colon cancer.

Methods/Interventions: Between January 2010 and January 2017, 40 patients underwent multivisceral resection of primary colon cancer invading or adhering to adjacent organs or structures. Of the patients, 21 were male and 19 were female, with a median age of 67 years (range, 45–86 years). The tumors were located in the right colon (n = 14) and left colon (n = 26).

Results/Outcome(s): The distribution of the resected adjacent organs or structures was as follows: abdominal or pelvic wall (n = 13), small bowel or colon (n = 8), bladder (n = 6), peritoneum (n = 6), vessels (n = 4), uterus or fallopian tube (n = 3) and iliopsoas muscle (n=1). One patient had two resected organs (the bladder and small bowel). The median operation time was 281 min (range, 154–671 min), and blood loss was 35 mL (range, 10-810 mL). Although intraoperative complications were observed in 2 patients, these complications were managed laparoscopically. Conversion to open surgery occurred in 7 patients (17.5%). Postoperative complications occurred in 4 patients (10%). Reoperation was not

required. Pathological invasion to other organs (pT4b) was confirmed in 16 patients (40%). One patients had residual pathological tumors, corresponding to an R0 resection rate of 97.5%. The pathological TNM classification was stage 2 in 15 patients, stage 3 in 16 patients, and stage 4 in 9 patients. The median postoperative hospital stay was 11 days (range, 8-27 days).

Conclusions/Discussion: For primary colon cancers, the use of laparoscopic multivisceral resection is feasible for carefully selecting patients and diagnosing the involvement of adjacent organs. Conversion to open surgery before multivisceral resection is an important procedure to avoid dissemination of cancer cells and local recurrence, if the tumor margin is unclear, or if massive adherence to adjacent organs or structures is observed laparoscopically.

SHORT AND LONG TERM RESULTS OF INTERSPHINCTERIC RESECTION FOR 128 CONSECUTIVE LOWER RECTAL CANCER PATIENTS.

P332

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Purpose/Background: Currently intersphincteric resection (ISR) is one of the popular options for very low rectal cancer. This study was examined to clarify the safety from our experience of consecutive R0 patients performed ISR.

Methods/Interventions: R0 ISR underwent for 128 lower rectal cancer patients since April 2007 to March 2016 (open: 24, laparoscopic: 104). Mean age was 63.0 years old and genders were 92 males, 36 females. Preoperative chemo-radiation (CRT) was performed for 15 patients (11.7%: Open 3, Lap 6) and lateral pelvic lymph node dissection underwent 34 patients (26.5%: Open 21=87.5%, Lap 13=12.5%). Recently most of the patients were treated by laparoscopic resection and open surgery was performed in early phase of this series.

Results/Outcome(s): Mean operative time was 320 minutes (Open 362, Lap 310), and mean blood loss was 161 g (Open 603, Lap 59). Median postoperative hospital stay was 10 days (Open 12, Lap 9) and anastomotic leak occurred in 9 patients (7.0%: Open 3=12.5%, Lap 6=5.8%). Diverting loop stoma was created for all and stoma closure was performed for 87.5% patients. Overall survival of 3 year was 92.3% in Stage I, 83.9% in Stage II, and 80.8% in Stage III. Relapse free survival of 3 year was 84.6% in Stage I, 85.6% in Stage II, and 67.3% in Stage III. Local recurrence was observed in 16 patients (12.5%). Stage of primary resection was I: 4 /54 (7.4%), II: 3 /15 (20.0%), III: 9 /59 (15.3%). Half of the local recurrent site (8 patients) was outside of the TME resection (lateral lymph node or pelvic plexus). Local recurrence after preoperative CRT was 1 /15 (6.7%).

Conclusions/Discussion: Short term results after ISR were good in both open and laparoscopic resection. Survival rates were also acceptable. However local recurrence was relatively higher in Stage II and III. Because half of local recurrence was at extra-TME site, preoperative CRT should be considered for ISR for Stage II and III patients.

IMPACT OF TUMOR DEPTH AND NODAL POSITIVITY ON 30-DAY OPERATIVE OUTCOMES FOLLOWING ASCENDING COLECTOMY.

P333

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Purpose/Background: The role of tumor pathology on specific complications has not yet been defined in ascending colon malignancy. Studies have commonly identified predictors in colorectal or rectal cancer alone. Our study investigates the role of tumor depth and nodal involvement on postoperative complications following right colectomy for colon cancer.

Methods/Interventions: We queried the 2012-2016 National Surgical Quality Improvement Program Colectomy Procedure-Targeted database for patients with malignancy of the ascending colon who underwent a right colectomy. Patients with disseminated cancer, preoperative chemotherapy, radiation, or steroids were excluded. Multivariate analysis (MVA) models were constructed to evaluate the association between tumor (T) and node (N) stage and postoperative outcomes.

Results/Outcome(s): 10,114 patients who underwent a right colectomy for ascending colon malignancy were identified and met inclusion criteria. Patients were 53.8% (5444) female, with mean age 69.6±12.3 years and BMI 28.2±6.5 kg/m². Major complications occurred in 20.8%, minor complications in 38.4%, and anastomotic leak (AL) in 2.2% of all patients. Overall 30-day mortality was 1.7%. Patients were separated into cohorts based on pathologic tumor and node classifications. No differences in AL were seen on univariate analyses based upon tumor depth or nodal status. On univariate analysis, patients with T4 lesions had higher 30-day mortality rates compared to those with ≤T3 (2.5%vs1.6%, p<0.02). Rates of major (29.9%vs19.3%, p<0.0001) and minor complications (50.4%vs37.2%, p<0.0001) were also increased in patients with T4 stage; however, after controlling for confounding variables, T4 was only independently associated with minor complications (OR 1.4; 95%CI 1.083-1.784). Patients with pathologic nodal involvement (N1 or N2) had significantly higher rates of major (43.4%vs36.7%, p<0.0001) and minor complications (22.8%vs19.7%, p<0.001). On MVA, nodal involvement was not independently associated with either

major or minor complications. However, nodal involvement was associated with decreased rate of AL (OR 0.59; 95%CI 0.358-0.964). Use of a minimally invasive approach had protective effect on AL (OR 0.60; 95%CI 0.384-0.928), major complications (0.66; 95%CI 0.511-0.852), and 30-day mortality (OR 0.39; 95%CI 0.234-0.663).

Conclusions/Discussion: Our analysis of patients with ascending colon malignancies showed an increased association between T4 stage and minor complications after right colectomy. Higher rates of major and minor complication were also noted with pathologic node involvement, although this independent association did not occur on MVA. Interestingly, nodal involvement was independently associated with decreased anastomotic leakage. Further research is needed to understand the impact of pathologic tumor and node stage on anastomotic leakage and other postoperative complications following ascending colectomy.

PATHOLOGICAL NODAL STAGING SCORE FOR RECTAL CANCER PATIENTS TREATED WITH RADICAL SURGERY WITH OR WITHOUT NEOADJUVANT THERAPY: A POSTOPERATIVE DECISION TOOL.

P334

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Purpose/Background: Our study aimed to help establish the standard of the minimum number of lymph nodes examined for rectal cancer, by estimating the probability that a pathologically node-negative patients has, indeed, free of positive nodes.

Methods/Interventions: 31,853 eligible patients with stage I-III adenocarcinoma of the rectum between 2004 and 2013 were identified from the Surveillance, Epidemiology and End Results (SEER) database. Patients were categorized into two groups: those treated with surgery directly (SURG) and those treated with neoadjuvant therapy (NEO). Nodal staging score (NSS) was developed based on pT/ypT stage and the number of nodes examined by using a beta-binomial model.

Results/Outcome(s): In both cohorts, the probability of missing a positive node was estimated to approximately 16% if 12 are examined, but drops to around 10% when 20 nodes are examined. In SURG cohort, to rule out 90% possibility of false staging, three, seven, 28, and 32 lymph nodes would need to be examined for patients with pT1-4 disease, respectively. While in NEO cohort, four, seven, 12, and 16 lymph nodes would need to be examined for patients with ypT1-4 disease to guarantee an NSS of 90%.

Conclusions/Discussion: Our study developed a model to estimate of false node-negative rate as a function of pathological tumor stage and number of lymph nodes examined. By determining whether a node-negative rectal

cancer patient is adequately staged, NSS may serve as an instrument to assist in tailoring postoperative management and surveillance for patient with rectal cancer.

PREOPERATIVE RADIOCHEMOTHERAPY AFFECTS POST-OPERATIVE OUTCOMES AND FUNCTIONAL RESULTS AT 1 YEAR IN PATIENTS TREATED BY TEM FOR RECTAL NEOPLASMS.

P335

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Purpose/Background: Aims of this study were: - to quantify the incidence of short-term (within 30 days) post-operative (p.o.) complications and functional disorders at 1 year from TEM. - to analyze the role of pre-operative radiochemotherapy (RCT) in increasing the morbidity rate and in worsening the long-term functional outcome, by a comparative analysis of patients undergoing TEM after RCT and those treated by TEM without pre-operative RCT.

Methods/Interventions: All patients treated by TEM (2000-2015) for rectal adenoma or early rectal cancer (noRCT group) and for locally advanced extraperitoneal rectal cancer after complete clinical response after RCT (RCT group) entered in the study. Short-term p.o. morbidity and mortality after TEM were recorded, and complications were graded according to the classification proposed by Clavien et al. At 1 year from surgery the functional results after TEM were evaluated according to Wexner's continence score and Cleveland Clinic's evacuation score. A statistical univariate and multivariate analysis of factors influencing p.o. morbidity, suture dehiscence, continence score and evacuation score was performed.

Results/Outcome(s): Ninety seven patients entered the study (36 RCT group; 61 noRCT group). On table are reported the main results of the study. No p.o. mortality occurred. The rate of p.o. complications was 20.6%, higher in RCT group (41.7% vs 8.2%; $p < 0.001$), but only 2.1% were grade ≥ 3 according to Clavien's classification. At

multivariate analysis of factors predicting p.o. complications, only pre-operative RCT was significantly related to p.o. morbidity ($p:0.007$; OR:9.697). The most frequent complication was suture dehiscence (12.4%), higher in RCT group (27.8% vs 1.9% in noRCT group; $p < 0.001$). Pre-operative RCT ($p:0.005$; OR:29.220) and more than 1 involved rectal quadrants ($p:0.026$; OR:7.113) were significantly related (at multivariate analysis) to p.o. suture dehiscence. At 1 year from surgery overall mean continence and evacuation scores were respectively 1 ± 1.761 and 25 ± 2.966 . These score were significantly worse in RCT group ($p:0.015$ for continence score; $p:0.028$ for evacuation score). At statistical multivariate analysis pre-operative RCT was the only independent variable significantly related to a worse continence score ($p:0.029$; OR:2.217). About evacuation score, a female gender was the only variable significantly related to a worse evacuation score ($p:0.034$; OR:2.157).

Conclusions/Discussion: TEM represents a safe procedure with low risk of severe p.o. morbidity. Suture dehiscence represents the most frequent p.o. complication. Pre-operative RCT seems to be related to a higher rate of p.o. morbidity and, particularly, to a higher rate of suture dehiscence. Functional results at 1 year from TEM are satisfactory both in RCT than noRCT groups. However, pre-operative RCT seems to affect also functional outcome, especially the continence score.

THE RISK FACTOR OF RECURRENCE AFTER CURATIVE RESECTION FOR STAGE II COLORECTAL CANCER.

P336

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Purpose/Background: The risk factor of recurrence after curative resection for Stage II colorectal cancer and the adaption of adjuvant chemotherapy are still unclear. We examined the risk factor of recurrence after curative resection for Stage II colorectal cancer in our hospital.

P335 P.O. outcome and functional results at 1 year in RCT and noRCT group

Outcome	RCT group	NoRCT group	P-value
N. of patients	36	61	-
Intra-operative complications	0%	0%	1.0
P.O. Mortality	0%	0%	1.0
P.O. Morbidity	15 (41.7%)	5 (8.2%)	<0.001
Mean P.O. Hospital stay (\pm SD)	5.417 \pm 1.888	4.951 \pm 1.978	0.257
Suture dehiscence	10 (27.8%)	1 (1.6%)	<0.001
Hospital re-admission within 30 days	0%	0%	1.0
Continence score	1.633 \pm 1.866	0.768 \pm 1.629	0.028
Evacuation score	24.100 \pm 2.820	25.714 \pm 2.909	0.015

Methods/Interventions: Curative resection was performed in 670 Stage II colorectal cancer patients between April 2007 and September 2015 at our institution. Clinicopathological factors related to recurrence were retrospectively analyzed.

Results/Outcome(s): Mean age was 68 years old, the number of male and female was 394 and 276 patients, maximum diameter of tumor was 5.3 ± 2.3 cm, pT3/T4 were 606/64 cases. Adjuvant chemotherapy was performed for 22 patients (3.3%). Cancer recurrence after surgery was occurred in 62 cases (9.3%). The number of recurrent sites were liver 23, lung 17, peritoneum 7, local 6, respectively. Clinicopathological factors related to recurrence were compared between recurrent free group and recurrent group. Abnormal CEA ($p=0.0023$), poorly differentiated cancer ($p=0.0410$), pT4 ($p=0.0003$), venous invasion positive ($p=0.0059$), longer operation time ($p=0.0386$), and adjuvant chemo therapy positive ($p=0.0266$) were significantly more in recurrent group. In multivariate analysis, abnormal CEA ($p=0.0189$), pT4 ($p=0.0021$), venous invasion positive ($p=0.0044$) were the independent risk factors of cancer recurrence. In patient with the risk factor of recurrence, the 3 year relapse free survival received adjuvant chemotherapy was significantly higher than that not received (88.6% vs. 73.3%, $p=0.0412$).

Conclusions/Discussion: Abnormal CEA ($p=0.0189$), pT4 ($p=0.0021$), venous invasion positive ($p=0.0044$) were the independent risk factors of cancer recurrence in Stage II colorectal cancer patients.

UNDERSTAGING AND UNDERTREATMENT OF COLORECTAL MALIGNANCIES IN UKRAINE.

P337

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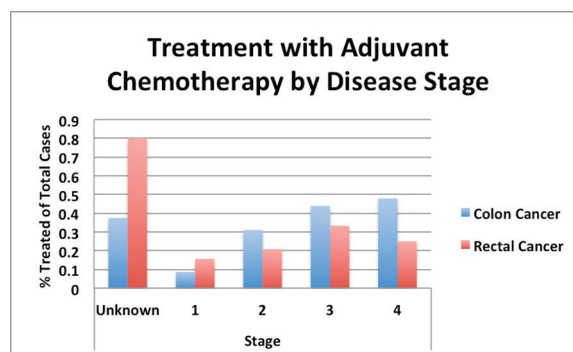
Purpose/Background: Colorectal cancer survival in developed countries has been improving over the years. However, in low-to-middle income countries the rates of survival continue to lag behind those seen in high-income countries. In Ukraine, the 1-year mortality is astoundingly high, 40.6% for colon cancer and 33.8% for rectal cancer. We sought to investigate colorectal cancer staging and oncologic treatment after surgery in Ukraine.

Methods/Interventions: We collected data from patients who were treated at the Ivano-Frankivsk (Ukraine) regional cancer center who were diagnosed with colorectal malignancies within the 5-year window of January 2011 to December 2015. All patients diagnosed with cancer in Ukraine are referred to and treated at the regional cancer

center. Thus, the Ivano-Frankivsk regional cancer center records represents 100% patient capture of that area. We performed a retrospective chart review and collected the data on demographics, staging, operative management, complications, and postoperative outcomes.

Results/Outcome(s): A total of 960 patients were identified in the Ivano-Frankivsk region with colon (689) or rectal (271) cancer diagnoses. Out of these 960 patients, 113 (11.77%) underwent preoperative CT scan of the abdomen and pelvis, and only 16 underwent CT scan of the chest (1.67%). 39 (4.06%) patients underwent a complete preoperative colonoscopy, and 298 (31.0%) had incomplete colonoscopies. The remaining 623 (64.9%) had no endoscopic evaluation at all, and were diagnosed intraoperatively. With regards to surgical resection, the total number lymph nodes resected were reported in only 2 (7, 10 nodes) of the 689 colon cancer patients, and in only 1 of the 271 rectal cancer patients (6 nodes); only positive nodes were reported in the rest of specimens. Post operatively, 31.1% of patients with Stage II colon cancer and only 43.9% of patients with Stage III colon cancer underwent adjuvant chemotherapy. Similarly, 20.9% and 33.3% of patients with Stage II and III rectal cancers, respectively, underwent adjuvant chemotherapy. Finally, 68.4% of patients with Stage II rectal cancer and 66.7% with Stage III rectal cancer underwent radiation therapy.

Conclusions/Discussion: In Ukraine, the perioperative care of colon and rectal cancers needs significant improvement. Our results describe the inconsistent and inadequate staging, likely resulting in significant under-staging, and varied chemotherapy treatment of colon and rectal malignancies, with large number of patients not receiving adjuvant chemotherapy. Ukraine, like many low to middle income countries, will likely see benefits in patient survival with implementation of standardized staging protocols, and stage-appropriate treatment regimens.



FUNCTIONAL OUTCOMES AFTER TATME: RETROSPECTIVE ANALYSIS OF QUALITY OF LIFE AND PELVIC FUNCTION.

P338

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Purpose/Background: Rectal resection evolved to sphincter-saving operations in order to avoid permanent colostomies and potentially increase the quality of life (QoL). Transanal total mesorectal excision (TaTME) seems to be a valid alternative for the treatment of rectal cancer, and might be associated with lower rate of permanent colostomies. With the adoption of TaTME as the standard of care for rectal cancer in many centres, concern exists about the patients' QoL and pelvic function. The aim of this study was to analyse the functional outcomes of the largest single center series of patients treated with TaTME for cancer

Methods/Interventions: Eighty patients with rectal cancer treated with TaTME in Hospital Clinic of Barcelona were contacted via postal mail. The following questionnaires were submitted: LARS-score, Wexner score, ICIQ, IIEFF-5, EORCT QLQ-29 and EORTC QLQ-30. Demographic, surgical and postoperative data was collected

Results/Outcome(s): Mean age was 65.7 ± 13 years, 26 patients were female (33.3%) and 54 were male (66.6%). The mean follow-up was 37.6 ± 17.7 months. Anorectal dysfunction was analysed using LARS-score (Major LARS 60.8% of the patients) and Wexner-score (mean 10 ± 5). Sexual dysfunction was present in 90% of the males (n=40) and in 52% of females (n=17). Urinary dysfunction was present in 62.2% of patients. Concerning EORTC QLQ-30 and QLQ-29, QoL was of 78% with normal levels of physical, role, emotional, cognitive and social functioning. The most common patient-reported problems were related to anorectal dysfunction and sexual dysfunction.

Conclusions/Discussion: Our data support the hypothesis that functional outcomes after TaTME are similar to laparoscopic TME even though there are some concerns related with sexual function, especially in male patients.

ANASTOMOTIC LEAKAGE AFTER COLORECTAL SURGERY: IMPACT OF AORTIC CALCIFICATIONS.

P339

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Purpose/Background: Anastomotic leakage (AL), with a prevalence of 2.4 to 19%, is a major complication of colorectal resection. There have been no solid data regarding whether patients with aortic calcification who have undergone colorectal surgery are at increased risk for anastomotic leakage. We analyzed the impact of the extent of aortic calcifications on anastomotic leakage (AL) in patients with colorectal resection for cancer.

Methods/Interventions: Prospectively collected data from *Paris Hospital Public Assistance* (Coincide database) was used. Patients undergoing colorectal resections for malignant pathology, between 2007 and 2010, were included. All patients underwent colorectal or coloanal anastomosis. Degree of aortic calcification was measured on preoperative computed tomography (CT). An aortic calcification score (ACS) was defined between the celiac trunk origin and aortic bifurcation, as: ACS-0 (no aortic calcification), ACS-1 (aortic calcification<50%) or ACS-2 (aortic calcification>50%). In cases of heterogeneous levels of calcifications, the most important area was chosen. Type of anastomosis was reported as termino-terminal (TTA), latero-terminal (LTA) and latero-lateral (LLA) anastomosis. Anastomotic leakage (AL) was defined during the 30 postoperative days as anastomotic dehiscence with communication between the endo- and extra-luminal compartments. There were clinically and/or biologically suspected and radiologically confirmed.

Results/Outcome(s): 179 patients were included. ACS-0,-1 and -2 were 36% (n=65), 33% (n=59) and 31% (n=55) respectively. Information on anastomosis type was available for 107 patients. 19 (18%) patients had an AL. The rate of AL was not influenced by age, sex, weight, TNM stage and urgency of surgery. It increased with severity of ACS, with 26.9% (n=17), 30.2% (n=18) and 42.3% (n=23) for an ACS -0, -1 and -2 respectively (p=0.35). The AL rate was higher for termino-terminal anastomosis than latero-terminal anastomoses: 25% vs. 3% (p=0.015) with no difference between hand-sewn or stapled anastomosis (16% vs 14%, p=0.79). For termino-terminal anastomosis, the rate of AL increased with ACS: ACS-0=18.3%, ACS-1=31.2% and ACS-2=50%, but without reaching significance (p=0.083).

Conclusions/Discussion: Aortic calcifications score seems to be associated with increasing anastomotic leak rate after colorectal surgery for cancer. In presence of aortic calcification, a latero-terminal anastomosis might be privileged to decrease the risk of anastomotic leak.

OUTCOMES AFTER TRANSANAL EXCISION OR TRANSABDOMINAL RESECTION FOR STAGE I RECTAL CANCER PATIENTS.

P340

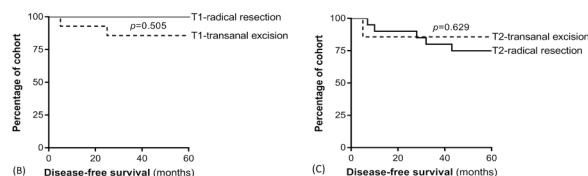
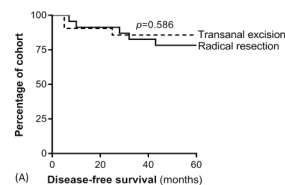
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Purpose/Background: National Comprehensive Cancer Network (NCCN) guidelines currently dictate definitive surgical therapy for stage I rectal cancer. We aimed to compare the outcomes of NCCN guideline-directed therapy of T1 and T2 rectal cancer patients treated by transanal excision (TAE) versus transabdominal resection (TAR).

Methods/Interventions: All patients who underwent definitive treatment for clinical T1-T2 (Stage I) rectal cancer from 07/2008 to 01/2017 at University of Florida (UF) were included in this IRB-approved study. Patients with nodal or distant metastasis and those with positive surgical margins were excluded. All patients followed NCCN guideline-directed therapy, i.e. patients either underwent transabdominal resection, transanal excision alone (for low-risk T1 lesions), or transanal excision with chemoradiation (high-risk T1 and all T2 lesions). Patients were categorized into two cohorts for comparison based on surgical procedure, TAE versus TAR. Those lost to follow-up were called to assess overall (OS) and disease-free survival (DFS). SPSS v.21 was used for statistical analysis. Student's *t*-test, chi-squared and Fisher's exact tests were used for statistical analysis, where appropriate. Survival analysis was done using both Kaplan-Meier analyses and Cox Proportional Hazards models.

Results/Outcome(s): A total of 44 patients were included in the study, with 21 undergoing TAE and 23 undergoing TAR. Short term outcomes significantly favored the TAE group; lower operative blood loss (25mL vs. 425mL, $p < 0.01$), shorter length of hospital stay (1.4 days vs. 6.3 days, $p < 0.01$), less postoperative complications (19% vs. 50%, $p < 0.05$), and lower total cost for index hospitalization (\$6,700 vs. \$25,000, $p < 0.01$). Mean follow up was 44 months. Only one patient in the TAR arm expired; hence DFS, rather than OS was compared between the groups. No difference in DFS was noted between the overall TAE and TAR groups (53.1 months vs. 52.2 months) *or* within the T1 and T2 subsets (Figure).

Conclusions/Discussion: Survival in stage I rectal cancer patients undergoing transanal excision (with or without chemoradiation) is comparable to transabdominal resection, regardless of the T stage. Transanal resection offers significant short-term benefits over transabdominal resection. Prospective trials to further elucidate this are ongoing.



Comparison of disease-free survival between transanal excision and transabdominal resection groups: (A) Overall study population (B) Patients with T1 lesions, and (C) Patients with T2 lesions

PATTERN OF DEFECTS IN TOTAL MESORECTAL EXCISION SPECIMENS: IS THERE ANY DIFFERENCE BETWEEN TRANSANAL AND LAPAROSCOPIC APPROACHES?

P341

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Purpose/Background: The surgical technique to perform Total Mesorectal Excision (TME) has evolved from open to minimal invasive techniques in many parts of the world. To overcome difficulties in dissection in the lowest part of the pelvis, Transanal Total Mesorectal Excision (TaTME) was introduced and has gained acceptance in the recent years. The published pathological results of TaTME seems to be at least comparable to Laparoscopic Total Mesorectal Excision (LaTME) in several case series. Whether or not TaTME has changed the pattern of defects in the retrieved mesorectal specimens, is yet to be clarified. This study aimed to determine the pattern of mesorectal defects in TaTME compared to LaTME for mid and low rectal cancer. The primary end-point was the study of the location of defects in the lower part of the rectum, as it is this part, which is dissected from below in the TaTME procedure.

Methods/Interventions: From our prospectively maintained TaTME database that includes all TaTME procedures performed at our institution since 2013, we have included 29 patients who originally had described defects in their retrieved TME specimens. Another 29 patients who underwent LaTME, with mesorectal defects served as a control group. All specimen photos and pathology reports were reviewed systematically, sites of mesorectal defects were identified, and the patterns of defects were defined.

Results/Outcome(s): In general, the main sites of mesorectal defects are anterior and lateral. A higher ration of specimens in the LaTME group with defects had defects below the peritoneal reflection ($P = 0.043$).

No statistically significant differences were found between the groups regarding the distribution of defects according to the anatomical quadrant. Groups were comparable in the number of the mesorectal defects and the distribution of defects among quadrants ($P = 0.870$ and $P = 0.599$ respectively).

Conclusions/Discussion: This study suggests that the pattern of defects in the retrieved mesorectal specimens differs according to the operative technique (TaTME vs LaTME). When the sites of the defects are analyzed according to the anatomical location (above or below the peritoneal reflection), that the ratio of the defects below the peritoneal reflection is lower in the TaTME group than in the LaTME group. Thus, TaTME has the potential to improve rectal cancer surgery through improvement in the quality of dissection in the lower rectum.

SURVEILLANCE OF TEM RESECTED LESIONS: ARE WE BEING DILIGENT ENOUGH?

P342

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Purpose/Background: Transanal endoscopic microsurgery (TEM) is widely used for the excision of rectal adenomas and in select patients for early rectal adenocarcinoma. Although surveillance guidelines have been published for rectal cancer treated with total mesorectal excision, limited recommendations exist for benign or malignant lesions excised with TEM. The purpose of this study was to review the surveillance practices at our institution and determine the patterns of recurrence among our benign and malignant TEM patient populations.

Methods/Interventions: A retrospective chart review was performed on all patients who underwent TEM for rectal adenoma or adenocarcinoma at a tertiary care teaching hospital, before June 2017. Data was collected on patient factors, tumour factors, surgical procedure, pathology, surveillance timing and recurrences.

Results/Outcome(s): In our study population of 114 patients, mean age was 67 years [43-88] and 68 patients (60%) were male. Mean tumour height from anal verge was 6.6 cm [2-18], with mean size of 4.0 cm [0.2-10.5]. Final diagnosis included 78 (68%) adenomas and 36 (32%) adenocarcinomas. Of the adenocarcinomas 23, 9, and 4 were T1, T2, T3 lesions respectively. Margins were positive in 13 adenomas (16.7%) and 5 adenocarcinomas (13.9%). Eight patients with adenocarcinoma went on to have radical resection within 3 months. The most commonly recommended endoscopic surveillance strategy by our group for both adenomas and adenocarcinomas was flexible sigmoidoscopy every 6 months for 2 years. Surveillance data was available for 74 patients (64%). The majority of patients who were scoped by the surgeon of record were meeting this endoscopic surveillance schedule, although some went on to have continued endoscopic surveillance by their local referring endoscopist and were therefore lost to follow-up (Table 1). The mean time to endoscopic follow up was 7.3 months for adenoma patients and 8.2 months for adenocarcinoma patients. Recurrences occurred in 4 adenoma patients (5%) and all were found on either the first endoscopic follow-up visit or within one year of TEM surgery. Three were successfully treated by repeat TEM or endoscopically, and 1 underwent radical resection. Recurrences occurred in 4 adenocarcinoma patients (11%), of which 3 patients had local recurrence only and one patient had local and distant recurrence. All recurrences were found between 10.7 and 38.5 months post TEM. Two of the 4 patients were salvaged with radical resection; the other two were inoperable and received palliative treatment.

Conclusions/Discussion: This data highlights the fact that recurrences post TEM surgery for both benign and malignant lesions can occur early or late and patients need to be diligently surveilled. Salvage surgery is not always possible. Further studies looking at recurrence patterns and timing of recurrences for benign and malignant lesions excised by TEM are needed, so that guidelines for surveillance of these patients can be created.

P342 Table 1: Timing of Endoscopic Follow-up post TEM

	≤6 months	12 months	18 months	24 months	>24 months	Median months from OR to visit	Lost to follow up from first visit
First visit (n=74)	61 (82.4%)	10 (13.5%)	2 (2.7%)	0	1 (1.3%)	6.5	n/a
Second visit (n=45)	7 (15.5%)	28 (62.2%)	6 (13.3%)	3 (6.7%)	1 (2.2%)	12.3	29
Third visit (n=28)	0	3 (10.7%)	17 (60.7%)	3 (10.7%)	4 (14.3%)	18.6	46
Fourth visit (n=15)	0	1 (6.7%)	2 (13.3%)	8 (53.3%)	4 (26.7%)	25.1	59
Fifth visit (n=10)	0	0	0	1 (10.0%)	9 (90%)	37.0	64

IS ROUTINE HISTOLOGICAL EVALUATION OF CIRCULAR STAPLER DOUGHNUTS NECESSARY AFTER COLORECTAL CANCER RESECTION?

P343

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Purpose/Background: Doughnuts of colorectal tissue created after use of circular end-to-end stapler are commonly submitted for histological evaluation, to ensure negative margin after colorectal cancer (CRC) resection. However, there has been only limited study on the clinical utility of routine histological assessment of the doughnuts. This study determined the incidence of pathologic findings in the doughnut specimens in patients undergoing radical resection for colorectal cancer and assessed if pathologic findings in doughnuts had any impact on patient management.

Methods/Interventions: Patients with rectal or rectosigmoid cancers who underwent radical resection and a circular stapled anastomosis (N=202) at a tertiary care center (St. Boniface Hospital and Victoria General Hospital, Winnipeg, Canada) between January 2010 to October 2017 were retrospectively reviewed. Data collected included patient demographics, co-morbidities, tumor location and characteristics, neoadjuvant treatments, surgical approach (open versus laparoscopic), surgeons' assessment of the gross margin, and pathology report of the doughnuts. In patients with abnormal findings in the doughnut, medical records were further reviewed to assess whether treatment course was altered because of the pathological findings.

Results/Outcome(s): 201 out of 202 (99.5%) patients had doughnuts submitted for histologic evaluation from 94 open, 58 hand assisted laparoscopic and 50 laparoscopic cases. All doughnuts were sent to the pathology lab separately from the primary tumor specimen. In 173 patients (86.0%), distal and proximal doughnuts were submitted separately. Pathologic findings were identified in 8 of 201 (4.0%) cases, which were all benign findings. The findings of these 8 patients included: 3 radiation related changes, 2 diverticula, 1 ulceration with no dysplasia, 1 tubular adenoma with no dysplasia, and 1 ischemic changes. Abnormal doughnut histology had no impact on patient treatment course after surgery. None of the study patients had positive margin or doughnuts with malignancy.

Conclusions/Discussion: Histologic review of anastomotic doughnuts is routinely performed, which increases healthcare costs and resources utilized. We found that abnormal histologies were found in only 4.0% of doughnut specimens after radical resection for CRC. These findings were all benign and none of the findings had any impact on patient management. Among studies that examine doughnut histology after CRC resection, this is the first to include a large sample of laparoscopic cases, where intra-op assessment of tumor location can be more challenging.

Even with inclusion of laparoscopic CRC resections, routine histological evaluation of doughnut specimens does not provide any meaningful clinical benefits.

GEOGRAPHIC AND FACILITY BASED DISPARITIES IN THE ADMINISTRATION OF NEOADJUVANT CHEMORADIOTHERAPY IN RECTAL ADENOCARCINOMA.

P344

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Purpose/Background: Treatment of locally advanced (clinical stage II or III) rectal adenocarcinoma with neoadjuvant chemoradiotherapy (nCXRT) has improved recurrence rates. Combining nCXRT with total mesorectal excision is considered standard of care in most clinical scenarios. However, discrepancies in the administration of these therapies, as well as the type of surgical approach, has been reported with respect to race, socioeconomic status, and insurance status. Previous studies have examined nCXRT, however there has been a recent push towards standardization of care and centers of excellence. We examined the role of geography and treatment facility on the administration of nCXRT, in a more updated cohort than previously examined.

Methods/Interventions: Patients with clinical T3 or T4 or any clinical N+ rectal adenocarcinoma who underwent radical surgery (non-local resections) were identified in the National Cancer Data Base (2006-2015). Univariate and multivariable logistic regression including age, race, insurance status, and Charlson comorbidity index, was used to examine the association between geography or facility type with the omission of nCXRT.

Results/Outcome(s): Of 41,986 patients identified with clinical stage II or III rectal cancer, 3,783 (8.9%) did not receive nCXRT and 38,249 (91.1%) received nCXRT. Median age in the overall cohort is 61yrs (IQR 53-71), 62.4% were male (n=26,179), and the majority were Caucasian (n=34,540, 82.3%). The majority of the patients received care at a non-academic facility (n=25,662, 61.1%), and in the Midwest (n=15,415, 36.7%). On univariate analysis, non-academic facility (OR=1.2, p<0.001) and geographic locations other than the Midwest (Northeast OR=1.2, p<0.001, South OR=1.3, p<0.001, West OR=1.13, p<0.001) were associated with the omission of nCXRT. On multivariate analysis non-academic facility was no longer associated with omission of nCXRT, while geographic location remained significantly associated (Northeast OR=1.1, p<0.01, South OR=1.5, p<0.001, West OR=1.39, p<0.001).

Conclusions/Discussion: Both academic facility and geographic location continue to play a significant role in the administration of nCXRT in clinically advanced rectal

cancer. When controlling for socioeconomic factors, the impact of academic facility is less apparent, while geographic location remained independently associated with omission of nCXRT. Utilization of this updated data after the initiation of society initiatives, such as the Commission on Cancer and the Rectal Cancer Task Force, suggests that further standardization and education is still necessary.

	Non-nCXRT, n (%)	nCXRT, n (%)
Gender		
Male	24,024 (62.8)	2,155 (57.6)
Female	14,225 (37.2)	1,582 (42.3)
Race		
Caucasian	31,415 (82.1)	3,125 (83.6)
Black	2,289 (6.0)	238 (6.0)
Hispanic	2,388 (6.2)	182 (4.9)
Other	1,918 (5.0)	152 (4.0)
Charleston Comorbidity Index		
0	30,347 (79.3)	2,536 (67.9)
1	6,311 (16.5)	848 (22.7)
2	1,182 (3.1)	249 (6.7)
3	409 (1.1)	104 (2.8)
Facility Type		
Academic	14,986 (39.2)	1,338 (35.8)
Non-Academic	23,263 (60.8)	2,399 (64.2)
Facility Location		
Northeast	9,416 (24.6)	951 (25.5)
Midwest	14,190 (37.1)	1,225 (32.8)
South	6,740 (17.6)	725 (19.4)
West	7,903 (20.7)	836 (22.4)

Table 1. Demographic Information

TRANSANAL TOTAL MESORECTAL EXCISION IN BENIGN AND MALIGNANT RECTAL PATHOLOGY.

P345

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Purpose/Background: Transanal total mesorectal excision (taTME) is a new surgical approach for lower rectal cancer and other benign pathology to facilitate the difficult pelvic dissection. The aim of this study was to report the experience of one center on this technique, looking at the short-term clinical and oncological outcome.

Methods/Interventions: From October 2013 to September 2017, were registered 33 selected patients to the transanal technique in a prospective study. The endpoints were short-term adverse events and quality of the TME surgery.

Results/Outcome(s): A total of 33 patients were analysed comprising 28 with rectal cancer, 3 polyposis and 2 ulcerative colitis. The median age was 56 (27-87) years and 20 were male. The rectal cancer were located at a median of 3 (0.5-7) cm from dentate line and 75% had neoadjuvant chemoradiation. The Gelpoint was used in all patients with a previous intersphincteric approach in 57% of the patients. The specimen had a transanal extraction in 31 cases and the anastomotic technic was manual in 17

and stapled in 16. In one patient occurred a lesion of the ureter that was corrected intraoperatively. Postoperative morbidity was 15.1%, 4 small bowel occlusions and 1 pelvic abscess all medically treated. The median length of stay was 9 (4-30) days. A complete or near complete TME specimen was delivered in 92.8% (26/28) of the cases and R1 resection in one (3.5%) with positive circumferential and distal margins. After a median follow-up of 15.1 months there were no local recurrence and two (7.1%) have developed hepatic metastases.

Conclusions/Discussion: This study confirms that taTME appears feasible and facilitating the difficult lower pelvic dissection in benign and malignant pathology, with low morbidity rate, and without compromising the oncological principles, with good specimen quality.

CLINICAL RELEVANCE OF HISTOPATHOLOGICAL DIAGNOSIS AND PREOPERATIVE CT PREDICTION OF PELVIC SIDEWALL LYMPH NODE METASTASIS IN LOWER RECTAL CANCER TREATED WITHOUT NEOADJUVANT THERAPY.

P346

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Purpose/Background: The preoperative assessment of regional and pelvic sidewall lymph node metastasis (LNM) is essential for the selecting appropriate treatment for lower rectal cancer. The purpose of this study is to clarify whether patients with low probability of pelvic sidewall LNM can be extracted using preoperative CT images of lower rectal cancer patients treated without any neoadjuvant treatment which affects the result of pathological diagnosis of LNM.

Methods/Interventions: Between 2010 and 2016, 397 patients underwent bi-lateral pelvic sidewall dissection with radical rectal resection for lower rectal cancer in our hospital. Among them, we targeted 243 adenocarcinoma located below the peritoneal reflection without neoadjuvant therapy and without past history of other diseases in the pelvis. From their preoperative enhanced CT (5 mm slice interval), we measured the short-axis length of visible-in-CT mesorectal lymph nodes (MLN) and lateral lymph nodes (LLN) with 0.5 mm as the minimum unit. The cut-off value to diagnose the metastasis was set to 10 mm, and <10 mm lymph node was defined as check lesion (CL), to compare the size of lymph node and the pathological metastasis diagnosis.

Results/Outcome(s): The LLN and MLN metastasis were seen in 37 (15%) and 107 (44%) patients, respectively. Metastasis accuracy rate of lymph node with a short axis of ≥ 10 mm was 67% in LLN and 66% in MLN. Most of LLN metastasis (35/37) were included in cases with visible lymph node structure in LLN or ≥ 10 mm lymph

node in MLN. The local recurrence in pelvic lateral area after pelvic sidewall dissection was seen in 4% of 230 cases of TNM stage I-III patients.

Conclusions/Discussion: From the results of the study, preoperative CT image can be useful for predicting a group with a low probability of lymph node metastasis in pelvic sidewall area. Prophylactic pelvic sidewall dissection should not be done routinely for those patients.

Prediction of LLNM by CT imaging

Overall (N=243) (No. of LLNM positive case)

	MLN \geq 10mm	MLN CL(+)	MLN CL(-)	total
LLN \geq 10mm	3 (2)	5 (3)	4 (4)	12 (9)
LLN CL(+)	16 (5)	63 (14)	13 (4)	92 (23)
LLN CL(-)	22 (3)	80 (2)	37 (0)	139 (5)
total	41 (10)	148(19)	54 (8)	243 (37)

Only 2 cases of LLN metastasis were found in the 117 patients without both of LLN CL and \geq 10mm MLN in preoperative CT images.

LLNM: lateral lymph node metastasis, MLN: Mesorectal lymph node, LLN: lateral lymph node, CL: check lesion

A NEW THERAPEUTIC STRATEGY THAT COULD CONTROL LOCAL RECURRENCE FOR LOCALLY ADVANCED RECTAL CANCER.

P347

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Purpose/Background: To clarify short- and long-term outcomes in patients with locally advanced rectal cancer who underwent radical surgery after receiving neoadjuvant chemoradiotherapy (NCRT) with irinotecan plus TS-1, which enhances the radiosensitivity of cancer cells.

Methods/Interventions: We examined risk factors for recurrence, disease-free survival (DFS) rates, and overall survival (OS) rate in 105 patients with locally advanced lower rectal cancer who were treated in our hospital from January 2011 through December 2015. Written informed consent to receive our regimen was obtained from all patients. The study protocol was approved by the institutional ethics committee of Kitasato University Hospital (Kanagawa, Japan) on June 19, 2017 (B17-063). To be eligible, patients had to have previously untreated rectal cancer (clinical T3 or T4, N0-2, M0), a histopathologically confirmed diagnosis of adenocarcinoma, and an Eastern Cooperative Oncology Group performance status of 0 to 3. The tumors were staged according to the staging system of the International Union against Cancer (UICC) TNM Classification of Malignant Tumours, 7th edition.

Results/Outcome(s): Toxicity of NCRT The characteristics of the patients in our study are shown in Table 1. Data on toxicity were obtained from all patients. Grade 3

adverse events occurred in 12 patients (11.4%). Only 1 patient had a grade 4 adverse event (diarrhea). Grade 3 toxicity was diarrhea in 6 patients and neutropenia in 5 patients. 6 patients+5 patients = 11 patients. There were no NCRT-related deaths. Treatment was discontinued in 5 patients, and dose reduction was performed in 10 patients.

Conclusions/Discussion: In conclusion, our treatment strategy, in which irinotecan was combined with TS-1 to enhance the radiosensitivity of locally advanced rectal cancer, was safe and had a high treatment completion rate and good short-term outcomes, including postoperative complication rates. As for long-term outcomes, no patient had local recurrence, and our regimen provided good DFS and OS. Therefore, our regimen is considered a useful treatment strategy. In the future, a search for biomarkers predicting the response to NCRT is urgently required. Our regimen adequately contributed to controlling local recurrence in patients with initial recurrence, and many hematogenous metastases to the lung or liver were seen as a characteristic pattern of initial recurrence. In patients with ypN1 and ypN2 disease, which are prognostic factors, early performance of diagnostic imaging studies is likely to facilitate the early detection and early treatment of disease, and such patients should receive intensive postoperative adjuvant therapy to inhibit distant metastasis.

IMPACT OF SURGICAL RESECTION OF SYNCHRONOUS PERITONEAL METASTASIS FROM COLORECTAL CANCER: A PROPENSITY SCORE-MATCHED ANALYSIS.

P348

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Purpose/Background: Peritoneal metastasis from colorectal cancer is one of the poorest prognostic factors. A clinical significance of resection of synchronous peritoneal metastasis is still controversial. The aim of this study was to investigate the usefulness of resection of synchronous peritoneal metastasis from colorectal cancer using a multi-institutional database.

Methods/Interventions: The patients who underwent surgery for stage IV colorectal cancer at 16 hospitals between 1991 and 2007 were enrolled in this study. The factors associated curative resection for synchronous peritoneal metastasis from colorectal cancer were investigated by logistic regression analysis. The impact of curative resection for synchronous peritoneal metastasis was investigated using a propensity score-matched analysis.

Results/Outcome(s): Among the 3965 patients with stage IV colorectal cancer, 1169 had synchronous peritoneal metastasis (28.5%). No patients received hyperthermic intraperitoneal chemotherapy (HIPEC) in this study. Among the 1169 patients, 783 had enough

clinicopathological information and went through further analysis. Out of 783 patients, 204 underwent curative resection. A multivariate analysis revealed that severity of peritoneal metastasis according to the Japanese classification ($P < 0.0001$) and distant metastasis ($P < 0.0001$) were independently associated with non-curative resection. In a propensity score-matched analysis, 118 patients who underwent curative resection were matched with 118 patients who did not undergo curative resection. With regard to each parameter, there was no significant difference between patients with and without curative resection. In the propensity score-matched cohort, patients with curative resection had better overall survival than those without (MST: 2.4 years and 1.3 years, $P < 0.0001$).

Conclusions/Discussion: The present study demonstrated that macroscopic curative resection improved overall survival of patients with synchronous peritoneal metastasis from colorectal cancer even without HIPEC.

WHY DO SOME PLACES NOT IMPROVE EVEN AFTER IMPLEMENTING AN ENHANCED RECOVERY PATHWAY?

P349

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Purpose/Background: While enhanced recovery pathways (ERPs) have been shown to improve patient satisfaction and reduce complication rates, length of stay, and cost in colorectal surgery, these findings have not been reproducible everywhere. In fact, despite a rapid increase in interest in ERPs in the U.S., there has been substantial variability in the degree of ERP uptake and implementation results. We sought to assess the current state of ERP implementation in the U.S. and to identify key factors that contribute to successful implementation.

Methods/Interventions: As part of a national ERP implementation initiative, we conducted structured telephone interviews with project leads at enrolled hospitals between August 22, 2017 and November 7, 2017. Interviewees were asked about their prior experience with ERPs. Of those with prior experience, we additionally elucidated whether process and outcome measures

were collected, whether reports were generated from the collected data, and whether the information was fed back to leadership and to frontline providers. Finally, we correlated these implementation processes with self-reported ERP implementation success.

Results/Outcome(s): Overall, 42 of 79 (53.2%) hospitals interviewed had prior experience with ERPs, of which 39 (92.9%) were in colorectal surgery. Of the 42 hospitals, 20 (47.6%) reported successful implementation, as defined by decreased length of stay or complication rates. There was tremendous heterogeneity in data collection and feedback; 31 (73.8%) hospitals collected both process and outcome measure data, 14 (33.3%) generated reports from the collected data, 12 (28.6%) fed the information back to leadership, and 6 (14.3%) fed the information back to frontline providers. Interviewees were twice as likely to report successful ERP implementation if they collected and fed both process and outcome measure data back to frontline providers (RR 2.0; 95% CI 1.18-3.29).

Conclusions/Discussion: We found tremendous heterogeneity in ERP implementation at hospitals across the US, especially regarding data feedback. Our results suggest that data collection is necessary but not sufficient to improve outcomes within an ERP implementation initiative; the data collected must also be fed back to frontline providers for outcomes to improve. However, this rarely occurred at the hospitals in our study. Feedback represents a critical component to ERPs and a commonly missed opportunity in realizing the maximum benefit from ERPs for colorectal surgical patients in the US.

PROLONGED OPERATIVE DURATION INCREASES RISK OF COMPLICATIONS REGARDLESS OF PATIENT COMORBIDITY.

P350

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Purpose/Background: Studies have demonstrated that prolonged operative duration (OD) is associated with higher rates of infectious and cardiopulmonary complications. Clinical dogma may lead surgeons to perceive this effect is limited to patients with extensive comorbidities or clinical acuity. To assess this traditional assumption,

P349 ERP implementation processes attributable to an increased likelihood of successful implementation

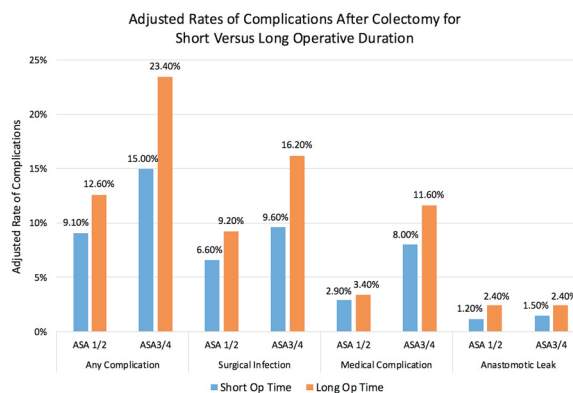
	Number of Hospitals (Total N =42)	Relative Risk (RR) of Self-Reported Success (95% Confidence Interval)
Data Collection	31 (73.8%)	1.06 (0.51-2.24)
Report Generation	14 (33.3%)	1.33 (0.71-2.49)
Feedback to Leadership	12 (28.6%)	1.35 (0.72-2.53)
Feedback to Frontline	6 (14.3%)	2.0 (1.18-3.29)*

we evaluated the association between prolonged OD and postoperative complications among colorectal surgical patients with differing comorbidity burden.

Methods/Interventions: We conducted a retrospective cohort study of patients who underwent elective colorectal resection with primary anastomosis between 2008 and 2016, using prospectively-collected data from the Michigan Surgical Quality Collaborative. Patients were divided into groups based on comorbidity burden (American Society of Anesthesiologists [ASA] physical status classification 1 or 2 versus 3 or 4), then further subdivided into tertiles based on OD. We compared postoperative outcomes (surgical infection, medical complication, or anastomotic leak) between patients with long versus short OD (top versus bottom tertile), stratified by ASA group. Adjusted rates of complications were calculated using multivariable logistic regression controlling for patient, operative, and surgeon factors. Finally, multivariable logistic regression was used to test the interaction between operative duration and ASA score.

Results/Outcome(s): We identified 19,199 patients who underwent elective colectomy with primary anastomosis during this time. Patients in the shortest OD tertile underwent a resection within 106 minutes while operations in the longest OD tertile lasted longer than 160 minutes. For patients with an ASA score of 1 or 2 ($n=8,796$), the adjusted rate of postoperative surgical infection was 6.6% (95% CI: 5.5%-7.6%) following a short operation while it was 9.2% (95% CI: 7.9%-10.5%) following a prolonged operation. For patients with an ASA score of 3 or 4 ($n=10,223$), the adjusted rates increased from 9.6% (95% CI: 8.5%-10.7%) to 16.2% (95% CI: 14.5%-17.8%) with prolonged OD. Medical complications did not significantly increase with prolonged OD for low ASA scores (2.9% [95% CI: 2.3%-3.7%] to 3.4% [95% CI: 2.5%-4.3%]), but they did for high ASA scores (8.0% [95% CI: 7.0%-9.0%] to 11.6% [95% CI: 10.1%-13.1%]) (Figure 1). Calculation of the combined interaction of high ASA and prolonged OD demonstrated no statistically significant effect on postoperative complications (OR=1.14, 95% CI: 0.91-1.42).

Conclusions/Discussion: Our study demonstrates that prolonged OD is associated with increased likelihood of postoperative complication for all colorectal patients, regardless of comorbidity burden. Thus, attention must be paid to maintaining operating room efficiency for healthy and sick patient populations alike.



RIGHT-SIDED VS LEFT-SIDED COLORECTAL CNCR AFTER CURATIVE RESECTION IN PATIENTS OVER 80 YEARS OF AGE: AN ANALYSIS OF A LARGE MULTICENTER STUDY IN JAPAN.

P351

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Purpose/Background: It has been gradually accepted that right-sided colon cancers (RCCs) and left-sided colon cancers (LCCs) are different entities that exhibit a different prognosis, and which are defined by molecular aberrations. Among these aberrations, microsatellite instability (MSI)-high is predominantly seen in RCCs, and associated with a better prognosis after surgery. Contrary to expectation that RCCs show better prognosis through higher frequency of MSI-high, there is some controversy as to whether RCC or LCC shows a better prognosis after surgery. However, it should be noted that MSI-high RCCs are more frequent in elderly patients, and the impact of the MSI status on prognosis may be emphasized in the elderly population. We aimed to evaluate the impact of the tumor location on the survival outcomes of elderly patients with colorectal cancer (CRC) after surgery.

Methods/Interventions: We conducted a multicenter case-control study of patients of >80 years of age who underwent curative surgery for stage 0 to 3 CRC at 41 hospitals in Japan between 2003 and 2007, and compared the baseline characteristics and survival outcomes between RCCs and LCCs. Cancer-specific survival (CSS) and cancer-specific relapse-free survival (CS-RFS), as well as overall survival (OS) and relapse-free survival (RFS), were analyzed to avoid the impact from other causes of death, which are unique to the elderly population.

Results/Outcome(s): Among the 1,680 patients who were enrolled in this study, 812 (48.3%) and 868 (51.7%) underwent curative surgery for RCCs and LCCs, respectively. In the patient characteristics, the RCC group showed higher percentages of female patients, patients

with a history of abdominal surgery, and patients with renal comorbidities in comparison to the LCC group. RCC was characterized by a larger tumor size and was more frequently diagnosed at an advanced stage, and with a mucinous/signet ring-like histology. Although there were no significant differences between RCCs and LCCs regarding OS and RFS, RCCs exhibited significantly better CSS and CS-RFS than LCCs (hazard ratio [HR] 0.67; 95% confidence interval [CI] 0.47-0.94 and HR 0.73; 95%CI 0.57-0.94, respectively). Moreover, in the multivariate analyses to investigate factors associated with CSS and CS-RFS, the right side was found to be independently associated with superior survival (HR 0.68; 95%BQ1] %CI 0.47-0.97, HR 0.74; 95%CI 0.57-0.96, respectively).

Conclusions/Discussion: Among colorectal cancer patients of >80 years of age, RCCs showed better CSS and CS-RFS than LCCs. Although the MSI was not investigated, the results suggested that MSI-high CRC, which is predominantly seen in elderly patients and RCCs, may affect survival outcome after surgery. Further analyses that include molecular aberrations are needed to identify the prognostic factors in elderly patients with CRC.

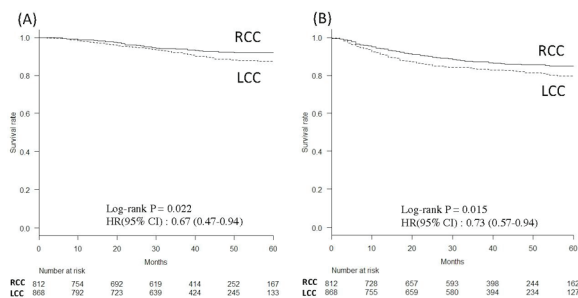


Figure 1. Comparisons of survival outcomes after curative surgery between right-sided and left-sided colorectal cancers.

Cancer-specific overall survival(A), Cancer-specific relapse-free survival(B).

INCREASED COMPLIANCE TO ENHANCED RECOVERY AFTER SURGERY PROTOCOLS REDUCES HOSPITAL LENGTH OF STAY.

p352

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Purpose/Background: Enhanced Recovery After Surgery (ERAS) protocols have been shown to reduce postoperative length of stay, readmissions and complications. ERAS protocols consist of a bundle of interventions and require participation from a multidisciplinary team including surgeons, anesthesiologists and nurses. While it is difficult to achieve 100% compliance with early implementation of an ERAS protocol, we sought to evaluate whether gradual compliance translates into significant changes in length of stay.

Methods/Interventions: This is a retrospective analysis of prospectively collected data during the initial 14 months of implementation of an ERAS protocol. All operations were performed at a single institution among 12 colorectal surgeons. Percent compliance was calculated for each patient as the number of completed ERAS interventions out of a total possible 22 interventions. The primary endpoint was total length of stay. Multiple regression analysis was used to determine the effect of percent compliance with ERAS protocol on hospital length of stay, adjusting for age, race, sex, operative approach, and severity of procedure.

Results/Outcome(s): A total of 534 operations were performed during the 14-month study period. There was a statistically significant reduction in length of stay with increasing rate of compliance with the ERAS protocol ($R = -0.371$, $p < 0.001$). Median LOS was 4 days (IQR 3-6 d). Individual surgeon compliance ranged from 37% to 89% (mean compliance 77.2% \pm 19.5%). Seven of twelve surgeons independently demonstrated significant reductions in length of stay with increased compliance. Even modest adoption of ERAS by the least compliant surgeon (34% to 55%) resulted in a significant improvement in length of stay ($R = -0.378$, $p < 0.0001$).

Conclusions/Discussion: Hospital length of stay inversely correlates with compliance to an ERAS protocol in this single institution study. While 100% compliance with an ERAS protocol is difficult to achieve in the immediate implementation period, even partial implementation and incremental improvements to compliance of an ERAS protocol translates into significant reductions in length of stay.

POST-OPERATIVE LENGTH OF STAY: THE IMPACT OF PRE-EXISTING COMORBIDITIES.

P353

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Purpose/Background: Pre-operative and peri-operative risk factors exist that have an impact on length of stay in colorectal surgery patients. If these risk factors can be identified early, modifications can be made that can reduce complications as well as length of stay (LOS). Over the last several years, standardized care and enhanced recovery programs have focused on improving patient care and shortening LOS and have been very successful. However, if we can identify specific patient factors that correlate with increased stay we can tailor these protocols to better suit the patient. By identifying risk factors associated with increased length of stay in patients undergoing colorectal surgery within our institution, we aimed to identify them pre operatively and make modifications to decrease potential complications and hospital length of stay.

Methods/Interventions: This study was a single institution retrospective study. The data warehouse was queried for data on patients who underwent colorectal surgery from 2010 to 2015. The data abstracted included underlying disease processes such as obesity, anemia, CHF, COPD, chronic kidney disease, chronic constipation, tobacco use, and poor nutritional status. The study population included both benign and oncologic procedures. This data was then analyzed using “R” statistical software to determine which particular co-morbidities have a statistically significant effect on hospital length of stay.

Results/Outcome(s): Analyzation of the data discovered several co-morbidities that strongly correlated with increased length of stay in our institution. Significance was determined by $p < 0.05$. This study included a patient population of 871. The mean length of stay was 11.58 days (1-150). Half of the patients had LOS less than 7 days and 75% had a LOS less than 13 days. The mean age of the patient population was 56 years (17-95 years). Age had correlation with LOS. Factors that had strong correlation with increased LOS ($p < 2.2e-16$) included open surgery vs laparoscopic surgery (9.22 vs 5.13 days), COPD (12.56 vs 5.88 days), CHF (12.8 vs 6.3 days), and chronic kidney disease (17.7 vs 7.02 days), anemia (8.86 vs 4.88 days) and poor nutritional status (10.7 vs 5.8 days). The factors that did not have a statistically significant correlation with increased length of stay included age, sex, race and tobacco use.

Conclusions/Discussion: Over the last decade standardized care and enhanced recovery programs have proven to have a impact on patient outcomes and LOS. Pre-operative health status has a significant effect on post-operative outcomes and length of stay. Several co-morbidities were revealed to have a strong correlation with LOS at our institution. Now that these correlating risk factors have been identified, we hope to tailor our enhanced recovery protocols to better fit these populations of patients pre, peri and post operatively.

BLEEDING ASSOCIATED WITH VENOUS THROMBOEMBOLISM PROPHYLAXIS IN THE POST-OPERATIVE COLORECTAL PATIENT: A RANDOMIZED PROSPECTIVE STUDY OF UNFRACTIONATED HEPARIN VERSUS LOW MOLECULAR WEIGHT HEPARIN.

P354

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Purpose/Background: Administration of venous thromboembolism (VTE) prophylaxis has become standard of care in the post-operative patient. Many factors in the post-operative period lead to a pro-thrombotic state, especially with cancer. Studies have looked at the effectiveness

of unfractionated heparin (UFH) and low molecular weight heparin (LMWH) as prophylaxis in preventing venous thrombosis with recent literature supporting the use of LMWH in the cancer patient. Post-operative bleeding following colectomy can be self limited and insignificant, but sometimes requires cessation of anticoagulation or transfusion. The aim of this study was to evaluate for a difference in rates of post-operative bleeding with use of UFH or LMWH after elective colectomy.

Methods/Interventions: After IRB approval, patients undergoing elective colectomy were randomized to receive either UFH or LMWH in the post operative period. An informed consent was obtained from patients during their pre-operative office visit. Patients were divided into two groups based on the operation they were having, left or right colon resection. The patients in these two groups were randomized in the pre-operative holding area, with consecutive patients alternating treatments. Exclusion criteria included prior VTE, clinical gastrointestinal bleeding (GIB) requiring urgent surgery, or use of anticoagulation in the pre operative period. A hemoglobin (Hgb) was checked prior to surgery and every morning post operatively. Trends in Hgb, as well as any evidence of GIB, symptoms of GIB, need for transfusion or holding of anticoagulation were recorded.

Results/Outcome(s): Over 13 months, 58 patients were recruited for the trial. Thirty were assigned to the UFH arm (24 lefts, 6 rights) and 28 were assigned to the LMWH arm (23 lefts, 5 rights). No patients in the UFH arm experienced symptoms related to bleeding, while two in the LMWH arm did. There was one bloody stool with UFH and four with LMWH. No transfusions were required with UFH while three patients were transfused on LMWH. Medication was held in two of the UFH patients and five of the LMWH patients. The mean drop in Hgb for UFH patients was 2.4 versus 2.64 with LMWH. None of these figures met statistical significance.

Conclusions/Discussion: A major concern of surgeons is post-operative bleeding. Holding anticoagulation post-operatively puts patients at increased risk for VTE. Current practices are affected by anecdotal experience, as there is limited data regarding bleeding complications comparing these medications. This study shows there to be no difference in bleeding complications when comparing LMWH to UFH. This, taken with information from previous studies that LMWH decreases risk of VTE, especially in cancer patients, confers it should be considered the medication of choice in patients who undergo elective colorectal surgery.

ANASTOMOTIC LEAK RATES BASED ON DEGREE OF OBESITY IN COLORECTAL SURGERY.

P355

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Purpose/Background: It has been well documented that higher anastomotic leak rates are seen in obese patients compared to the non-obese in colon and rectal surgery¹. Many of these studies compared non-obese (<25 BMI) and obese (>25 BMI) patients without further looking into different classes of obesity (i.e. BMI 25-30, 31-35, 36-40 etc). The purpose of our study is to determine if increasing levels of obesity correspond to higher levels of left sided anastomotic leak rates in our patient population.

Methods/Interventions: We performed a retrospective study analyzing our low pelvic colorectal anastomoses from 2012-2016 using the Colon and Rectal Associates (Shreveport, LA) database. Our patient population was obtained by identifying patients with the CPT codes 44145, 44207, 45119, and 45112. The patient population included both malignant and non-malignant pathologies. We stratified the patients based on BMI and leak rate. Categories included BMI <25, BMI 26-30, BMI 31-35, BMI 36-40, BMI 41-45, and BMI > 45

Results/Outcome(s): Our total patient population was 139 patients. Total number of leaks identified out of the entire population was 10 (7.19%). Breaking down each individual category, the leak rate for non-obese (< 25 BMI) was 3 out of 39 (7.69%). For BMI 25-30, there was a leak rate of 4 per 52 (7.69%). BMI 31-35, leak rate was 1 per 26 (3.85%). For BMI 36-40 there were no leaks (13 patients). For BMI 41-45, the leak rate was 1 per 4 (25%), and for BMI > 46 the leak rate was 1 per 5 (20%).

Conclusions/Discussion: Our data showed that there is a higher leak rate for obesity levels greater than 40 compared to the obese patients with BMI's of 25-35. One confounding factor was that we had no leak rates for patients with BMI's 36-40. Likely this was due to small sample size. Our findings, though limited due to patient population size, warrants further investigation into a larger study group 1. Benoist, S et al. Impact of obesity on surgical outcomes after colorectal resection. American Journal of Surgery. April 2000: 179(4):275-81

SUB TOTAL/ TOTAL COLECTOMY INVOLVE A HIGHER COMPLICATIONS RATE IN COMPARISON TO RIGHT HEMICOLECTOMY.

P356

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Purpose/Background: Experience and clinical observation suggest that patients undergoing subtotal/total (SBTC/TAC) colectomy have a higher complications rate and a slower post-operative course in comparison to those undergoing right hemicolectomy (RHC). Nevertheless, this observation has no written evidence to date. The aim of our study was to compare intra and post op complication of SBTC/TAC and RHC.

Methods/Interventions: Data of patients who had a SBTC/TAC or RHC in our department between 2008 and 2016 was collected. Patients with colitis of any etiology, motility disorders, previous colon resections or concurrent resections of other organs were excluded. Only elective surgeries were included.

Results/Outcome(s): Seventy-five patients who had a SBTC/TAC and 398 that underwent RHC met the inclusion criteria. Both groups were comparable in terms of gender, medical and surgical background and operative approach (laparoscopic/open surgery). Patients undergoing SBTC/TAC were younger with a higher proportion of ASA 1 and were operated on more frequently by a colorectal surgeon ($p < 0.001$ for all three). Still, the SBTC/TAC group demonstrated a higher rate of intra and post - op complications ($p < 0.001$ for both). The latter includes all anastomotic leaks ($p = 0.012$) and specifically those requiring reoperation ($p = 0.041$), all reoperations ($p = 0.034$) and readmissions ($p = 0.008$). The patients in the SBTC/TAC group also had a prolonged post-operative course: longer time for bowel activity and oral intake restitution and a longer hospitalization ($p < 0.001$ for all three). These results were confirmed by a multivariate analysis after corrections for known risk factors for the major adverse outcomes. There was no difference in mortality rate ($p = 0.189$).

Conclusions/Discussion: SBTC/TAC involve a higher intra and post-operative complications rate including all and re-operated anastomosis leaks and total reoperations. Those patients experience longer post-operative recovery. Pre-operative patient counseling should relate to these subjects.

P355

	Total # of pts	Non-Leak	Leak	Leak Rate
BMI < 25	39	36	3	7.69%
BMI 25-30	52	48	4	7.69%
BMI 31-35	26	25	1	3.85%
BMI 36-40	13	13	0	0.00%
BMI 41-45	4	3	1	25.00%
BMI > 46	5	4	1	20.00%

OPERATIVE OUTCOMES AFTER ROBOTIC PROCTECTOMY FOR RECTAL CANCER ARE INFLUENCED BY CENTER-LEVEL VOLUME.

P357

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Purpose/Background: Use of robotic proctectomy (RP) for rectal cancer has steadily increased. Randomized-controlled trials (RCT) evaluating the safety of RP are being completed, however, these trials include high-volume RP surgeons. In an effort to capture the true experience with RP, we used the National Cancer Database (NCDB) to characterize national variations in volume of RP for rectal cancer and to compare operative outcomes with center-level RP volume.

Methods/Interventions: We identified patients in the NCDB who underwent RP for rectal cancer from 2010-2015. Hospitals were divided into four categories based on the number of RPs performed per year (>12, 6-12, 2-6, <2). Univariate and multivariable analyses were performed to investigate the relationship between RP volume and operative outcomes. Included in multivariable analyses were patient factors (age, race, insurance, comorbidity gender, socioeconomic status, neoadjuvant radiation) and hospital characteristics (hospital type, volume of all proctectomy types).

Results/Outcome(s): The number of RPs increased significantly from 2010 to 2015; in 2010, 4.8% of proctectomies in our cohort were approached robotically, compared to 23% in 2015 ($p < 0.001$). There is wide hospital-level variation in the volume of RP performed; 10% of RPs were done at centers doing >12 RP/year, while 25% were done at hospitals that did <2 RP/year. Compared to high volume centers, hospitals performing lower volumes of RP had significantly increased rates of conversion, increased rates of positive margins and decreased rates of identification of ≥ 12 lymph nodes in univariate analysis (Table 1). There were no differences in early mortality rates. These findings were unchanged after multivariable analysis. Of note, compared to centers performing >12RPs/year, those performing 2-6RP/year and <2RP/year were 35% (OR 0.65, $p < 0.001$) and 45% (OR 0.55, $p < 0.001$), respectively, less likely to identify 12 LNs. Similarly, the odds of positive margins at lower volume centers were significantly higher (6-12RP/year OR 1.51, $p 0.04$; 2-6RP/year OR 1.43, $p 0.08$; <2RP/year OR 1.77, $p 0.009$).

Conclusions/Discussion: RP is being utilized with increased frequency for rectal cancer. As the early data from RCTs on the safety of RP matures, it will be important to understand the broad applicability of the results across centers. In our cohort, >50% of the patients had RP at centers doing <6RPs/year. Our data suggest that low volume of RP is associated with worse outcomes, including inadequate LN sampling and positive margins. Future analyses of RP should include data from across the

P357 Table 1

	Robotic Proctectomies/Year					P-value
	Overall	>12	6-12	2-6	<2	
CONVERSION TO OPEN						<0.001
No	7,706 (92%)	936 (98%)	2,229 (95%)	2,702 (92%)	1,839 (87%)	
Yes	641 (7.7%)	21 (2.2%)	119 (5.1%)	228 (7.8%)	273 (13%)	
≥ 12 LNs						<0.001
No	2,105 (25%)	152 (16%)	558 (24%)	753 (26%)	642 (30%)	
Yes	6,194 (74%)	800 (84%)	1,774 (76%)	2,168 (74%)	1,452 (69%)	
Unknown	48 (0.6%)	5 (0.5%)	16 (0.7%)	9 (0.3%)	18 (0.9%)	
MARGINS						0.007
Negative	7,840 (94%)	922 (96%)	2,206 (94%)	2,751 (94%)	1,961 (93%)	
Positive	463 (5.5%)	34 (3.6%)	132 (5.6%)	158 (5.4%)	139 (6.6%)	
Unknown	44 (0.5%)	1 (0.1%)	10 (0.4%)	21 (0.7%)	12 (0.6%)	
30-DAY MORTALITY						0.22
No	5,805 (98%)	754 (99%)	1,674 (98%)	2,034 (99%)	1,343 (98%)	
Yes	51 (0.9%)	4 (0.5%)	14 (0.8%)	16 (0.8%)	17 (1.2%)	
Unknown	49 (0.8%)	5 (0.7%)	18 (1.1%)	11 (0.5%)	15 (1.1%)	
90-DAY MORTALITY						0.17
No	5,702 (97%)	744 (98%)	1,651 (97%)	1,988 (96%)	1,319 (96%)	
Yes	100 (1.7%)	10 (1.3%)	21 (1.2%)	36 (1.7%)	33 (2.4%)	
Unknown	103 (1.7%)	9 (1.2%)	34 (2.0%)	37 (1.8%)	23 (1.7%)	

volume spectrum. Furthermore, attention should be paid not only to appropriately training surgeons to perform RP, but also to ensuring adequate volume and resources to provide quality outcomes.

UNDERUTILIZATION OF LAPAROSCOPY SURGERY FOR ELECTIVE COLON RESECTION IN TEXAS.

P358

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Purpose/Background: Laparoscopic surgery in colorectal resection has shown to reduce mortality, complications, cost, and hospital length of stay. Even with all the benefits, laparoscopic surgery remains underutilized. This study examined the utilization of laparoscopic surgery for elective colonic resection for benign and oncologic diseases in Texas.

Methods/Interventions: We used 100% Texas Medicare Data and included patients undergoing open and laparoscopic colectomy in 2015. Patients over 65 years of age with or without comorbidity/complications (DRG 330 and 331) who underwent elective non-emergent surgery were included. Open and laparoscopic cohorts were further analyzed based on the primary diagnosis of benign disease or cancer. Descriptive statistics were used to evaluate the utilization rate of laparoscopy and hospital characteristics.

Results/Outcome(s): The study included 4,884 patients who underwent colon resection in 311 hospitals in Texas. Patients were primarily non-Hispanic whites (82%), women (60%) with a mean age of 73 .6 years. Of all colectomies, 40% were laparoscopy. Resection for oncologic disease (52%), versus benign disease (48%), was more likely to occur using an open approach ($p < 0.001$). 247 (78%) hospitals had laparoscopy technology available. Hospitals were primarily located in an urban environment (79%) and categorized as private nonprofit hospitals (38%). The mean total procedure volume at hospitals was 307 (± 321.9) colectomies.

Conclusions/Discussion: Less than half of the colectomies performed in Texas for colon resection were laparoscopic. Among Texas Medicare patients, laparoscopic utilization rates fail to keep pace with open procedures for benign and oncologic diseases. Identifying areas of low utilization, as well as patient and hospital characteristics, will permit targeted interventions to improve laparoscopy use and patient outcomes. State legislation incentivizing laparoscopy for elective colon resection, when appropriate, has the potential to improve patient outcomes in Texas.

SIMULATION OF THE EFFECT OF A NATIONAL ACCREDITATION PROGRAM ON DISPARITIES IN RECTAL CANCER CARE.

P359

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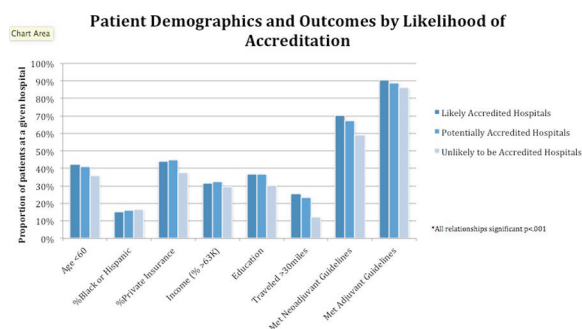
Purpose/Background: Proposed standards for the National Accreditation Program for Rectal Cancer (NAPRC) promote multidisciplinary contributions to ensure quality in rectal cancer care. Recognizing that the requirements for accreditation may be most onerous for lowest-performing institutions, it is unknown whether NAPRC will improve care across all settings or widen disparities. To understand the implications for disparities in the delivery of high quality rectal cancer care, we simulated hospitals' propensity for accreditation and described the characteristics of patients most likely to be served by accredited hospitals.

Methods/Interventions: We queried the National Cancer Database from 2010-13 and composed a composite measure of likelihood of accreditation, based on previously published metrics of rectal cancer surgical quality: annual resection volume and rates of adherence to colon cancer quality guidelines. We characterized hospitals as likely to be accredited centers (LACs: ≥ 20 resections/year, $\geq 85\%$ compliance with lymph node guidelines, and $\geq 50\%$ adherence to adjuvant chemotherapy), potentially accredited centers (PACs: > 10 resections/year and either $\geq 85\%$ compliance with lymph node guidelines or $\geq 50\%$ adherence to adjuvant chemotherapy, or both), or unlikely to be accredited centers (UACs: ≤ 10 resections/year and neither $\geq 85\%$ compliance with lymph node guidelines nor $\geq 50\%$ adherence to adjuvant chemotherapy). Hospitals with other combinations of quality metrics were not further evaluated. We described characteristics of these groups and the patients they serve using chi square tests and ANOVA. We then compared rectal cancer quality metrics by likelihood of accreditation, as a specification test of face validity of the classification scheme.

Results/Outcome(s): Among 1,281 hospitals that performed 76,294 rectal cancer resections, we designated 58 LACs (4.5% of hospitals), 290 PACs (22.6%), and 211 UACs (16.5%). LACs and PACs exhibited higher rates of adherence to chemoradiation for locally advanced rectal cancer, compared with UACs ($p < .001$), validating the classifications. LACs and PACs were more likely to be academic institutions, while the majority of UACs were community hospitals ($p < .001$). Patients treated at LACs were more likely to be younger, white, have higher income, private insurance, a higher level of education, and travel farther for treatment ($p < .001$).

Conclusions/Discussion: We found that hospitals least likely to receive NAPRC accreditation status tend to be community hospitals with lower rates of compliance with rectal cancer quality metrics, serving patients of lower

socioeconomic position with lesser access to resources. In order to avoid exacerbating disparities in access to high quality rectal cancer care, NAPRC must work to be inclusive of lower performing institutions.



INTRACORPOREAL ANASTOMOSIS IN MINIMALLY INVASIVE RIGHT COLECTOMIES IS ASSOCIATED WITH FEWER INCISIONAL HERNIAS AND SHORTER LENGTH OF STAY.

P360

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Purpose/Background: Intracorporeal anastomoses have been associated with several putative benefits including reduced length of stay and reduced risk of incisional hernia (IH). To date, studies comparing these techniques have focused on short-term outcomes. In this study we report short-term complications and incisional hernia rate in patients undergoing minimally invasive right colectomies with intra- and extracorporeal anastomoses for neoplastic disease.

Methods/Interventions: We reviewed the electronic medical records of all patients undergoing robotic right colectomy by a single surgeon from 2013 to 2017. Exclusion criteria were concomitant procedures requiring a laparotomy and lack of at least one follow-up visit. The decision to perform an intra or extracorporeal anastomosis

was based on the availability of the robotic stapler and technical support. The primary outcome was the incisional hernia rate diagnosed either clinically or on postoperative CT, analyzed using time to event analysis. Secondary outcomes included length of stay, surgical site infection (SSI) rate and other postoperative complications using parametric and nonparametric tests. Statistical significance was set at $p < 0.05$. Patients were followed according to NCCN guidelines.

Results/Outcome(s): A total of 170 patients met the selection criteria; 69 had intracorporeal and had 101 extracorporeal anastomoses. Three patients required early conversion to a laparotomy due to the extent of the disease and were considered extracorporeal cases. Groups were similar with respect to age, BMI, smoking history and previous abdominal wall hernias. All but two of the intracorporeal cases were performed using a Pfannenstiel extraction site, while 98% of extracorporeal cases employed a vertical midline incision. Median follow-up time was similar in both groups. The one-year estimated IH rate was 13% after extracorporeal and 0 after intracorporeal anastomoses ($p = 0.02$); none of the IH were in patients with conversion to open surgery. The sole hernia after intracorporeal anastomosis was at a trocar site. Short-term outcomes are presented in Table 1. There were 5 reoperations within 30 days for anastomotic leak (1), mesenteric thrombosis (1), incarceration of non-incisional hernia (1), anastomotic bleeding (1), and thrombosed hemorrhoid (1).

Conclusions/Discussion: This study shows that performing an intracorporeal anastomosis and placing the extraction site in the suprapubic area may reduce the IH rate compared to an extracorporeal anastomosis though a midline periumbilical incision. This can be accomplished without increasing the overall complication rate and potentially shortening the length of stay. These results justify the performance of a prospective randomized trial comparing outcomes after intracorporeal and extracorporeal anastomoses.

P360 Table 1

	Intracorporeal (n=69)	Extracorporeal (n=101)	p
Operative Time, min, median (IQR)	188 (160-215)	154 (125-176)	<0.01
Any Complication n (%)	11 (16)	15 (15)	0.85
CD grade ≥ 3 n (%)	2 (3)	5 (5)	0.70
Return to OR in 90 days	2 (3)	3 (3)	>0.99
SSI	7(10)	5(5)	0.23
SSI- Grades I & II	6 (9)	3 (3)	0.16
SSI- Grades III & IV	1(1)	2 (2)	>0.99
LOS days, median (IQR)	3 (2-3)	4 (3-5)	<0.01
Readmission in 90 days n (%)	5 (7)	10 (10)	0.55

TRENDS IN CLINICAL AND FINANCIAL OUTCOMES AFTER ROBOTIC COLORECTAL SURGERY OVER TIME: WE NEED TO KEEP PUSHING THE TECHNOLOGY ENVELOPE.

P361

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Purpose/Background: While the robotic approach facilitates a minimally invasive approach, a lack of clear demonstration of improved outcomes in the context of greater technological costs may have prevented its greater adoption. With any new technology, whether clinical and financial outcomes have changed favorably over time bears assessment.

Methods/Interventions: From 2012–2014, adult patients who underwent elective robotic colorectal resection were identified from the national Premier Perspective data. Patient demographics, insurance type, primary diagnosis, resection type, co-morbidity, surgeon specialty (colorectal vs. other) and hospital type, region and volume were compared for the 3 consecutive years. Postoperative medical and surgical complications and direct, cumulative, total (including 30-day post-discharge) and resource utilization costs were assessed. Multivariable analyses were performed to evaluate the adjusted trends in these outcomes over the 3 years.

Results/Outcome(s): Of 3,918 robotic procedures, 857(21.9%), 1,397(35.7%) and 1,664(42.5%) were performed in 2012, 2013 and 2014 respectively. There was a reduction in direct admission from home ($p=0.02$) over time. Robotic sigmoid resection (34.4% vs. 29.9% vs.28.8%, $p=0.001$) reduced while anterior resection (23.2% vs. 27.1% vs. 28.3%, $p=0.02$) increased over years. There was greater use of the technology for cancer (diverticular disease 37.2% vs. 30.1% vs. 29.3%, $p=0.0001$; malignancy 42.4% vs. 50.8% vs. 52.5%, $p=<0.0001$). Low ($p=0.003$) and intermediate ($p=0.01$) volume surgeons increasingly used the technology over time. Hospital type and location were the same, however, high ($p=<0.0001$) and intermediate ($p=<0.0001$) volume hospitals were associated with 2012 and 2014 respectively. Complications were similar. Cumulative index admission ($p=0.02$) and total ($p=0.01$) costs increased over time before adjustment. After adjusting for perioperative factors, overall costs were similar across years. However, radiology (Mean[SD]:\$114 [\$472] vs. \$116 [\$428] vs. \$106 [\$352], $p=0.01$) equipment (Mean[SD]:\$29 [\$153] vs. \$23 [\$120] vs. \$24 [\$153], $p=0.01$) and professional (Mean[SD]:\$17 [\$109] vs. \$10 [\$61] vs. \$7 [\$37], $p=<0.0001$) expenses reduced in the recent years. Postoperative complications remained comparable after adjustment.

Conclusions/Discussion: The use of robotic surgery has shifted to more complex conditions (rectum / cancer) and by less experienced surgeons and institutions over time, while clinical and financial outcomes have been

maintained. This suggests that the technology has helped the wider use of the minimally invasive approach for the benefit of surgeons and patients without an escalation of costs. With the continued use and development of robotic technology, costs and efficacy may improve further.

IMPACT OF A POST-DISCHARGE VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS PROGRAM IN PATIENTS UNDERGOING SURGERY FOR COLORECTAL CANCER OR INFLAMMATORY BOWEL DISEASE (IBD).

P362

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Purpose/Background: Prophylactic anticoagulation is routinely used in the inpatient setting for colorectal surgery patients. However, the risk of VTE remains elevated after discharge - perhaps especially in an era of decreasing lengths of stay. Extensive evidence and clinical guidelines suggest post-discharge VTE prophylaxis is critical in patients undergoing colorectal surgery for cancer. Recent evidence suggests that IBD patients are at a similar or increased risk as those with cancer. Post-discharge prophylaxis is infrequently provided to these patients and there are few data available on results of providing it in clinical practice. The purpose of this study is to assess the clinical impact of a systematic post-discharge VTE prophylaxis program on patients undergoing surgery for colorectal cancer or IBD.

Methods/Interventions: We performed a single institution retrospective, non-randomized, pre- (1/1/2012-4/30/2014) and post-intervention (8/1/2014-8/1/2017) analysis of a systematic post-discharge pharmacological prophylaxis program against the primary outcome, post-discharge symptomatic VTE. Patients undergoing surgery for colorectal cancer or IBD with a Caprini score of ≥ 5 on day of discharge were enrolled to receive pre-discharge patient education and bedside delivery of prophylactic low-molecular weight heparin (LMWH) to complete up to a 28-day post-operative course. An institutional American College of Surgeons National Surgical Quality Improvement Program dataset was employed to identify patients and outcomes.

Results/Outcome(s): Among 1265 patients who underwent surgery for colorectal cancer or IBD, 660 (52.2%) were in the pre-intervention cohort and 605 (47.8%) patients were in the post-intervention cohort. Rates of inpatient VTE did not significantly differ between cohorts (0.3%, $n=2$ pre-intervention vs. 0.5%, $n=3$ post-intervention, $P=0.67$). Compared to the pre-intervention cohort, patients in the post-intervention cohort demonstrated a significantly lower post-discharge VTE rate (2.1%, $n=14$ pre-intervention vs. 0.7%, $n=4$ post-intervention,

P361 Adjusted clinical and financial outcomes trends of robotic colorectal surgery over time (2012 – 2014)

Variable	2012 N= 857	2013 N= 1,397	2014 N= 1,664	p-value
Cardiovascular complications, % (SE)	8.2% (0.9)	10.1% (0.8)	10.8% (0.8)	0.4
Respiratory complications, % (SE)	4.9% (0.7)	5.6% (0.6)	4.9% (0.5)	0.4
Neurological complications, % (SE)	0.8% (0.3)	0.6% (0.2)	0.6% (0.2)	0.8
Urinary complications, % (SE)	2% (0.5)	2.4% (0.4)	2.2% (0.4)	0.8
Venous thrombosis or Pulmonary embolism, % (SE)	0.4% (0.2)	0.4% (0.2)	0.8% (0.2)	0.2
Iatrogenic intraoperative injury, % (SE)	0.9% (0.3)	1% (0.3)	1.1% (0.3)	0.9
Paralytic ileus or obstruction, % (SE)	14.4% (1.2)	12.4% (0.9)	12.7% (0.8)	0.3
Other postop GI complications, % (SE)	6.1% (0.8)	6.7% (0.7)	7% (0.6)	1.0
Wound disruption, % (SE)	0.4% (0.2)	0.4% (0.2)	0.5% (0.2)	0.9
Hemorrhage / Transfusion, % (SE)	6.7% (0.9)	5.9% (0.6)	5.2% (0.6)	0.1
Sepsis / septicemia, % (SE)	0.8% (0.3)	0.6% (0.2)	1.2% (0.3)	0.5
Wound/Intra-abdominal infection, % (SE)	7.9% (0.9)	6.3% (0.7)	6% (0.6)	0.2
Intestinal fistula, % (SE)	2.9% (0.6)	2% (0.4)	2% (0.4)	0.3
Direct index admission costs, mean (SD)	\$10,718 (\$19,671)	\$10,371 (\$11,911)	\$10,592 (\$10,674)	0.7
Cumulative index admission costs, mean (SD)	\$19,013 (\$11,912)	\$19,473 (\$12,526)	\$19,759 (\$10,964)	0.9
Total (includes 30-day post- discharge) costs, mean (SD)	\$19,134 (\$12,021)	\$19,631 (\$12,765)	\$19,999 (\$11,341)	0.9
Room and board costs, mean (SD)	\$4,328 (\$5,220)	\$4,547 (\$6,320)	\$4,735 (\$4,922)	0.5
Surgery costs, mean (SD)	\$6,172 (\$3,590)	\$6,299 (\$3,876)	\$6,581 (\$4,216)	0.7
Supply costs, mean (SD)	\$4,793 (\$3,705)	\$4,852 (\$3,897)	\$4,571 (\$3,694)	0.1
Pharmacy costs, mean (SD)	\$1,321 (\$2,842)	\$1,306 (\$1,716)	\$1,326 (\$1,529)	0.7
Anesthesia costs, mean (SD)	\$534 (\$646)	\$560 (\$760)	\$603 (\$774)	0.1
Recovery room costs, mean (SD)	\$459 (\$387)	\$477 (\$395)	\$498 (\$372)	0.4
Laboratory costs, mean (SD)	\$304 (\$469)	\$324 (\$562)	\$314 (\$559)	0.1
Physiotherapy costs, mean (SD)	\$202 (\$764)	\$229 (\$905)	\$211 (\$634)	0.2
Diagnostic procedures costs, mean (SD)	\$22 (\$243)	\$17 (\$127)	\$22 (\$190)	0.6
Therapeutic costs, mean (SD)	\$162 (\$355)	\$175 (\$598)	\$197 (\$1,154)	0.1
Radiology costs, mean (SD)	\$114 (\$472)	\$116 (\$428)	\$106 (\$352)	0.01
Professional costs, mean (SD)	\$17 (\$109)	\$10 (\$61)	\$7 (\$37)	<0.0001
Medical equipment costs, mean (SD)	\$29 (\$153)	\$23 (\$120)	\$24 (\$153)	0.01

Adjusted covariates: age, race, point of origin, procedure, diagnosis, co-morbidity; facility region, size and procedure volume.

Costs were additionally adjusted to the inflation (CPI) of 2014.

SE: Standard Error.

SD: Standard Deviation.

$P=0.03$). There was no significant difference in readmission for post-discharge bleeding events in either group.

Conclusions/Discussion: A systematic post-discharge VTE prophylaxis program providing LMWH for up to 28 days post-operatively to patients undergoing colorectal surgery for cancer or IBD is safe and effective in significantly reducing post-discharge VTE events.

A POPULATION-BASED ANALYSIS OF THE DRIVERS OF SHORT-TERM COSTS FOLLOWING COLORECTAL SURGERY.

P363

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Purpose/Background: Background: Colon and rectal resections are commonly performed for a variety of benign and malignant disease. The morbidity and mortality following resection is responsible for significant healthcare utilization and therefore identifying areas to create efficiencies is essential for decreasing healthcare cost in a resource limited system. **Objective:** The purpose of this study was to characterize predictors of excess short-term costs associated with all colon and rectal resections performed in a national cohort of Canada.

Methods/Interventions: Methods: This was a population based retrospective analysis of colon and rectal resections with anastomoses performed between April 2008 - March 2015 in Canada (excluding Quebec). Total inpatient cost for all colorectal resections were calculated. All figures were in 2014 Canadian dollars. Adjustments were made for demographics, comorbidities, complications, operative technique, hospital and surgeon. Costs were modeled using a linear regression utilizing MCMC estimation.

Results/Outcome(s): Results: 108,304 patients were identified for the analysis. Multivariable regression showed the adjusted average cost of a 50-year-old male undergoing open colon resection for benign disease with no comorbidities or complications was \$9270 (95% CI \$7146-\$11,624; $P=<0.001$). With adjustment for complications, laparoscopic colon resections carried a cost savings of \$1390 (95% CI \$1682 - \$1099; $P=<0.001$) when compared to open resections. Conversely, when incorporating complication costs for each modality, laparoscopic colon resection saved \$5111 [AD1] [Office2] (95% CI \$5533-\$4690; $P=<0.001$) when compared to open resection. Complications were the main driver for increased costs as anastomotic leaks added \$9129 (95% CI \$8583-\$9670; $P=<0.001$). In addition, medical complications such as renal failure requiring dialysis (\$16,939, 95%CI \$15,547-\$18,314; $P=<0.001$) and ICU admission (\$2,840/day, 95%CI \$2814-\$2866; $P=<0.001$) carried significant cost.

Complications requiring reoperation cost \$16,313 (95% CI \$15,739-\$16,885; $P=<0.001$).

Conclusions/Discussion: Conclusion: Major drivers of increased resource utilization include both medical and surgical complications with a significant cost associated with re-operation. There is a clear cost advantage to laparoscopic colorectal resections with or without adjustment for complications. While not all complications can be avoided, reducing certain complications can result in considerable cost savings.

A COMPARISON OF PERIOPERATIVE OUTCOMES USING DAVINCI XI VERSUS SI FOR COLON AND RECTAL SURGERY.

P364

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Purpose/Background: At our institution, we previously studied our robotic outcomes against our laparoscopic data and found fewer conversions to open procedures, and shorter length of stay. There is little data available comparing the two widest used robotic surgical platforms for colon and rectal surgery. The majority of the literature focuses on small case control studies. The main arguments against robotic surgery are the overhead cost and the learning curve. We aimed to compare the newest robotic platform (Xi) with its older counterpart (Si) for a variety of colorectal operations.

Methods/Interventions: IRB approved retrospective chart review was conducted. Patients undergoing robotic surgery on either platform (Si or Xi) by 3 colorectal surgeons at Robert Wood Johnson University Hospital from January 2011 through June 2017 were identified. Intergroup differences were tested with Chi-square and multivariable logistic regression analysis, controlling for age, gender, ASA, procedure, and robotic platform for categorical variables; Wilcoxon rank sum test and generalized linear modeling with the same controlling for numeric variables.

Results/Outcome(s): 415 charts were reviewed and 349 patients were included in the final analysis. 127 patients underwent surgery on the Si, and 222 patients had surgery on the Xi, for a variety of colorectal indications including polyps, cancer, diverticulitis, prolapse and IBD. There were no differences in the groups with regard to ASA, BMI, gender, or distribution of diagnoses, but patients in the Xi group were older than in Si (59.4 ± 14.0 versus 56.3 ± 14.3 years, $p<.05$). The average conversion rate from robotic to open surgery did not differ between the Si (11.0%) and Xi (7.2%) ($p=.22$) nor did the complication rates (14.1% vs 11.3% $p=.43$). However, the OR costs were significantly different at a median of \$5,220 (IQR 4,149-6,513) for the Si, and \$3,713 (3,037-4,429) for the Xi ($p<.001$), which

was confirmed in the multivariable analysis (OR [odds ratio]=1.47, 95%CI [confidence interval] 1.37-1.59). The total hospital costs were not statistically different. The duration of the SI procedures (median 269 minutes, IQR 212-306) was significantly greater compared to Xi (232 minutes, IQR 191-282, $p=0.0012$); OR=1.07, 95%CI 1.011-1.128 in the multivariable analysis. The length of stay for patients after Si (4 days [3-6]) was also greater than Xi (3 days [3-4], $p=0.004$); OR=1.22, 95%CI 1.17-1.33.

Conclusions/Discussion: Both generations of DaVinci robot offered similar outcomes with regards to conversion rate and complications. However, the Si proved to be more costly operatively when compared with the Xi. Those operated on by the Xi platform also stayed in the hospital a day less than those on the Si. These results may be partly due to learning curve of surgeons throughout the 6 year study period, as well as implementation of ERAS protocols. The procedure length and OR costs also decreased with the Xi compared to the Si.

CLOSTRIDIUM DIFFICILE COLITIS IN THE SETTING OF HYPOVOLEMIC SHOCK.

P365

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Purpose/Background: *Clostridium difficile* colitis (CDiff) is relatively common in hospitalized patients with worse outcomes reported in septic shock. We looked at patients in hypovolemic shock to determine what physiologic changes impact the development and outcome of CDiff.

Methods/Interventions: Using the Glue Grant database, adults > 18 years with blunt traumatic hemorrhagic shock were divided into two groups: Those who developed CDiff and those who did not (NoCDiff). Variables were compared using univariate analysis and risk factors for CDiff and mortality were determined using multivariate analysis.

Results/Outcome(s): In total 1,976 adults were analysed, 49 (2.5%) developed CDiff during the course of their hospitalization. There was no significant difference in mean age (43 ± 18 years), sex, home medications or comorbidities (except CDiff patients had higher rate of prior myocardial infarction 12.2% vs. 2.6%, $p=0.002$). CDiff were found to be more severely injured: Injury severity score 36 ± 11 vs 32 ± 14 , $p=0.014$, with higher pre-hospital shock index 1.4 ± 0.7 vs. 1.2 ± 0.6 , $p=0.043$, more pre-hospital crystalloids given 3416 ± 2975 vs. 2102 ± 2167 , $p=0.003$, lower emergency room (ER) hemoglobin 9 ± 2.6 vs. 10 ± 2.7 , $p=0.019$ and higher international normalized ratio 1.8 ± 0.8 vs. 1.5 ± 0.9 , $p=0.009$. ER vitals, lactate level and base deficit were no different. On ICU admission, CDiff had higher APACHEII score 31 ± 6 vs. 29 ± 7 , $p=0.029$, and Marshall organ dysfunction score 6 ± 3 vs

5 ± 3 , $p=0.008$ and higher rates of ARDS 38.8 vs 23.1%, $p=0.011$ and nosocomial pneumonia 46.9% vs. 28.2%, $p=0.005$ (although there was no difference in the rates of other nosocomial infections such as UTI, surgical site infections or catheter related infections). There was also no difference in the rates of laparotomy or abdominal compartment syndrome, and resuscitation blood products, crystalloids, vasoactive agents, parenteral or enteral calories given or steroid administration. CDiff had longer length of ICU stay 19 ± 13 days vs. 13 ± 13 days, $p=0.001$ and higher rate of unplanned ICU readmission (18.3% vs. 7.3%, $p=0.010$). The mortality rate in CDiff was 8.1% with no difference between the two groups. The CDiff patients had a higher rate of nursing rehabilitation discharge, 75% vs 46%, $p=0.003$. Vasopressors, measures of physiologic status and overall volume of fluid administered were not found to be independent risk factors for the development of CDiff or subsequent mortality.

Conclusions/Discussion: Although CDiff patients were more severely injured and resuscitated more aggressively during pre-hospital transport, they were hemodynamically similar during hospitalization with mildly elevated organ dysfunction scores. The only additional higher rate of infectious complications were respiratory related. Measures of hypoperfusion and the amount of resuscitation or vasoactive agents had no independent effect on CDiff incidence or outcome.

AUTOMATED POST-DISCHARGE SURVEILLANCE REDUCES AVOIDABLE HOSPITAL READMISSIONS - OUTCOMES FROM THE ACS-NSQIP DATABASE.

P366

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Purpose/Background: Thirty-day readmission following operative intervention has become a quality performance measure. The aim of this study was to investigate the effect of an automated post-discharge surveillance (APDS) program in reducing avoidable readmissions following colorectal surgery.

Methods/Interventions: The American College of Surgeons National Surgical Quality Improvement Program database was queried for adult patients who underwent colorectal resection at our single center, tertiary care institution during a one year (2016-2017) time period, using procedure specific CPT codes. The incidence of avoidable readmissions and cost was compared between patients who were and were not enrolled in an APDS program as part of an enhanced recovery pathway. An avoidable readmission was defined as a return hospitalization for a complication that may have been managed safely at home had it been identified sooner.

Results/Outcome(s): Two hundred and nine patients who underwent open, laparoscopic or robotic colorectal resections were identified. Of these, 187 (89.5%) patients were enrolled in an APDS program and 22 patients (10.5%) were not enrolled. Reasons for not initiating APDS included no access to a smartphone, patient refusal, nurse inexperience, non-participating surgeon, and English not being the patient's primary language. Overall, there were 25 (12%) readmissions within 30 days of hospital discharge. The majority of hospital readmissions occurred in non-APDS enrolled patients (60%, n=15), whereas APDS enrolled patients comprised 40% (n=10). Sixty percent (9 of 15 patients) in the non-APDS group had avoidable readmissions, compared to only 10% (1 of 10 patients) in the APDS group. Utilization of an APDS program was associated with a 50% absolute reduction in avoidable readmissions. The total expenditure for hospital readmissions was \$311,349. Avoidable readmissions contributed to 24% (\$75,488) of this cost. With APDS, avoidable readmission costs totaled \$4,260, whereas in the non-APDS group, avoidable readmission costs were higher, totaling \$71,228 with an average cost per readmission of \$7,914.

Conclusions/Discussion: In our study, an automated post-discharge surveillance program substantially reduced avoidable readmissions within 30-days of hospital discharge after colorectal surgery. This type of primary prevention strategy improves the patient's transition from hospital to home and contributes to significant hospital cost savings.

REAL-TIME AUDITING OF AN ENHANCED RECOVERY PROGRAM (ERP). WHAT THE TRUTH REVEALS.

P367

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Purpose/Background: Clinical practice guidelines for ERPs after colorectal surgery have been published and are widely utilized. These programs vary in complexity and components but are proven to effectively improve clinical outcomes and cost of care. Real-time audits of ERPs may help develop processes that ensure compliance with these

programs. We sought to evaluate how real-time auditing of our institutional ERP impacted compliance and outcomes within our colorectal patient population

Methods/Interventions: As a quality initiative this study was exempt from IRB approval. Data was gathered between September 2016 and September 2017. Pre-, peri- and postop we looked at 40 components of our program. Audits were performed during this time frame real-time by a nurse data manager, weekly by a nurse data manager and surgeon and monthly with ERP team. Feedback was given to residents and nurses as deficiencies were identified. Statistical analysis was performed with Chi-Square and T-test, p value set at 0.05

Results/Outcome(s): 70 patients were enrolled in our ERP program during the study timeframe. We compared compliance from the first 6 months to the latter 6 months of our audit. Compliance improved statistically use of our standardized postop order set (36.36% vs 75.68%, p=0.0010), complex carbohydrate loading (45.45% vs 78.38%, p=0.0421) and use of oral abx (24.24% vs 59.46%, p=0.0320). Audit improved the appropriate use of preop iv antibiotics (33.33% vs 83.78%, p<0.0001). Good compliance was found during both times frames with preop dosing of alvimopan (90.91% vs 94.59%, p=NS), gabapentin (84.85% vs 94.59%, p=NS) and acetaminophen (87.88% vs 97.3%, p=NS) and did not statistically change between the two timeframes. There was good compliance with TAP blocks over the year (90.91% vs 91.89%, p=NS). Struggles of improving compliance was related to postoperative overuse of alvimopan (18.18% vs 19.92%, p=NS) despite non-statistical decrease in open/conversions between the timeframes (24.24% vs 13.52%, p=NS). Following a regimented discharge pain medication plan (meds, dosing, number of tablets) is were significant deficiencies were found. In the first 6 months of our audit no patient discharged from our ERP had discharge medication ordered as was intended. This statistically improved over the latter 6 months of study period but needs further improvement (0% vs 27.3, p=0.0013). Outcomes such as length of stay, and 30 day complications did not differ between the two timeframes but trends were noted both in relation to 30 day readmissions (15.15% vs 8.11%, p=NS) and ED visits (12.12% vs 8.11%, p=NS).

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Avoidable Readmissions	APDS patients	Non-APDS patients
Superficial infection		2
Clostridium difficile infection	1	2
Post epidural headache		1
Nausea		1
High ileostomy output		2
Urinary retention		1

APDS: Automated Post-discharge Surveillance

Conclusions/Discussion: Real-time auditing of an ERP can improve compliance and identify cost saving strategies. Although none of the deficiencies can be clearly tied to clinical outcomes better compliance may help reduce hospital and ED readmissions.

DOES THE IMPLEMENTATION OF AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL DECREASE THE INCIDENCE OF WOUND INFECTIONS IN COLORECTAL SURGERY?

P368

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Purpose/Background: Enhanced recovery after surgery (ERAS) programs standardize perioperative care to reduce length of hospital stay, complications and costs. The aim of our study was to examine the role of ERAS programs in reducing the incidence of postoperative surgical site infections in colorectal resection patients.

Methods/Interventions: This is a retrospective study conducted at a single, tertiary care center of patients who underwent open, laparoscopic, and robotic right hemicolectomy and low anterior resection before ERAS implementation (2012- 2014) and after ERAS implementation (2015-2017). Baseline peri-operative characteristics and the 30-day surgical site infection rate were compared between each group.

Results/Outcome(s): Of the 454 patients who underwent colorectal resection, 258 (56.8%) were non-ERAS patients and 196 (43.2%) were ERAS patients. Both groups had similar perioperative baseline characteristics with respect to age (63.5 ± 14.5 vs. 64 ± 13 years), gender (62% female), ASA class, smoking history, immunosuppressant history, and incidence of stoma creation at the time of the index surgery ($P = .05$). ERAS patients had significantly more intra-abdominal abscesses at the time of the index surgery compared to non-ERAS patients (10% vs. 5%, $P = 0.02$). There were a total of 45 (10%) surgical site infections. Surgical site infections occurred more frequently in non-ERAS (11%, $n = 28$) patients compared to ERAS patients (9%, $n = 17$), although this was not statistically significant ($P = 0.60$). Thirty-four (76%) of the surgical site infections were superficial, with 59% ($n=20$) occurring in non-ERAS patients and 41% ($n=14$) occurring in ERAS patients. Of the 11 deep/organ space infections, 8 (73%) occurred in non-ERAS patients and 3 (27%) occurred in ERAS patients. After adjusting for multiple medical comorbidities in logistic regression, the ERAS protocol in colorectal surgery reduced the odds of overall surgical site infection by 20% compared to non-ERAS patients, although this was not statistically significant (OR 0.80, CI .42-1.52, $P = .50$).

Conclusions/Discussion: Our data suggests implementation of an ERAS protocol reduces the risk of surgical site infections in colorectal resection patients. This finding indicates using ERAS protocols leads to major improvement in reducing postoperative colorectal surgical site infections.

THE CORRELATION BETWEEN ANAL PAP CYTOLOGY AND HISTOPATHOLOGIC OUTCOMES IN HIV-POSITIVE MALES.

P369

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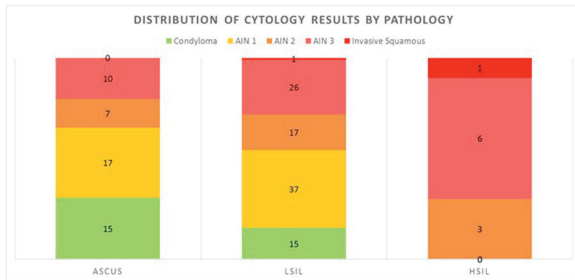
Purpose/Background: Background: The Human Papillomavirus (HPV) is the most common sexually transmitted infection in the work and is an identifiable source of anogenital carcinomas and condylomas. The use of anal pap cytology has been accepted as a screening method for anal intraepithelial neoplasia (AIN), however the reported overall sensitivity and specificity of anal pap cytology is variable. Therefore, the aim of this study is to examine the correlation between anal pap cytology and tissue histology as well as identify any predictive risk factors for more advanced histology in low risk HIV-positive males. .

Methods/Interventions: Methods: Consecutive male patients with a history of HIV infection who presented to a tertiary care colorectal clinic with abnormal anal pap cytology and who underwent surgical resection within six months were studied. Patients without operative pathology were excluded. Cytology and operative pathology were compared in a cross tabulated table via Spearman rank-order correlation. For patients with low grade cytology (ASCUS and LSIL) risk factors for high grade histology (AIN 3 and invasive squamous carcinoma) including age, sexually transmitted infections, CD4 counts, tobacco usage, high risk HPV status, presenting symptoms and prior history of HPV vaccination were analyzed.

Results/Outcome(s): Results: Between 2012 and 2017, 155 patients met criteria and underwent chart review. The mean age was 39 and 50% were Caucasian. In terms of anal pap cytology, 32% were diagnosed with ASCUS, 62% with LSIL, and 6% with HSIL. Distribution of operative pathology included 19% condyloma, 35% AIN 1, 17% AIN 2, 27% AIN 3 and 1% invasive squamous cancer. There was positive correlation between increasing pap cytology and increasing pathology ($r=0.27$; $p=0.0008$). (Figure) Patients with low grade cytology (ASCUS/ LSIL) were divided into two groups based on having either low or high-grade histology. Comparison of risk factors between the two groups showed no significant association.

Conclusions/Discussion: Conclusions: Anal pap testing has a weak, but significant correlation with operative pathology as indicated by HSIL and LSIL findings on

cytology, which correlate with more serious pathological results. No risk factors identified, other than cytology predict more advanced histology. This would suggest that even those with less concerning anal paps should be referred for anoscopy and possible EUA.



“RELAPAROSCOPY” TO TREAT EARLY COMPLICATIONS FOLLOWING COLORECTAL SURGERY.

P370

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Purpose/Background: Laparoscopic surgery has already shown clear benefits that could also be useful in emergency situations such as early reoperations after colorectal surgery. The aim of this study is to evaluate the safety and feasibility of laparoscopic reintervention (“relaparoscopy”) to manage postoperative complications after laparoscopic colorectal surgery.

Methods/Interventions: A retrospective study based on a prospectively collected database was performed between June 2000 to August 2017. Patients that underwent a laparoscopic surgery who required a reoperation were included. The series was divided in Group 1 (G1): patients reoperated by laparoscopy (relaparoscopy) and Group 2 (G2) patients reoperated by laparotomy. Demographic data, hospital stay, type of complications, number of reoperations, morbidity and mortality were analyzed. Data were statistically analyzed using Student’s t test and chi square test.

Results/Outcome(s): A total of 1632 patients underwent laparoscopic colorectal surgery during the period of time were analyzed. One hundred forty one (8,6%) patients required a reoperative surgery. Of them, 89 (63,1%) were included in G1. No differences were identified in demographic aspects (age, gender, BMI, ASA, prior surgeries, comorbidities) between the groups. When the initial surgery was converted or surgical time was longer the reoperations was performed by laparotomy in the majority of cases [(conversion G1: 5,6%, G2:24,4%, p:0,1) and (Surgical time G1: 172 vs. G2: 229 min, p:0,002)] The most common findings at reoperative surgery was anastomotic leakage 87/141 which was more feasible to be treated

by laparoscopic [G1: 62/89 (69.6%), G2: 19/45 (42%), p: 0,03], whereas wound complications 14/141 [(G1: 5/89 (5.6%) G2: 9/45 20%, p: 0,01)] and bowel perforation [(G1: 3/89 (3.3%) G2: 5/45 (11.1%), p: 0.003) were more suitable to be treated by laparotomy. Time elapsed between the original surgery and the reoperation was shorter in G1 (G1: 4.6 vs. G2: 6 days, p: 0,01). Although there were no statistically differences, there was a tendency of having a decrease length of stay in the laparoscopic group (G1: 10.8 vs. G2: 13.6 days, p: 0,1).

Conclusions/Discussion: Relaparoscopy is safe and feasible for treating early postoperative complications, particularly to manage anastomotic leakage.

CLINICAL OUTCOMES OF HARTMANN RESECTION: BENIGN VS. MALIGNANT ETIOLOGY.

P371

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Purpose/Background: Hartmann resection is performed for both benign and malignant etiologies, and is associated with high morbidity and mortality. We aim to study both short (30-day) and long term clinical outcomes after Hartmann resection to test the hypothesis that outcomes differ based on indication for operation (benign vs malignant).

Methods/Interventions: Retrospective cohort study conducted at tertiary university teaching hospital. All patients who underwent Hartmann resection from 2010 to 2015 were included in the study. Patient demographics, co-morbidities, operative and peri-operative variables were retrieved from electronic charts by retrospective review. Patients were divided into benign and malignant groups and analyzed with specific emphasis on short term morbidity, mortality and long term outcomes including disposition and stoma reversal. The chi-square test or Fisher’s exact test is used and P-values less than 0.05 are considered statistically significant. Continuous variables were analyzed with t-test.

Results/Outcome(s): Total of 126 patients are categorized into two groups: benign (101 pts) and malignant (25 pts). All patients in benign group had complicated diverticulitis and malignant group had complicated colon or rectal adenocarcinoma. Mean age and BMI are 66, 29.0 in benign group; and 72, 29.7 in malignant group. More females (p values 0.015) and emergency cases (p value 0.001) noted in benign group. Smoking (p value 0.144), Diabetes (p value 0.519), preoperative steroid use (p value 0.692) and poor functional status (partial or total dependency) (p value 0.176) are similar in both groups. Short term and long term post-operative morbidity and mortality is shown in table 1. Higher superficial surgical site infections (p value 0.0019) in short term and lower

stoma reversal (p value 0.014) in long term is observed in malignant group.

Conclusions/Discussion: Hartmann resection when performed for malignant indication, results in higher superficial surgical site infections in short term and lower chance of stoma reversal in long term.

EVALUATING ACCURACY OF “HEMORRHOID”: REFERRAL COMPARISON ACROSS SPECIALTIES AND SYMPTOMS.

P372

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Purpose/Background: A large proportion of patients with anorectal complaints are referred to colorectal surgeons with the label of “hemorrhoids”. Objectives are to review presenting symptoms, frequency of accurate diagnosis, and analyze determinants of misdiagnosis in order to guide educational endeavors.

Methods/Interventions: The charts of patients referred to colorectal clinic with the diagnosis of “hemorrhoid” were reviewed from 2012 to 2017. Univariable analysis was performed to assess accuracy in the referring providers diagnosis of hemorrhoids based patient presentation and physician specialty. Multivariable regression analysis was performed to determine predictors of correct or incorrect diagnosis

Results/Outcome(s): Review of charts identified 476 patients with the referral diagnosis of hemorrhoids. The most common presenting symptoms were bleeding 63% (n=302), pain 48 % (n=228) and protrusion 39% (n=185). The referral diagnosis of hemorrhoid was accurate in 65% (n=311) (Table1). Patients presenting with pain or protrusion were most likely to be correctly diagnosed. Among patients with incorrect hemorrhoid diagnoses (35%, n=169), the most common actual diagnoses were anal fissure (34%), skin tag (27%) and hypertrophied papilla (6%). One rectal and 2 anal carcinomas were found. Univariable comparison showed that compared to general practitioners, gastroenterologists had 86% higher odds of correct diagnosis [Odds Ratio: 1.86, 95% CI: 1.1-3.1, p=0.02] while the gynecologists had 68% lower odds of correct diagnosis at the time of referral [Odds Ratio: 0.32, 95% CI: 0.1-0.8, p=0.02]. On multivariable analysis, referring specialty was not predictive of accurate diagnosis. Patients presenting with protrusion had 73% higher odds of accurate diagnosis compared to those without, regardless of referral physician specialty [Odds Ratio: 1.73, 95% CI: 1.1-2.7, p=0.02]. Patients presenting with pain [Odds Ratio: 1.6, 95% CI: 1.1-2.5, p=0.03] or pruritus [Odds Ratio: 2.5, 95% CI: 1.2-5, p=0.008] were more likely to have been incorrectly diagnosed. Perianal exam was performed in only 48% of patients prior to referral to CRS, but was not significantly associated with accurate diagnosis (p=0.18).

P371 Table1

		All Patients		Benign		Malignant		P Value
		N	%	N	%	N	%	
Postoperative Morbidity and Mortality								
Superficial Surgical	No	117	92.9	98	97	19	76	0.0019
Site Infection	Yes	9	7.1	3	3	6	24	
Organ/Space SSI	No	121	96	98	97	23	92	0.2577
	Yes	5	4	3	3	2	8	
Fascial	No	122	96.8	97	96	25	100	0.5838
Dehiscence	Yes	4	3.2	4	4	0	0	
Unplanned	No	116	92.1	93	92.1	23	92	1
return to OR	Yes	10	7.9	8	7.9	2	8	
Readmission	No	114	90.5	94	93.1	20	80	0.0607
<30 days	Yes	12	9.5	7	6.9	5	20	
Hospital Discharge	Expired	12	9.7	10	10.1	2	8	0.8886
Destination	Home	74	59.7	59	59.6	15	60	
	Rehab	4	3.2	4	4	0	0	
	Separate acute care	2	1.6	2	2	0	0	
	Nursing Home	32	25.8	24	24.2	8	32	
Stoma Reversal	No	79	62.7	58	57.4	21	84	0.014
	Yes	47	37.3	43	42.6	4	16	
Length of Hospital	Mean	15.1(1.0)		15.2(1.1)		14.8(2.5)		0.897
Stay	(Standard Error)							

Conclusions/Discussion: A variety of anorectal complaints are diagnosed as hemorrhoids by those providers who have initial contact with the patients. Educational programs directed towards improving physician knowledge can potentially improve diagnostic accuracy and earlier initiation of appropriate care. Presenting symptoms other than protrusion lead to higher rate of misdiagnosis by referral physician

Table 1: Presenting symptoms of patients presenting to colorectal clinic

	Total N=476 (100%)	Correct Hemorrhoid Diagnosis n=311 (65%)	Incorrect Hemorrhoid Diagnosis n=165 (35%)	P-value
Presentation				
Pain	228(48)	137 (60)	91 (40)	0.026
Protrusion	185(39)	135 (73)	50 (27)	0.006
Pruritus	44(9)	21(48)	23(52)	0.01
Bleed	302(63)	203 (67)	99 (32)	0.27
Anal Leakage/Seepage	22(5)	14 (64)	8 (36)	0.82
Change in Bowel Habits	10(2)	8 (80)	2 (20)	0.51

Table 1: Presenting symptoms of patients presenting to colorectal clinic

IS IT POSSIBLE TO PREDICT PRESCRIPTION OBSTRUENT FOR PATIENTS WITH AN ILEOSTOMY?

P373

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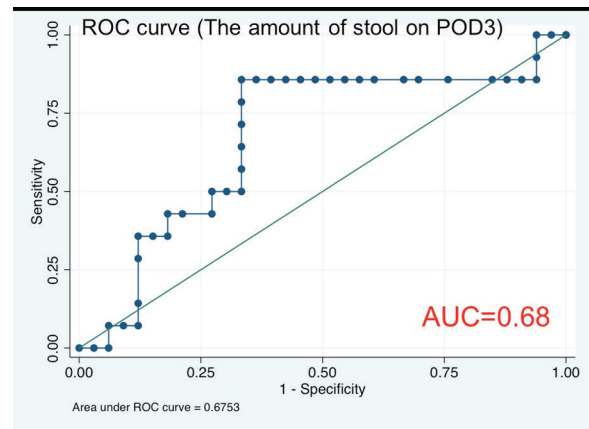
Purpose/Background: As the choice of a sphincter saving operation, the number of patients with a temporary ileostomy is increasing. The stool from ileostomy is water diarrhea or muddy stool. It is necessary to control the balance of body fluid due to the amount of stool from ileostomy. We sometimes need to prescribe obstructant. In this study, we evaluate the relationship between the amount of stool from ileostomy and the prescription obstructant.

Methods/Interventions: Between March 2012 and March 2017, patients with ileostomy operation were included. The amount of stool from ileostomy was measured daily (postoperative day1; POD1, POD2, POD3, POD5). The relationship between the amount of stool from ileostomy and the prescription obstructant at the time of hospital discharge was assessed statistically.

Results/Outcome(s): A total of 49 patients, 23 laparoscopic surgery and 26 open surgery, were included in this study and obstructant was prescribed in 14 patients (28.6%). The amount of stool on POD1,2,3,5 did not reach a statistically significant level. From the data obtained by the 2D method, an ROC curve was drawn. The area under the curve was calculated as 0.53(POD1),

0.50(POD2), 0.68(POD3), 0.64(POD5), which indicated that the amount of stool on 3POD had strong abilities to predict prescription obstructant. A cut-off value of prescription obstructant was estimated at 500mL. Using this cut-off value, the amount of stool on POD3 predict prescription obstructant for patients with an ileostomy (Odds ratio =8.00[1.55-41.2], p=0.01).

Conclusions/Discussion: To measure the amount of stool especially on POD3, we can predict the prescription obstructant for patients with an ileostomy. The measurement of the amount of stool on POD3 allows for early intervention and patients can avoid from dehydration.



THE USE OF HUMAN DERMAL ALLOGRAFT (CYMETRA®) FOR THE TREATMENT OF CHRONIC PILONIDAL DISEASE: COMPARISON TO TRADITIONAL SURGICAL METHODS.

P374

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Purpose/Background: Pilonidal sinus disease is a common condition affecting young adults. It is often associated with pain, drainage, and restriction of daily activities. There is no consensus on treatment and traditional surgical excision comes with significant morbidity. More conservative measures, like the use of human dermal allograft (Cymetra®), have been explored with varied success.

Methods/Interventions: After IRB approval, a retrospective review was performed for patients undergoing surgical treatment of pilonidal sinus disease between 2004 and 2015. Clinicopathologic data, perioperative outcomes and recurrence were studied.

Results/Outcome(s): Two hundred three patients underwent surgical treatment for pilonidal disease in the study period. One hundred thirty-one (64.5%) were treated by curettage with Cymetra® instillation (CWCI) while 50 (24.6%) patients had surgical excision (SE). Median age was 25 years with the average length of follow-up being

8.52 months. Recurrence at two years was 27% in the CWCI group versus 22% in those undergoing SE regardless of prior surgical intervention. Twenty-two percent of each group required reoperation. In patients without previous pilonidal surgery, 27.1% of the CWCI group and 31.1% of SE group recurred by two years ($p=0.7$).

Conclusions/Discussion: Curettage with Cymetra[®] instillation is an effective surgical option in the treatment of pilonidal sinus disease and carries low morbidity when compared to surgical excision. For well selected patients without prior surgical intervention, recurrence rates are similar to surgical excision. As such, CWCI should be considered in early management of chronic pilonidal disease.

HEMORRHAGING HEMORRHOIDS: PREOPERATIVE BLEEDING REQUIRING TRANSFUSION IS AN UNDER-REPORTED INDICATION FOR HEMORRHOIDECTOMY.

P375

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Purpose/Background: Although hemorrhoids represent a common cause of asymptomatic lower gastrointestinal bleeding, clinically significant hemorrhage from hemorrhoids is believed to be rare. The true incidence of bleeding requiring blood transfusion is not well reported. We hypothesized that the prevalence of significant hemorrhage from hemorrhoids was higher than estimated, and sought to identify risk factors for blood loss requiring transfusion.

Methods/Interventions: All patients undergoing surgical hemorrhoidectomy at a single institution from January 2012 to June 2017 were retrospectively identified. Patients with documented cirrhosis were excluded due to the confounding nature of rectal varices. Preoperative hemorrhoidal bleeding requiring blood transfusion was identified by chart review, as were selected patient characteristics. Univariate analyses, including Wilcoxon rank-sum, Chi-square, and Fisher's exact tests compared

patients requiring hemorrhoidal-related blood transfusions to those who did not. Multivariable logistic regression evaluated for factors associated with transfusion, including age and use of anticoagulants.

Results/Outcome(s): Three hundred sixty-four patients were identified and included in the analysis. Of these, 287 (78.9%) patients experienced bleeding from hemorrhoids, and 29 (8.0%) experienced clinically significant hemorrhage requiring blood transfusion. There were no significant differences in age, sex, or aspirin use between the two groups. A greater proportion of patients requiring blood transfusion were on either an anticoagulant or antiplatelet agent, though this difference did not reach statistical significance (Table). Multivariable logistic regression controlling for patient age identified the usage of an anticoagulant or antiplatelet agent as a risk factor for hemorrhoid-related blood transfusions (OR 3.6, $p=0.039$).

Conclusions/Discussion: This single institution study identified preoperative bleeding requiring blood transfusion in 8% of all hemorrhoidectomy patients over a 5-year period. Additionally, the use of an anticoagulant or antiplatelet agent was independently associated with the need for a hemorrhoid-related blood transfusion. Future research will be needed to further evaluate the implications of this under-recognized complication of hemorrhoids.

SETONS PRIOR TO DEFINITIVE SURGERY FOR COMPLEX TRANSPPHINCTERIC ANAL FISTULA – DO THEY COMPLICATE THEIR WELCOME?

P376

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Purpose/Background: Patients presenting with complex transsphincteric anal abscess fistula require control of sepsis, confirmation of the anatomical extent of the fistula, maturation of the fistula tract, and selection of an operation to avoid recurrence and incontinence. Draining setons have been utilized for these purposes however the material used for the seton, interval to corrective surgery

P375 Risk Factors for Bleeding Requiring Transfusion Prior to Hemorrhoidectomy

	Required Transfusion	%	No Transfusion	%	p value
Total Patients	n = 29	8.0%	n=335	92.0%	
Age [median, IQR]	53	[40 - 62]	50	[47 - 60]	0.290
Sex (Male)	16	55.2%	13	45.7%	0.325
Aspirin	7	24.1%	63	18.8%	0.485
Anticoagulant	3	10.3%	15	4.5%	0.165
Antiplatelet	1	3.5%	1	0.3%	0.153
Anticoagulant or Antiplatelet	4	13.8%	16	4.8%	0.064

with associated seton complications, and surgical cure of the fistula have not been widely analyzed in longitudinal studies.

Methods/Interventions: After Internal Review Board approval, a retrospective review of our prospective database was performed. From 1/1/2011 to 12/31/2014, 304 consecutive patients who underwent placement of a seton for transsphincteric anal fistula were identified by Current Procedural Terminology codes (CPT) and followed to 9/30/2017. For comparative analysis, these cases were stratified into categories of standard transsphincteric fistula, horseshoe fistula, Crohn's or ulcerative colitis fistula with or without a pouch, and rectovaginal fistula. Statistical analysis was performed using SPSS19.0 (IBM, Armonk, NY, USA).

Results/Outcome(s): 13 patients were lost to follow up within 4 weeks after a seton was placed leaving 291 patients for analysis. There were 188 males and 103 females of a mean age of 44 (range 13-82) years and a mean BMI of 27.5. 173 setons were coated polyester (59%) and 118 (41%) were vessel loops. 64 of 291 (22%) patients developed recurrent abscesses with indwelling setons at the secondary opening, 38/172 (22%) occurred with coated polyester setons and 26/118 (22%) occurred with vessel loops ($p>0.99$). 29/291 (10%) setons were disrupted and replaced. 291 patients required 572 operations following the index seton (mean = 1.97) over the 4-year time period; drainage and debridement 23.4%, fistulotomy 21.2%, LIFT 20%, seton replacement/exchange 18%, ERAF 6.3%, plug/glue 4%, cutting seton 3%, gracilis flap 1%, APR 1%, diversion 1%, mesh 1%. Table 1 demonstrates 6 categories of complex fistula, interval to curative surgery and success of fistula closure. 64% (186/291) of all transsphincteric fistula remained closed during the follow-up period. 79% (83/105) of cases with persistent fistula had indwelling setons at their last follow-up.

Conclusions/Discussion: Indwelling setons, although integral to the treatment of complex transsphincteric anal fistula, are associated with recurrent abscesses at the secondary opening (22%) as well as seton disruption (10%). 291 patients with an initial seton required 572 operations for an overall cure rate of 64%. The treatment of transsphincteric fistulas continues to be challenging despite the initial placement of a seton.

Transsphincteric fistula	Mean # of months from index seton to curative procedure	Fistula cure rate %	Follow-up after fistula closure (months)
Standard (n=170)	8	76%	12
Crohn's (n=77)	22	36%	21
Pure horseshoe (n=25)	12	76%	20
Pure rectovaginal (n=8)	4	50%	4
Ulcerative colitis without pouch (n=3)	6	67%	29
Ulcerative colitis with pouch (n=8)	18	44%	29

ELECTIVE MINIMALLY INVASIVE SURGERY FOR SIGMOID DIVERTICULAR DISEASE: OPERATIVE OUTCOMES OF PATIENTS WITH COMPLICATED VERSUS UNCOMPLICATED DISEASE.

P377

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Purpose/Background: This study aimed to compare the results of elective minimally invasive surgery between patients with complicated versus uncomplicated sigmoid diverticular disease.

Methods/Interventions: A prospectively maintained IRB-approved institutional database was queried for all consecutive patients who underwent minimally invasive surgery, including laparoscopic, hand-assist laparoscopic, and robotic sigmoidectomy for diverticular disease between 2010-2017. Patients were classified according to the modified Hinchey classification into complicated (abscess, fistula, stricture, obstruction, bleeding or perforation) versus uncomplicated disease. Data recorded included baseline demographics, indications for surgery, operative details, and complications.

Results/Outcome(s): A total of 325 patients underwent elective sigmoidectomy for complicated (n=105) and uncomplicated (n=220) diverticular disease. Surgical indications for patients with complicated disease were abscess (n=74), stricture (n=14), fistula (n=28), and bleeding (n=7). The groups were statistically comparable for age, gender, body mass index, and ASA score. Patients with complicated disease had higher rates of concomitant loop ileostomy creation (9.5% vs. 0.9%, $p<0.001$) and synchronous resections (9.5% vs. 2.7%, $p=0.01$), higher volumes of blood loss (177 ± 140 vs. 125 ± 92 ml; $p<0.001$), longer lengths of stay (5.6 ± 3 vs. 4.8 ± 2 days; $p=0.04$) and longer operative times (218.2 ± 59 vs. 185.8 ± 63 minutes; $p<0.001$). However, there were no significant differences in anastomotic leak rates, (2.9% vs. 0.9%; $p=0.3$) conversion to laparotomy, (4.8% vs. 2.3%; $p=0.3$) or overall complication rates (36% vs. 25.9%; $p=0.06$), for complicated and uncomplicated disease respectively; no mortality was recorded (Table).

Conclusions/Discussion: Minimally invasive surgery for complicated diverticular disease resulted in higher rates of proximal ileostomy construction and synchronous resections, and longer operative times and length of hospitalization. However, it otherwise has outcomes not significantly different than those recorded in patients with uncomplicated disease. These findings support the algorithm of deferral of surgery for uncomplicated diverticulitis.

	Complicated N=105	Uncomplicated N=220	P
Age (mean±SD)	58±13	56±10	0.07
Male gender n (%)	58 (55.3)	113 (51.4)	0.5
Body mass index (mean±SD)	27±5	28±5	0.1
ASA 1-2/3	76/29	177/43	0.1
Previous episodes	3±2	5±3	0.0001
Previous admissions	1±1	1±1	0.1
Pre-operative albumin	4±0.7	4.3±0.5	0.001
Surgical approach	101/4	207/13	0.59
Laparoscopic- Hand-assist laparoscopic/ Robotic			
Loop ileostomy n (%)	10 (9.5)	2 (0.9)	0.0001
Synchronous resection n (%)	10 (9.5)	6 (2.7)	0.01
Small bowel	4	1	
Tube/ovary	4	1	
Hysterectomy	1	1	
Appendix	1	3	
Conversion n (%)	5 (4.8)	5 (2.3)	0.3
Estimated blood loss (ml)	177±140	125±92	0.0001
Length of stay (days)	5.6±3.7	4.8±2.9	0.04
Operative time (minutes)	218±59	185±63	0.0001
Re-admission n (%)	9 (8.6)	15 (6.8)	0.6
Complications n (%)	38 (36)	57 (25.9)	0.06

IS LAPAROSCOPIC MANAGEMENT OF COMPLICATED DIVERTICULITIS REASONABLE?

P378

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Purpose/Background: Minimally invasive approach can be used safely and effectively in management of complicated diverticulitis. These include diverticulitis disease with abscess, fistula, perforated diverticulitis, as well as emergent and planned operations.

Methods/Interventions: From a prospectively maintained laparoscopic database, we queried for diagnosis of diverticulitis. From a total of 583 cases of diverticulitis identified, 87 cases of complex diverticulitis, as defined as fistula, perforation or large pelvic abscesses, met criteria for our search. Preoperative diagnosis, operative findings, procedure type and outcomes were analyzed.

Results/Outcome(s): Of the 87 cases, mean age was 64 (30-91), mode ASA was 3 (1-4) and mean BMI was 28.4 (17.6-51.6), with 13 cases with a BMI > 35. Average EBL for all cases was 197 mL. Total cases classified as elective at the time of surgery was 84 and 3 as emergent. 67.4% of patients had prior abdominal surgery, 13 % had multiple prior abdominal operations. Preoperative fistula diagnosis in 34 (39%) of cases: 19 (56%) colovesical, 4 (12%) colovaginal, 3(8%) colorectal, 5 (15%) coloenteric, one supralevator and 2 were unspecified. Other preoperative diagnosis included: perforation 7 cases, complex abscess 7 cases, and 44 were classified as complicated

diverticulitis. Procedures performed included Hartmann's, laparoscopic low anterior resection (LAR) left colectomy and sigmoidectomy. See table 1 for distribution of procedures. Laparoscopic completion was 94%, with no hand assist cases. Initial stoma rate including both Hartmann's and protective ileostomy was 56.2%, reversal rate was 98%. Postoperative morbidities include: 2 anastomotic leaks, 2 ileus, 1 parastomal hernia, 5 pelvic abscesses that were managed with percutaneous drainage, 2 UTIs, 1 hematoma requiring operative washout, with overall 30 days morbidity rate of 13 (14.6%). Other delayed morbidity included 3 incisional hernias and one anastomotic stricture. There was no perioperative mortality. All colovesical fistulas were repaired laparoscopically by the colorectal team with urologic oversight. During this time, no cases of complicated diverticulitis were managed by open procedures.

Conclusions/Discussion: This experience shows that a laparoscopic approach for management of complicated diverticulitis with the proper minimally invasive surgical (MIS) technique is safe. Fistulas and complex abscesses can be addressed definitively laparoscopically or robotically with good outcomes. While laparoscopic approach to diverticulitis is less common, many centers withhold this operative approach in complicated cases, or insist they be performed in a hybrid or hand-assisted fashion. We present here our results with a straight MIS approach for complicated abscesses and fistulas due to diverticulitis to evaluate the outcomes of this approach.

Procedure		
Hartmann's	29	100%
Laparoscopic	21	72%
Robotic	4	12%
SILS	1	3%
Transverse colostomy	3	10%
LAR/Left/Sigmoid resection	58	100%
Robotic	7	12%
SILS	1	1%
Laparoscopic	47	81%
TAC	2	3%
Lap converted to open	1	1%
Total	87	

SIGMOIDECTOMY FOR DIVERTICULAR DISEASE: RISK FACTORS FOR EXTENDED LENGTH OF HOSPITAL STAY.

P379

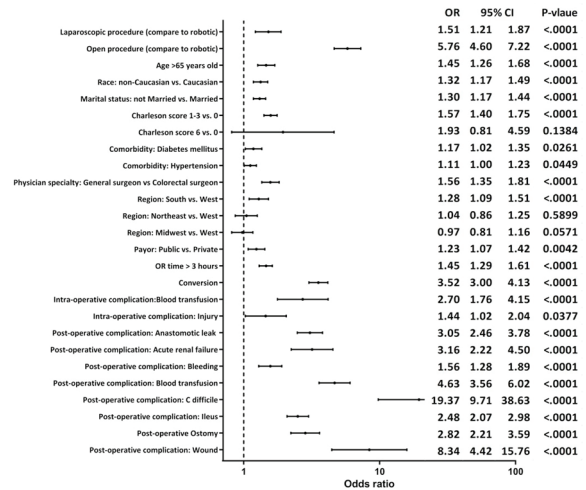
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Purpose/Background: Postoperative length of hospital stay is a critical measurement of surgical outcomes. The aim of this study was to identify risk-factors for extended length of stay (LOS >7 days) after elective sigmoidectomy for diverticular disease.

Methods/Interventions: Patients who underwent elective sigmoidectomy from 2013-2015 were identified using ICD-9 codes from the premier healthcare database (~20% of all inpatient hospital discharges in the US). Univariate logistic regression models were applied to determine the impact of 29 predefined variables (which included patient characteristics, hospital characteristics, and perioperative outcomes) as potential risk factors for extended postoperative LOS [defined as >75th percentile in the overall study population). A multivariate logistic regression model was performed using a step-wise model selection method. All tests were two-sided, with statistical significance set at a p-value<0.05. Statistical analyses were performed with SAS 9.4.

Results/Outcome(s): 12,720 patients (3694 open; 7767 laparoscopic; 1259 robotic) were identified. Median LOS was 5 days for the 3 groups. Risk factors for LOS >7 days included several patient, hospital and payor characteristics (Figure 1). Of 26 statistically significant risk factors, the most significant included open procedure, conversion to an open procedure, blood transfusion, anastomotic leak, acute renal failure, postoperative *clostridium difficile* infection, and postoperative wound complication. While operative approach is a potential modifiable risk factor; patient, hospital and payer characteristics cannot be controlled for to fully assess their true impact on LOS after elective sigmoidectomy for diverticular disease.

Conclusions/Discussion: In this analysis, risk factors associated with extended LOS (>7 days) after elective sigmoidectomy for diverticular disease were multifactorial. With an increasing clinical burden of this disease nationwide, further evaluation of pre- and post-operative risk factors for elective sigmoidectomy is imperative to improve outcomes.



HARTMANN STUMP COMPLICATIONS: ARE THEY RARER THAN WE THINK?

P380

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Purpose/Background: Hartmann's procedure (HP) is performed when a colorectal anastomosis is deemed unsafe or not feasible. A stump leak is a feared complication of HP, however the incidence and outcomes of this complication are not known. Thus, the aim of this study was to examine the post-operative stump complication rates and report on outcomes of these complication following HP.

Methods/Interventions: After institutional review board approval, a retrospective cohort study of patients who underwent elective or urgent HP between 2006-2016 at a tertiary care institution was performed. Information on patient demographics, co-morbidities, disease characteristics, operative variables and post-operative outcomes were collected. The primary outcome was stump complications, a composite outcome of stump leak and peri-stump collection. The secondary outcomes were length of stay, ICU admission, re-interventions, mortality, and Hartmann reversal rate. Stump leak was defined as evidence of dehiscence of the rectal stump staple line with adjacent pelvic collection on CT, and extravasation of rectal contrast if received. Peri-stump collection was defined as a collection adjacent to the rectal stump, with no definite contrast leak. Each case determined to have a potential stump complication was reviewed with the respective attending surgeon and a single-blinded gastrointestinal radiologist. Fisher exact and Wilcoxon rank sum tests were used.

Results/Outcome(s): Of 244 patients with a Hartmann's procedure, 10 (4.1%) patients had a rectal stump complication (6 stump leaks and 4 peri-stump collections). Patient demographics, disease characteristics and operative variables were similar for patients with and without stump complications (Table 1). Rectal tube placement, intra-abdominal drain use, stump location and stump disease status were not associated with stump complications (Table 1). Of 10 patients with stump complications, 80% required re-intervention including 6 percutaneous drainages and 2 re-operations. Patients with stump complications had significantly longer length of hospital stay (30.5 [19-57] vs. 17.0 [10-40] days, $p=0.046$), without any differences in ICU admission rates (30% vs. 34.3%, $p=0.91$), mortality (10% vs. 9%, $p=0.91$) or Hartmann's reversal (20% vs. 27.4%, $p=0.72$).

Conclusions/Discussion: To date, this is the largest cohort study to specifically report on the incidence and outcomes of stump complications following HP. The incidence of rectal stump complications was very low. As such, we could not identify any significant predictors. Rectal stump complications increase patients' morbidity with an expected need for re-intervention and significantly increased length of stay. Given the low incidence of stump complications, a multicenter pooled analysis would be helpful to identify predictors of stump complications.

Hartmann Stump Complications			
	No stump complications	Stump complications	p-value
Table 1A – Patient characteristics			
Age, years, median (Q1-Q3)	67.0 (58.0-79.0)	61.5 (48.3-81.3)	0.59
Male (%)	116 (49.6)	3 (30.0)	0.22
Diagnosis			0.32
Diverticular disease (%)	46 (19.7)	2 (20.0)	/
Malignancy (%)	57 (24.4)	3 (30.0)	/
Non-colorectal malignancy (%)	11 (4.7)	1 (10.0)	/
IBD (%)	35 (15.0)	2 (20.0)	/
Bowel ischemia (%)	6 (2.6)	1 (10.0)	/
Volvulus (%)	10 (4.3)	1 (10.0)	/
Iatrogenic injury (%)	9 (3.9)	0	/
Other (%)	60 (25.6)	0	/
ASA 3 or 4 (%)	153 (65.4)	7 (70.0)	0.55
Smoker (%)	60 (25.6)	0	0.17
Diabetes (%)	53 (22.7)	2 (20.0)	0.9
Corticosteroid use (%)	47 (20.1)	3 (30.0)	0.74
Anti-hypertensive use (%)	97 (41.5)	3 (30.0)	0.46
Albumin, median (Q1-Q3)	28.0 (22.0-35.0)	26.5 (23.0-33.5)	0.94
Receiving chemo or previous chemo (%)	45 (19.2)	2 (20.0)	0.95
Receiving radiation or previous radiation (%)	26 (11.1)	2 (20.0)	0.43
Table 1B – Operative characteristics			
Emergency Surgery (%)	180 (76.9)	9 (90.0)	0.29
Surgical Approach			0.36
Open (%)	211 (90.2)	10 (100.0)	/
Laparoscopic (%)	13 (5.6)	0	/
Lap converted to open (%)	10 (4.3)	0	/
Part of colon used for stump			0.69
Rectum (%)	156 (66.7)	8 (80.0)	/
Rectosigmoid (%)	26 (11.1)	0	/
Sigmoid (%)	36 (15.4)	2 (20.0)	/
Descending colon (%)	4 (1.7)	0	/
Transverse colon (%)	2 (0.9)	0	/
Ascending colon (%)	3 (1.3)	0	/
Diseased segment used for stump (%)	124 (53.0)	8 (80.0)	0.21
Drain placed (%)	51 (21.8)	3 (30.0)	0.55
Rectal tube (%)	77 (32.9)	5 (50.0)	0.28
OR length, hours, median (Q1-Q3)	4.0 (3.0-6.0)	4.3 (3.0-5.1)	0.77
Intra-op blood product administration (%)	86 (36.9)	6 (60.0)	0.32
EBL, mL, median (Q1-Q3)	300.0 (100.0-500.0)	350.0 (125.0-500.0)	0.65
Table 1C - Outcomes			
ICU admission (%)	81 (34.6)	3 (30.0)	0.91
Length of stay, days, median (Q1-Q3)	17.0 (9.8-40.3)	30.5 (19.0-57.3)	0.046
30-day mortality (%)	21 (9.0)	1 (10.0)	0.91
Hartmann reversal (%)	64 (27.4)	2 (20.0)	0.72

FACTORS PREDICTING DEVELOPMENT OF COLONIC FISTULAS FOLLOWING CT GUIDED DRAINAGE OF COLONIC DIVERTICULAR ABSCESES.

P381

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Purpose/Background: The purpose of the study was to identify the factors associated with development of colonic fistula following CT guided drainage of colonic diverticular abscesses.

Methods/Interventions: All patients undergoing CT guided drainage of left sided colonic diverticular abscesses from 2009 to 2017 were included in the study. Colonic fistula was defined as drain study contrast injection showing communication with colonic lumen. Clinical and demographic variables associated with development of colonic fistula were investigated.

Results/Outcome(s): 105 patients (55% female), with mean age of 59 years and mean abscess size of 6.3 cm and mean BMI of 30.28 kg/m² underwent CT guided drainage of colonic diverticular abscesses during the study period. Overall, 90 patients underwent surgical intervention. Nine patients underwent emergent/urgent surgical intervention due to failure of percutaneous drainage. Sixty patients (57.1%) developed colonic fistula to the drain and 59 of them underwent subsequent resection. On univariate analysis, male gender, lower BMI, higher ASA class, smoking, and larger size of the abscess were associated with development of a colonic fistula ($p<0.05$). On multivariate analysis, female gender (Odds Ratio 0.35, $p=0.02$), higher BMI (OR 0.92, $p=0.01$), and increasing abscess size (OR 1.32 per centimeter, $p=0.01$) were predictive of developing colonic fistula.

Conclusions/Discussion: More than half of patients develop colonic fistula after CT guided drainage of diverticular abscesses. Male gender, lower BMI, and increasing abscess size were predictive of development of colonic fistula.

SIGNIFICANT FINDINGS ON COLONOSCOPY AFTER DIVERTICULITIS: A MULTICENTER REVIEW.

P382

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Purpose/Background: The ASCRS guidelines recommend a colonoscopy following the resolution of acute diverticulitis to confirm the diagnosis and exclude malignancy or other pathology. However, research supporting this recommendation is scarce. The aim of this study was

to evaluate the incidence of malignant or advanced adenomatous pathology detected on colonoscopy following an episode of diverticulitis.

Methods/Interventions: This is a retrospective study of patients who underwent colonoscopy after an episode of acute diverticulitis between January 2005 and July 2016 at three major teaching institutions. Demographics, imaging studies, endoscopy findings, and surgical pathology reports were reviewed. Advanced adenomas were defined as adenomas ≥ 1 cm, serrated adenomas or tubulovillous adenomas.

Results/Outcome(s): 598 patients (308 men; 62%) underwent colonoscopy for a history of diverticulitis after resolution of acute symptoms. Median age was 53 (range, 22-88) years. Colonoscopy was complete in 495 patients (83%), and 30 advanced adenomas and 4 adenocarcinomas were found in these patients (**Table 1**). Colonoscopy was incomplete in 103 patients (17%). Of these, 49 underwent surgery for persistent symptoms. 1 advanced adenoma and 5 adenocarcinomas were found in resected specimens.

Conclusions/Discussion: Routine colonoscopy following an episode of diverticulitis have a higher rate of incomplete examinations than usual. This practice results in a limited yield of significant pathology. In spite of improved management with CT scans, our study indicates that colonoscopy should still be recommended after episodes of diverticulitis, especially if a prior colonoscopy has not been performed.

HARTMANN'S REVERSAL: FACTORS AFFECTING COMPLICATIONS AND OUTCOMES.

P383

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Purpose/Background: The Hartmann's procedure is often emergently performed for patients suffering from infectious, inflammatory, or malignant processes, with the intent to restore GI continuity at a future operation. Over half of patients historically do not undergo reversal, and those who do have been found to suffer significant morbidity. This study seeks to determine those factors

that influence the outcomes for patients undergoing Hartmann's reversal.

Methods/Interventions: A retrospective review of patients undergoing Hartmann's reversal between May 2002 and October 2017 was conducted at a tertiary medical center. Collected data included patient characteristics at the time of Hartmann's reversal and intra- and post-operative complications. Chi square test was used for categorical variables. Wilcoxon signed rank or t-test where appropriate was used for multivariate analysis. Significance was set at $p < 0.05$.

Results/Outcome(s): 195 patients were included. Mean age at reversal was 58.8 years, and 114 (58%) were male. Patients underwent initial Hartmann's procedure for diverticular disease (62%), malignancy (8.7%), iatrogenic causes (3.6%), volvulus (1%), ischemia (3%), anastomotic leak (11.3%), and other (11.3%). 62 (31.8%) patients experienced a major complication following reversal. 8 (4%) patients had an anastomotic leak, of which 2 underwent diverting loop ileostomies, 3 anastomoses were revised, and 3 were resected with end colostomy and rectal stump. 7 (3.6%) had a GU injury (bladder or ureter), all of which were identified and repaired at the time of reversal. 8 (4%) patients had wound dehiscence after reversal. 13 (6.67%) patients had an intraabdominal abscess which required either IR or operative drainage. On univariate analysis, patients who experienced a major complication were more likely to have an ASA 4 at the time of reversal (14.3% vs 4.24%, $p=0.019$), liver disease (6.6% vs 0.8%, $p=0.021$), and BMI < 30 (35% vs 17.3%, $p=0.020$). No significant differences were noted in age, gender, history of diabetes, cardiac, or peripheral vascular disease, open or laparoscopic approach for reversal, or duration of time until reversal. There was no increase in major complication rate after reversal if the original Hartmann's procedure was performed emergently.

Conclusions/Discussion: Many patients who undergo the Hartmann's procedure will likely maintain a permanent colostomy. Nearly one-third of patients who had reversal surgery experienced a major complication. 4% patients undergoing reversal had an anastomotic leak, comparable to previously reported rates. Patients with ASA 4, liver disease, and BMI < 30 were at higher risk of a major complication following reversal surgery. Patients who underwent laparoscopic reversal vs open had no significant differences in major complications. Many factors expected to be associated with significant differences in morbidity were not found to affect outcomes.

P382 Findings on Complete Colonoscopy

Pathology	N= 495 (%)	Median Age (years)
Diverticular disease alone	454 (92)	52 (22-88)
Advanced adenoma	30 (6)	55 (36-86)
Adenocarcinoma	4 (0.8)	61 (56-88)
Rectal Carcinoid	3 (0.6)	46 (42-66)
Inflammatory bowel disease	4 (0.8)	55 (30-63)

TRAUMA COLOSTOMY REVERSAL: ARE RECTAL CONTRAST STUDIES NECESSARY?

P384

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Purpose/Background: Colorectal surgeons are often involved in the reversal of colostomies created for trauma. Preoperative rectal contrast studies are common in preparation for colostomy reversal. Rationale for these studies includes evaluating the distal segment of bowel to ensure it has healed from the initial injury without evidence of leak or stricture. We hypothesize that rectal contrast studies are unnecessary prior to reversal of the trauma colostomy, as there is no underlying bowel disease.

Methods/Interventions: We conducted a retrospective analysis of patients who underwent colostomy creation for colorectal trauma at our level one trauma center from 2006 to 2016. Through chart review we evaluated the initial hospital admission, outpatient follow up including any preoperative imaging, readmission for ostomy reversal, and reversal follow up. We defined a preoperative study as necessary if it changed surgical management. All radiographic images were independently reviewed and congruent with initial reads.

Results/Outcome(s): 110 patients were identified with colostomy formation following traumatic colorectal injury. The average age was 27.9 years with a majority being male (93.6%). Injury sites included colon in 28 (25.5%), intraperitoneal rectum in 26 (23.6%), and extraperitoneal rectum in 56 (50.9%). Initial operative management included proximal diversion in 67 (60.9%) patients, Hartmann's procedure in 38 (34.5%), and resection with anastomosis and proximal diversion in 5 (4.5%). There was a 44% procedure-related complication rate. Work-ups for ostomy reversal were performed in 72 (65.4%) patients and 78 (70.9%) patients ultimately underwent colostomy reversal. 19 (17.3%) patients were lost to follow up. The average time from creation to reversal was 303.3 days. Of the workups performed, 58 (82.9%) included a barium enema, 5 (7.1%) had a CT scan, and 14 (20%) underwent endoscopy. Only 3 (4.3%) of those studies revealed an abnormality, all found on barium enema; one fistula of the sigmoid stump and two non-flow-limiting narrowings. No results changed operative management. 17 (21.7%) patients experienced a complication after reversal. There were no post operative complications in the patients who did not undergo preoperative workup with barium enema, endoscopy or CT.

Conclusions/Discussion: Barium contrast studies rarely identify abnormalities prior to colostomy closure, fail to predict perioperative complication and do not change the surgical management of the colostomy closure, and are therefore unnecessary.

EFFECT OF ORAL ANTIBIOTIC AND MECHANICAL BOWEL PREPARATION ON SURGICAL SITE INFECTION (SSI) FOR COLORECTAL SURGERY: A SYSTEMATIC-REVIEW AND UPDATE.

P385

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Purpose/Background: To evaluate the relative effectiveness of mechanical preparation, antibiotic preparation, combined preparation or no preparation on the incidence of SSI using historical and recently published studies. Colorectal procedures account for only 10% of procedures performed nationally, but are responsible for 25% of all complication rates. As a result, there has been much debate and focus on the necessity of oral antibiotic and mechanical bowel preparation for colorectal surgery and its effect on surgical site infections (SSI). Recent studies have added information to this debate, but consensus in the surgical community on the best practice remains elusive.

Methods/Interventions: Medline, Cochrane, and Twitter searches were undertaken using the terms "colorectal, surgery, antibiotics, bowel preparation." A total of 12 randomized trials, 22 cohort studies, and 5 meta-analyses were included in this review. The incidences of SSI, from superficial to deep, as well as adverse outcomes of *C. difficile* were considered.

Results/Outcome(s): The literature demonstrates a consistent trend towards lower infection rates and anastomotic leak rates with the use of oral antibiotics, often statistically significant. Further, while there is some ambiguity in *C. difficile* infection rates, the larger studies do not suggest an increased risk with oral antibiotic bowel preparation.

Conclusions/Discussion: The use of oral antibiotics with or without mechanical bowel preparation consistently reduces the incidence of SSI compared to non-use of oral preparation. Results suggest the use of oral antibiotic has minimal impact on the incidence of *C. difficile* infection rates. Consideration should therefore be given to use of oral antibiotic preparation in patients undergoing elective colorectal resections.

IS THE ABILITY TO VOID SPONTANEOUSLY A PRE-REQUISITE TO DISCHARGE AFTER AMBULATORY ANORECTAL SURGERIES?

P386

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Purpose/Background: Ambulatory anorectal surgery is associated with a high incidence of urinary retention often resulting in ED visits and unplanned readmissions. Therefore, ambulatory surgery discharge criteria at many

institutions include the ability to void spontaneously after surgery. We sought to assess the effectiveness of passing a voiding trial in preventing ED visits and readmissions.

Methods/Interventions: We did a retrospective review of three ambulatory procedures (hemorrhoidectomy, fistulotomy and anal condyloma excision) performed at two locations. One of these locations required the ability to void spontaneously as a pre-requisite for discharge after ambulatory anorectal surgeries (spontaneous void group) whereas the other location did not maintain this requirement and patients were discharged once they were deemed ready (no void group). To minimize confounding factors, patients undergoing operations by a single attending surgeon were included and patients undergoing multiple procedures were excluded. Patient demographics, PACU times, return to ED and readmissions were recorded. Fisher's exact and Chi-square tests were used for comparison and a p value of <0.05 was considered statistically significant.

Results/Outcome(s): A total of 154 patients met inclusion criteria. Out of these, 87 were in the spontaneous void group and the remaining 67 were in no void group. The average age in no void group was 41.13 years and 43.82 years in spontaneous void group ($p=0.25$). Male to female ratios were 1.71 and 1.79 for spontaneous void and no void groups respectively ($p=1.00$). There was no difference in the types of procedures ($p=0.92$) or ASA class ($p=0.27$) between the two groups. The average PACU time for the spontaneous void group was 233.52 minutes vs 114.09 minutes in no void group ($p<0.0001$). Three patients in spontaneous void group required straight catheterization in PACU and one required admission due to inability to void despite straight catheterization. There were 9 (13.42%) ED visits in no void group and 11 (13.25%) in spontaneous void group ($p=1.0$). Out of these patients, 5 (7.46%) patients in no void group and 8 (9.63%) in spontaneous void group required readmission ($p=0.77$). The most common reasons for ED visits were urinary retention (45%) and uncontrolled pain (20%).

Conclusions/Discussion: Our results indicate that patients can be safely discharged without voiding after anorectal procedures without increasing the risk of ED visits or readmissions. Furthermore, a requirement to spontaneously void before discharge significantly prolongs PACU stays and does not decrease the risk of ED visits or unplanned readmissions.

COMPARISON OF SINGLE INCISION AND CONVENTIONAL LAPAROSCOPIC COLORECTAL SURGERY: A CASE MATCHED ASSESSMENT FROM NATION-WIDE TARGETED COLECTOMY COHORT.

P387

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Purpose/Background: Single incision laparoscopic surgery (SILS) has been implemented to increase cosmetic outcomes while demanding higher technical skills than conventional laparoscopy (CL) in the setting of colorectal surgery (CRS). In this study, we aimed to compare the short-term perioperative surgical outcomes of SILS-CRS and CL-CRS using a nation-wide procedure-targeted database.

Methods/Interventions: olectomy-targeted American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was retrospectively reviewed to query patients between 2012 and 2016, who underwent either SILS or CL. SILS patients were compared with their CL counterparts through 1:5 case-matching based on patient age \pm 5 years, gender, BMI \pm 3, ASA classification and indication for surgery. Demographics, preoperative characteristics, short-term surgical outcomes including conversion, reoperation and readmission rates were compared between the two groups. Matched univariate analysis was performed after adjusting the differences in patient characteristics, and postoperative findings were assessed.

Results/Outcome(s): A total of 403 SILS-CRS patients were compared to 2015 CL-CRS patients. Matched univariate analysis on patient demographics showed that age (54.7 \pm 16.8 vs. 54.8 \pm 16.6, $p=0.90$), male gender (45.2% vs. 45.2%, $p>0.99$), BMI (28.6 \pm 6.5 vs. 28.6 \pm 6.4, $p=0.97$), ASA classification 3 or 4 (54.1% vs. 54.1%, $p>0.90$), diagnosis [(Colon cancer): 29.8%, (IBD): 25.6%, (Diverticulitis): 17.4%, $p>0.99$] were comparable between SILS-CRS and CL-CRS groups, respectively. Study groups were similar in terms of diabetes, smoking status, severe COPD, ascites, congestive heart failure, hypertension requiring medication, acute renal failure, dialysis, disseminated cancer, open wound infections, bleeding disorders, transfusion in 72 hours prior to surgery and systemic sepsis (all $p>0.05$). There were more patients in SILS-CRS group who had preoperative dyspnea [7.4% vs. 5%, $p=0.04$] and >10% weight loss in the last 6 months [8.2% vs. 5.1%, $p=0.01$]. Perioperative findings indicated that operative time was 41.3 minutes shorter ($p<0.001$) and mean length of stay (LOS) was reduced by 1.5 days ($p<0.001$) in the SILS-CRS group, which reached statistical significance (Table 1). No statistically significant differences were observed between groups in terms of conversion to open, superficial skin infection, wound dehiscence, organ space infection, pneumonia, pulmonary embolism, deep venous

thrombosis, renal insufficiency, urinary tract infection, sepsis, Clostridium difficile infection, reoperation, blood transfusion, anastomotic leak, ileus and readmission rates (all $p > 0.05$).

Conclusions/Discussion: ACS-NSQIP data demonstrates that in carefully matched group of patients single incision laparoscopic colorectal surgery provides faster operations and shorter hospital stay with similar short time outcomes.

Table 1 – Case Matched Linear Coefficients for SILS-CRS vs. CL-CRS

Outcome	Estimate (95% CI)	p-value
Length of stay	-1.5 (-2.2, -0.76)	<0.001
Operative time	-41.3 (-49.9, -32.6)	<0.001

Case matched on age \pm 5 years, gender, BMI \pm 3, ASA class, and indication for surgery.

THE USE OF SILVER NITRATE IN COMPLEX FISTULA IN ANO, LONG-TERM OUTCOMES.

P388

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Purpose/Background: Complex anal fistula is a difficult condition to treat with high recurrence rates, and after surgery the incontinence is common. Now a days, the treatment is based on surgery. There are very few reports of nitrate silver irrigations for the management of complex anal fistula. The aim of this research is to determine the healing rate of a group of patients with complex anal fistulae treated with silver nitrate irrigation in our Department and to describe the outcomes of a follow up of 3 years.

Methods/Interventions: The design of this project is : retrospective, cohort study, transversal, and descriptive. We included consecutive cases with complex anal fistula managed as outpatient in our Department between June 2014 and December 2014. In all cases physical examination with DRE, anoscopy, and 3-D ERUS were performed. Two cc of 1% silver nitrate solution were instilled into the fistula tract between 1 to 12 sessions. The number of sessions were determined by the cessation of the symptoms and physical examination; to confirm the healing of the fistula we used a second 3-D ERUS. And we compared the outcomes of the same patients in 2017, with a follow up of 3 years.

Results/Outcome(s): In our series we included 13 patients (Male : 11), with an average age of 49.5 yo (28 – 63 yo). One of the male patients was lost during the follow up. The time of evolution of the fistula in ano in

our series is an average of 41.23 months with a range of 6 -96 months. In the next chart, we show the type of fistula as well as the localization of the primary opening. None of our patients had complete healing with the application of silver nitrate solution. All of them needed surgery and 10 procedures were performed. Two patients avoided the surgery. In the next chart we summarize the surgery that were performed. The mean follow up was 33 months, and the range was between 14 to 48 months. None of the patients have developed fecal incontinence or had appeared a new fistula tract. All the patients treated with silver nitrate and surgery had healed completely. The two patients that did not accept the surgery present a healing of 100%. Most of the patients had faced surgical treatment before the silver nitrate management, the range of number of surgeries is 0-7 with an average of 2.15 surgeries per patient. Five patients had active drainage fluid in the fistula, 3 of them intermittent and 2 of them continuous. When we applied the silver nitrate, the range of pain intensity was 1-9 points. The average of this pain intensity was 2.53

Conclusions/Discussion: The application of silver nitrate solution into the fistula tract produces fibrosis of this tissues. This changes of the fistula tract could transform a complex fistula into a simple fistula; even though the 1% silver nitrate solution is not enough to obtain the fistula healing, it helps to perform a more secure surgery with no complications such as fecal incontinence or recidivant fistula tracts and good long term outcomes.

RETROSPECTIVE ANALYSIS OF SURGICAL TREATMENT OUTCOMES IN PILONIDAL DISEASE AFTER CLEFT LIFT REPAIR.

P389

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Purpose/Background: **Purpose:** Cleft lift repair has been suggested as promising treatment for chronic intergluteal pilonidal cyst disease, but there remains absence of consensus on surgical therapy. We aimed to examine and compare to published data our consecutive series of patients treated by cleft lift repair.

Methods/Interventions: **Methods:** A consecutive series of patient who underwent an elective cleft lift repair of non-acute pilonidal disease over a 3-year period (2014-2017) were evaluated. Two colorectal surgeons used the same operative technique in a single institution. Surgical

outcomes including dehiscence, infection, recurrence after cleft lift repair and time to complete healing were compared to previously published data.

Results/Outcome(s): Results: There were 53 patients (6 female) aged 25.0 ± 7.5 years (median 23, range 16-50) in this retrospective study. Mean symptom duration was 25.3 ± 41.4 months (median 10, range 1 week to 20 years), 16 were current and 3 were former smokers, and 6 patients had American Society for Anesthesia score (ASA) ≥ 3 . Mean operative time was 94 ± 23 minutes, all but one operations were outpatients, and mean time to complete healing was 3.1 ± 3.1 months (median 2, range 2 weeks to 18 months). There were 5 (9.4 %) clinical recurrences over a median follow up of 16 months. We observed no relationship between recurrence after complex repair and smoking history (5/34 never smokers versus 0/19 ever smokers; $p=0.079$), gender (5/48 male versus 0/6 female; $p=0.407$), ASA (ASA ≤ 2 4/47 versus 0/6 for ASA ≥ 3 ; $p=0.457$), and number of prior recurrences ($p=0.591$).

Conclusions/Discussion: Conclusions: We have not observed any clinical predictors of failed repair in this pilot study of cleft lift repair of chronic pilonidal sinus disease. Moreover, cleft lift repair as performed does appear to match previously published rates of recurrence. Further study will compare current data to historical institutional outcomes.

RETROSPECTIVE REVIEW OF RECURRENCE OF PILONIDAL DISEASE AFTER TREATMENT WITH LIMBERG FLAP VERSUS OTHER SURGICAL MANAGEMENT.

P390

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Purpose/Background: Pilonidal disease remains a complicated problem that is especially troublesome to young, active adults. Multiple surgical approaches, to include primary excision with closure or marsupialization, Bascom procedure, Karydakias flap and Limberg flap, are available for definitive management. However, these surgical repairs are often prone to wound dehiscence and prolonged wound care. There is no surgical technique that has consistently been shown to be superior in decreasing disease recurrence. We sought to look at our institution's experience with Limberg flap and other surgical approaches as well as treatment adjuncts to determine the best method to reduce pilonidal disease recurrence.

Methods/Interventions: A retrospective review was performed including all patients greater than 18 years old, undergoing definitive pilonidal surgery, and having completed follow-up care at our institution over a five-year period (APR 2012 – MAR 2017). Patients were divided into Limberg flap, versus control (simple cystectomy with or without primary closure, Bascom procedure, and

Karydakias flap). Demographics, to include if the patient underwent laser hair removal, and postoperative outcomes were obtained.

Results/Outcome(s): We identified 154 cases, 71 Limberg flap and 83 control. There were 133 males and 21 females, ranging in age from 18 to 47 (mean 25.5, median 24). Patients undergoing Limberg flap experienced recurrence of disease at a rate of 23% (16/71) vs. 25% (21/83) in control patients ($p=0.71$). Patients undergoing laser hair removal ($n=41$) had a recurrence rate of 34% (14/41) vs. 20% (23/113), for patients without laser hair removal, ($p=0.09$). Recurrence rates were higher for women, 33% (7/21) vs. men, 23% (30/133), ($p=0.28$). Rates of all other complications (excluding recurrence) were similar between the two groups, with complication rates of 30% (21/71) vs. 27% (22/83), ($p=0.72$) for Limberg flap vs. control, and 39% (16/41) vs. 24% (23/113), ($p=0.10$) for laser hair removal vs. none.

Conclusions/Discussion: No surgical technique demonstrated superiority in preventing recurrence of pilonidal disease. There was a slight trend towards lower rates of recurrence and all complications for Limberg flap versus other surgical management, however, this was insignificant. Interestingly, patients undergoing laser hair removal had higher rates of recurrence and other complications, both nearing significance. However, this is likely secondary to bias, as the more complicated cases are generally referred for hair removal. Our recurrence and complication rates are similar to other published data regarding all surgical management of pilonidal disease. A prospective study is needed to determine the most effective surgical procedure for treatment of pilonidal disease.

RECTOVAGINAL AND RECTOURETHRAL FISTULA REPAIR WITH PLACENTA DERIVED STEM CELLS: PRELIMINARY STUDY.

P391

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Purpose/Background: Rectovaginal (RVF) and Rectourethral (RUF) fistulas are debilitating conditions associated with low rates of successful surgical repair. Recently, reports have evaluated the use of injected mesenchymal stem cells (MSC) for the treatment of fistula-in-ano with modest results. However, these products have limited use in patients with RVF or RUF. Viable cryopreserved human placental-derived stem cells (PDSC), composed of umbilical amnion and Wharton's jelly, has the benefit of retaining the native collagen and hyaluronic acid-rich extracellular matrix, endogenous growth factors, and other endogenous cells found in placental tissue and has been evaluated in the treatment of enterocutaneous fistula. We wished to examine the use of PDSC in patients with complex RVF and RUF.

Methods/Interventions: A pilot study was designed and approved by the institutional review board to evaluate the safety and efficacy of PDSC for the treatment of refractory RVF and RUF. Patients with no history of prior repair were excluded. PDSC was supplied free to the participant as a 2x4 cm rectangular piece. RVF was repaired with a perineal approach, primary mucosal repair, overlay of the PDSC and overlapping of the sphincter muscles. RUF was repaired with primary closure of the mucosal defects, overlay of PDSD, and re-approximation of the transverse perineal muscles. Successful treatment was defined as complete wound healing and the lack of drainage.

Results/Outcome(s): From 11/2016 – 11/2017, 6 patients (5 female) agreed to participate. The median age was 59 years (30 – 81 years), and the median number of prior repairs was 3.5. (1 – 5). Two patients were diagnosed with Crohn's disease. There were no adverse outcomes and at 4 out of 6 fistula were healed successfully at a median follow up of 9 weeks (2 – 44 weeks).

Conclusions/Discussion: Preliminary data on the use of PDSC for the repair of RVF and RUF are promising. Larger studies are needed to further evaluate the efficacy and to determine the contribution of PDSC to biology of wound healing.

THE TIMING OF KOCK POUCH COMPLICATIONS: DO THEY FIT A PATTERN?

P392

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Purpose/Background: Kock pouch (*i.e.*, Continent ileostomy) remains an alternative to restorative proctocolectomy in select cases. Despite their utility, a major limitation is the increased potential for postoperative complications. We hypothesized that the morbidity profile differed based on the timing of their development. The aim of this study was to evaluate the period from construction to development of pouch-related complications, and to determine if certain complications correlated with timing.

Methods/Interventions: Following IRB approval, we identified patients undergoing Kock pouch creation between 1991 and 2016. Patient demographics, underlying disease, and details regarding Kock pouch surgery, complications and their timing, and necessity for revision or excision were documented. The primary metric was postoperative complication.

Results/Outcome(s): Overall, 209 patients were identified (131 women; mean age of 44 years). The mean follow-up was 10.4 ± 10 years. The most common indications were ulcerative colitis (56%), Crohn's disease (14%), indeterminate colitis (12%), familial adenomatous polyposis (5%). A total of 117 (56%) patients had a total of 207 procedures including revisions. The mean interval

for pouch revision was 4.5 ± 9.4 years after pouch creation, with a mean of 1.7 revisions per patient. Ultimately, 43 (21%) patients had their pouch excised, at a mean interval of 8.5 ± 11.4 years after pouch creation. 26 (60%) out of 43 patients had prior revision surgeries with a mean interval of 6.2 ± 5.5 years between the last revision surgery and pouch excision. Indications for pouch excision were valve slippage (n=9), malfunctioning pouch (n=9), pouch fistula (n=6), non-specific inflammation of the mucosa (n=2), parastomal ulcers (n=1), pouch stricture (n=1), pouch ischemia (n=1), leakage and sepsis (n=1), recurrent obstruction (n=1), parastomal hernia (n=1), and other (n=11). Patient characteristics along with time interval for various complications, revisions, and excisions are summarized in Table 1. There was no statistically significant difference in terms of complication rates and time to complications when stratified by underlying diagnosis. Valve slippage remained the most common complication after K pouch creation and tended to occur later, while prolapse and incontinence were earlier complications.

Conclusions/Discussion: Most complications following Kock pouch occur several years following surgery. While there remains a risk of pouch-related complications, they tend to be manageable, and independent of the underlying diagnosis. For many patients, it represents a valuable surgical option.

PATIENT SATISFACTION AND FUNCTIONAL OUTCOMES AFTER TRANSSPHINCTERIC FISTULOTOMY: A MULTICENTER EXPERIENCE.

P393

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Purpose/Background: The treatment of low transsphincteric anal fistulas presents a challenge to many surgeons who are reticent about performing fistulotomy (FT) due to fear of aggravating postoperative fecal incontinence (FI). The myriad of modern proposed treatments including LIFT, glue, flaps and setons reflects the difficulty in obtaining a satisfactory outcome for this classic problem. In properly selected patients, we hypothesize the classic intervention of FT for low transsphincteric anal fistulas will have lower rates of postoperative fecal incontinence than historically described, and that the vast majority of patients express satisfaction after undergoing FT. We aimed to test this hypothesis in a multicentric patient population sample.

Methods/Interventions: An IRB-approved retrospective review was performed on a prospectively maintained multicentric database of all patients with transsphincteric cryptoglandular anal fistulas treated at a two academic institutions between 2005-2015. Patient demographics, comorbidities, fistula characteristics, and healing rates

were collected. Telephone follow up was performed to assess FT patient's overall degree of satisfaction with treatment received, and pre- and postoperative FI was assessed by means of the the Cleveland Clinic Fecal Incontinence Questionnaire. Telephone data collection is ongoing.

Results/Outcome(s): Overall, 469 patients underwent 590 repairs with a mean follow-up of 14(range, 0-175) months. Of these, 208 patients (35%) underwent FT. Healing rates following a FT were significantly better than after a sphincter-sparing repair (90% vs. 40%; $p < 0.001$). Twenty-six FT patients responded to the telephone questionnaire to date. Seven (26%) reported new or worsening FI postoperatively, but only three (11.5%) reported the symptoms affect their quality of life more than rarely. Satisfaction with the procedure was graded 1-10 and mean satisfaction rate was 9. Twenty-four patients (92%) reported they would undergo a FT again if needed.

Conclusions/Discussion: FT has an excellent healing rate and patients are overall satisfied with their outcomes despite the risk of postoperative FI. FT remains a formidable option for select patients with low transsphincteric anal fistulas.

ENDORECTAL ADVANCEMENT FLAP REPAIR WITH THE USE OF FLUORESCENCE ANGIOGRAPHY: DOES IT STACK UP TO TRADITIONAL APPROACHES?

P394

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Purpose/Background: Fistula-in-ano has a reported incidence of 31-34%. Multiple modalities for the operative management of fistula-in-ano have been described to include fistulotomy with or without seton placement, fibrin sealant, anal fistula plug, ligation of the intersphincteric tract (LIFT) and endorectal advancement flap (ERAF). In an effort to address complications with ERAF, including flap breakdown, recurrence and fecal incontinence, intraoperative fluorescence angiography (FA) was utilized to assess flap perfusion prior to final fixation. Here, we report the outcomes of the first study comparing anal fistula repair utilizing ERAF with FA with traditional treatment modalities.

P392 Patient characteristics

	Overall	Crohn's Disease	Familial Adenomatous Polyposis	Indeterminate Colitis	Ulcerative Colitis	Other	P Value
Male	78	6	8	7	45	12	
Female	131	23	2	19	72	15	
BMI mean (Range)	25 (21-27)	24 (21-27)	26 (23-31)	25 (21-27)	25 (20-27)	24 (22-26)	NS
Age, mean (Range)	44 (30-54)	43 (36-53)	51 (44-54)	45 (38-48)	45 (34-54)	39 (30-47)	NS
Number of Revisions	207	30	9	28	129	11	
Years to excision, mean (SD)	8.5 (11.4)	12.8 (13.0)	6.0 (9.9)	5.5 (5.6)	8.4 (13.0)	12.0 (15.9)	NS
Years to revision, mean (SD)	4.5 (9.4)	3.3 (6.5)	2.2 (3.9)	2.3 (4.5)	5.2 (11.0)	11.0 (10.7)	NS
Years to complication, mean (SD) [N]							
Fistula	4.6 (7.4) [36]	7.6 (7.6) [6]	13 [1]	4.8 (4.3) [6]	3.3 (8.0) [21]	-	NS
Pouchitis	8 (7.23) [38]	5.5 (5.1) [6]	5 [1]	5.8 (4.6) [11]	12.2 (8.6) [15]	7 (8.5) [2]	NS
Valve Slippage	6.8 (12.4) [78]	7.3 (14.8) [10]	2.6 (5.8) [5]	3.0 (5.8) [7]	8.5 (13.5) [50]	6.5 (5.0) [2]	NS
Afferent Stricture	4.7 (11.0) [14]	1.5 (2.1) [2]	9 [1]	8.8 (5.6) [4]	10 (17.8) [5]	10 [1]	NS
Valve Stricture	4.1 (11.9) [39]	5 (6.4) [2]	5 (7) [3]	8.0 (6.9) [7]	12.5 (13.9) [24]	-	NS
Bowel Obstruction	7.1 (9.1) [41]	2.7 (2.3) [3]	0.5 (0.71) [2]	5.1 (5.3) [14]	8.6 (12.0) [19]	10 [1]	NS
Para stromal Hernia	4.2 (8.4) [64]	2.7 (2.6) [9]	5.1 (9.2) [3]	3.6 (5.8) [11]	4.9 (10.3) [35]	11.5 (2.1) [2]	NS
Prolapse	3.6 (5.1) [29]	0.8 (2.3) [3]	5.5 (7.8) [2]	0.4 (0.9) [5]	4.6 (5.8) [16]	10 [1]	NS
Ostomy Bleeding	6.9 (5.5) [21]	5.5 (3.3) [4]	13 [1]	14.5 (2.12) [2]	5.8 (5.4) [15]	-	NS
Incontinence	3.8 (8.2) [65]	10.8 (15.5) [6]	5.3 (9.2) [3]	2.6 (3.8) [11]	3.6 (7.8) [42]	10 [1]	NS

NS : Not Significant

Methods/Interventions: We retrospectively reviewed both simple and complex fistula-in-ano repair by board certified colorectal surgeons from 2013 to 2017 at a single safety-net urban hospital. Treatment modalities ranged from simple fistulotomy to endorectal advancement flap with and without the use of fluorescent angiography. Patients who underwent fistulotomy, ERAF, and ERAF with FA were grouped (A, B, and C, respectively) by procedure type. All other cases that did not fit into these three groups were excluded from analysis. Demographics, intraoperative data, and 60-day outcomes were recorded and compared using STATA 13 (College Station, TX).

Results/Outcome(s): Sixty-four persons were identified that met inclusion criteria; 48 in Group A, 6 in Group B, and 10 in Group C. There was no difference in age, sex, BMI, ASA score or comorbidities between the three groups. Mean follow-up for all groups was 159.8 days (+/- 42 days). Group B and C had higher rate of prior surgeries (66.7% and 80%, respectively) when compared to group A (27.1%, $p=0.001$). Despite Group B and moreover group C having a higher rate of complexity as suggested by a significantly higher re-operative surgery rate, there were no significant differences in postoperative complication rates among the three groups. There were no mortalities in either groups.

Conclusions/Discussion: ERAF with FA is safe and feasible and should be considered when repairing complex fistula-in-ano.

INTERSPHINCTERIC COMPONENT IN COMPLEX FISTULA-IN-ANO LIKE AN ABSCESS AND SHOULD BE TREATED LIKE ONE: TRANSANAL OPENING OF INTERSPHINCTERIC SPACE (TROPIS) PROCEDURE IN 158 HIGHLY COMPLEX ANAL FISTULAS.

P395

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Purpose/Background: In complex fistulas with significant intersphincteric component (high transsphincteric, horseshoe and supraleator fistulas), the intersphincteric component acts like an abscess. Simply draining the intersphincteric sepsis once as is done in LIFT procedure would lead to recurrence in many cases (upto 50%). In such fistulas, laying open the intersphincteric part of the fistula through the transanal route (deroofting the abscess) ensures healing in most cases. This is the basis of TROPIS (transanal laying open of intersphincteric space) procedure. TROPIS was done and evaluated in highly complex fistulas.

Methods/Interventions: Methods/Interventions: In a prospective non-controlled study, all consecutive patients of complex high fistula-in-ano operated in a referral center were included in the study. All fistula were high (involving more than one-thirds of sphincter complex). Simple fistula in which fistulotomy was possible were excluded. Preoperative MRI scan was done in all the patients. The main outcome measures were healing rate, hospital stay, objective incontinence scores OPERATIVE PROCEDURE A curved artery forceps was inserted through the internal (primary) opening into the intersphincteric part of the fistula tract. The mucosa and the internal sphincter over the artery forceps were laid open inside the rectum with electrocautery. The incision,

P394 Table 1.

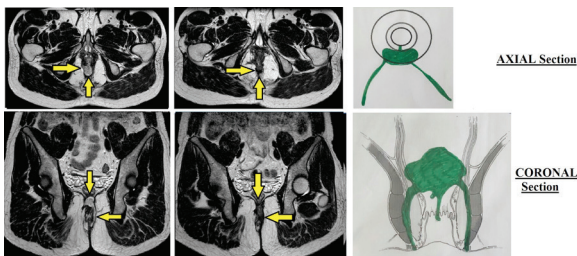
	Fistulotomy (n=48)	ERAF (n=6)	ERAF + FA (n=10)	
Prior Fistula Procedure, n (%)	11 (27.1)	4 (66.7)	8 (80)	P = 0.001
Prior Surgery Type, n (%)				
Fistulotomy	9 (18.8)	1 (16.7)	1 (10)	
LIFT	0 (0)	0 (0)	0 (0)	
Seton	4 (8.3)	3 (50)	7 (70)	
Complication Type, n, (%)				
Post-operative Urinary Retention	1 (2.1)	0 (0)	0 (0)	
Fecal Incontinence	0 (0)	0 (0)	1 (10)	
Abscess / Infection	4 (8.3)	0 (0)	0 (0)	
Flap Separation	0 (0)	1 (16.7)	1 (10)	
Complications Total, n, (%)	5 (10.4)	1 (16.7)	2 (20)	P = 0.693
Mortality, n, %	0 (0)	0 (0)	0 (0)	

Comparison of prior fistula procedures and outcomes

starting from the internal opening, was usually curvilinear but could also be oblique, depending upon the direction of the intersphincteric tract. In case of horseshoe fistula, the incision extended on both sides of the midline posterior internal opening. In case of supralelevator extension/tract, the incision was extended from the midline posterior internal opening up to the supralelevator rectal opening.

Results/Outcome(s): 158 patients with highly complex fistula-in-ano with a follow-up of 4-35 months (median-14 months) were included. Male/Female: 145/13, age-45.31 ±9.3 years. 77.8% (123) were recurrent, 82.3% (130) had multiple tracts, 34.8% (55) had horseshoe tract, 30.4% (48) had supralelevator extension and 31% (49) had associated abscess. Four patients were excluded (lost to follow-up). Fistula healed completely in 83.7% (129/154) and didn't heal in 16.3% (25/154). 23/25 of these were reoperated with same procedure and fistula healed in 20 patients. Thus overall healing rate was 96.7% (149/154). There was no significant change in incontinence scores.

Conclusions/Discussion: The success rate of TROPIS (>96%) in highly complex fistula (majority were recurrent fistula with multiple tracts, horseshoe tracts and supralelevator extension) is quite impressive. The external sphincter is not cut or damaged due to which the risk to continence is minimized. The technique is simple, easy to reproduce, associated with little pain and early resumption of normal activities.



Recurrent high posterior fistula with abscess in a 32 year old male patient. Axial section (Upper row).

Posterior intersphincteric abscess with fistula seen hyperintense on T2 image (Upper left panel), healed tract seen on T2 (upper middle panel), Schematic diagram-axial section (upper right panel).

Coronal section (Lower row). High Fistula and abscess extending to supralelevator region seen hyperintense on T2 image (lower left panel), healed tract seen hypointense on T2 (lower middle panel), Schematic diagram-coronal section (lower right panel).

BMI INFLUENCES DECISION FOR SURGERY IN ELECTIVE RESECTION FOR DIVERTICULITIS.

P396

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Purpose/Background: In recent years, the criteria for elective sigmoid resection in diverticular disease have evolved. Recently, more nuanced guidelines that emphasize individual factors such as surgeon judgement and patient quality of life have been adopted. Obesity is a recognized risk factor for perioperative complications and is anecdotally acknowledged as a factor that increases the technical difficulty of an operation. We set out to evaluate the impact of obesity on elective surgical recommendations for diverticulitis.

Methods/Interventions: We conducted a retrospective review of 143 patients undergoing colonoscopy after acute sigmoid diverticulitis by the colorectal surgeons at an urban tertiary referral center from January 2012-October 2017. Data for age, ASA class, race, smoking status, body mass index (BMI), number of episodes of diverticulitis, presence of intraabdominal abscess, and operative treatment recommendations were analyzed. We recorded which patients had been offered sigmoid resection and whether they ultimately underwent surgery. Logistic regression was used to analyze the data.

Results/Outcome(s): A total of 63 out of 143 (44%) patients were offered an elective operation for diverticulitis. Of these, 55 patients (38%) ultimately underwent surgery. Average BMI was 31.4 kg/m². Patients were separated into two groups based on BMI more or less than 30 kg/m². Patient factors associated with likelihood of being offered an operation were BMI < 30 kg/m² (OR=3.3, p<0.001) and increased number of episodes of diverticulitis (OR=1.8, p<0.001). The median BMI of those offered and not offered surgery was 28.1 kg/m² and 32 kg/m² respectively. The number of patients with intraabdominal abscesses found at the time of acute diverticulitis among those offered and not offered surgery was 14 and 13, respectively. The presence of intraabdominal abscess, age, ASA class, race, smoking status were similar in the surgical and non-surgical groups.

Conclusions/Discussion: Patients with a higher BMI were less likely to be offered elective resection of sigmoid diverticulitis. Further research is warranted to ascertain whether this phenomenon is more widespread, and if so, whether it is justified based on surgical outcomes.

COLORECTAL CANCER (CRC) WITH LUNG AND SYNCHRONOUS ELSEWHERE METASTASES TREATED WITH DEFINITIVE LUNG STEREOTACTIC BODY RADIOTHERAPY (SBRT): A CASE SERIES.

P397

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Purpose/Background: Metastatectomy is recommended for colorectal cancer (CRC) with solitary metastases isolated to lung or liver, as it may offer extended survival or even cure. However, the median survival for CRC patients with multiple metastases is 6-9 months, typically treated with chemotherapy alone as the standard of care, reserving local therapy for palliation only. We reviewed 10 cases of CRC with multiple metastases treated with neoadjuvant chemotherapy and stereotactic body radiotherapy (SBRT) to the lung.

Methods/Interventions: Between 2012 and 2017, 5 males and 5 females with CRC metastatic to the lung and one other extrapulmonary site were treated with lung SBRT and reviewed in this IRB-approved study. Patients were between the ages 54-79 (median 64.5), with an ECOG performance status of 0 (n=8), 1(n=1), or 2(n=1). Primaries consisted of 4 rectal and 6 colon tumors, clinically either T4(n=2) or T3(n=8) and 6 with positive nodes. Each patient had a single lung metastasis with a median size 1.2 cm (0.7 – 2.6 cm) prior to SBRT. All patients also had synchronous single metastasis to the liver (n=6), brain (n=1), soft tissue(n=1), or mediastinum(n=1). We analyzed how these patients were managed as well as their survival and disease control via Kaplan Meier analysis. Median follow-up was 28 months.

Results/Outcome(s): Eight of 10 patients received some combination of neoadjuvant capecitabine, 5-fluorouracil, oxaliplatin, bevacizumab, or cetuximab, all with at least a partial response. Resection of the primary CRC was performed on 8 of 10 patients with negative margins and the other 2 were non-surgical candidates with rectal cancer treated with definitive chemoradiation. Liver metastases were treated with resection during CRC surgery (n=2), SBRT(n=2), or chemotherapy alone(n=2). The brain and sternal metastases were treated with radiotherapy. All of the lung lesions progressed or remained the same size after chemotherapy, after which they underwent SBRT to 40-54 Gy in 4-6 fractions (median biologic equivalent dose=101 Gy). Median time from CRC resection to lung SBRT was 5 months. Six patients received adjuvant chemotherapy following SBRT. The median survival of all patients was 42 months, with a survival rate of 80%, 67%, and 55% at 1, 2, and 3 years respectively. Eight of 10 lung lesions treated with SBRT were locally controlled at last follow-up. Disease free progression was 66% and 39% at 6 months and 1 year, with median time to distant failure of

10 months. Progressive disease was treated with additional chemotherapy (1 with SBRT).

Conclusions/Discussion: In patients with CRC metastatic to the lung with up to two synchronous extrapulmonary metastases, SBRT to progressing lung metastases in the setting of chemotherapy-induced response to extrapulmonary metastatic site provides excellent disease control and improve median survival relative to historical controls.

SURGICAL MANAGEMENT OF PRIMARY COLONIC LYMPHOMA: BIG DATA FOR A RARE PROBLEM.

P398

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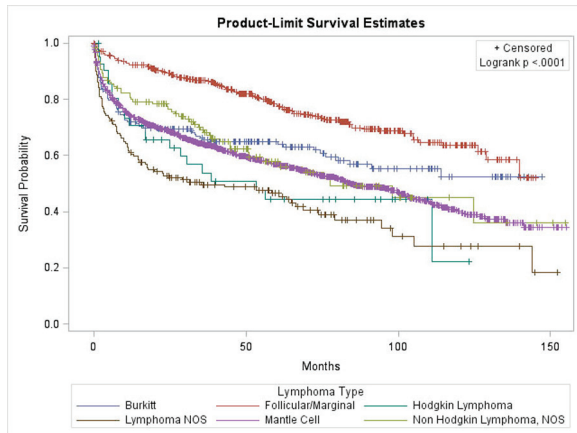
Purpose/Background: Lymphoma is an uncommon and heterogeneous malignancy of the colon. Treatment is individualized and often multidisciplinary, and there are few guidelines to assist the colorectal surgeon in management. We hypothesize that survival in primary colorectal lymphoma depends on histologic subtype and treatment strategy.

Methods/Interventions: The National Cancer Data Base (NCDB) was queried for all patients with primary colonic lymphoma who underwent resection between 2004 and 2014. Patients who underwent palliative resection were excluded. Demographic, histologic, hospital level, and treatment factors were analyzed for effect on survival with a Cox Proportional Hazard analysis.

Results/Outcome(s): After applying exclusion criteria, 2,747 patients were identified. The mean age was 65.8 (range 18-90) and 36% of the population was female. The three most common histologic subtypes were mantle cell (62%), follicular/marginal (17%), and Burkitt's Lymphoma (7%). 91% of patients underwent segmental colectomy and 3% underwent subtotal colectomy. 1,113 patients (40.5%) received adjuvant chemotherapy. The 5-year overall survival was 60.4%. Multivariate analysis revealed the following significant predictors of decreased mortality: follicular/marginal histology (HR: 0.38; 95% CI 0.31-0.46; p<0.001), age < 65 (HR: 0.35; 95% CI 0.31-0.41; p<0.001), adjuvant chemotherapy (HR: 0.58; 95% CI 0.51-0.66; p<0.001), Charlson Score of 0 (HR: 0.63; 95% CI 0.55-0.71; p<0.001), and R0 resection (HR: 0.79; 95% CI 0.71-0.90; p<0.001). Very few patients (<2%) received neoadjuvant chemotherapy or underwent radiation therapy, and these treatments were not associated with survival. Increasing stage was associated with increased mortality (Stage II HR: 1.25, p=0.008; Stage III HR 1.59, p=0.005; Stage IV HR 1.80; p<0.001).

Conclusions/Discussion: Colonic lymphoma is a rare and heterogeneous malignancy with a high five-year mortality rate. Follicular/Marginal histology is a favorable

sub-type. In general, surgeons should attempt R0 resection and strongly consider post-operative chemotherapy when appropriate.



Kaplan-Meier Curve for Overall Survival by Lymphoma Subtype

A SYSTEMATIC REVIEW OF OUTCOMES AFTER SALVAGE ABDOMINOPERINEAL RESECTION FOR PERSISTENT OR RECURRENT ANAL SQUAMOUS CELL CANCER.

P399

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Purpose/Background: Up to 30% of patients with squamous cell cancer of the anus (SCCA) will require a salvage abdominoperineal resection (APR) for either persistent or recurrent disease. The objective of this systematic review was to assess cancer-related outcomes in patients with (i) persistent or (ii) recurrent SCCA.

Methods/Interventions: We included publications that assessed outcomes after salvage APR for persistent or recurrent SCCA. EMBASE and MEDLINE were searched. The primary outcomes were overall survival (OS), disease free survival (DFS), and locoregional recurrence or metastatic disease.

Results/Outcome(s): A total of 21 retrospective, case series (range 9 – 111) met our inclusion criteria. The median time to salvage APR was 2.6 months (IQR 2.6 – 3.0 months, 5 studies) for persistent disease and 32.7 months (IQR 23.5 – 32.7 months, 4 studies) for recurrent disease. The median five-year OS from the time of salvage APR was 47.0% (IQR 31.0 – 52.3%, 8 studies) for persistent disease and 51.0% (IQR 28.0-60.9%, 9 studies) for recurrent disease. The median 5 year DFS following salvage APR was 30.0% (IQR 29.5 – 53.0%, 7 studies) for all patients. Following salvage APR, median locoregional recurrence rate was 39.5% (IQR 36.4– 77.9%, 16 studies) and 18.2% (IQR 14.7 – 32.6%, 17 studies) of patients developed metastatic disease after salvage APR.

Conclusions/Discussion: Our review characterizes the best evidence for outcomes following salvage APR for

patients with persistent or recurrent SCC. The evidence is limited by the quality of included studies, as many were single center case series.

OVERALL AND DISEASE-FREE SURVIVAL FOLLOWING COMPLETE PATHOLOGIC RESPONSE TO NEOADJUVANT CHEMORADIATION: A BENCHMARK FOR NON-OPERATIVE MANAGEMENT.

P400

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Purpose/Background: Neoadjuvant chemoradiation (nCRT) is commonly employed for patients with stage II and III rectal cancers. Approximately 15-20% of these patients will have a complete clinical response (cCR), with no remaining tumor evident on physical exam, endoscopy or imaging. A watch and wait approach has been advocated for these patients but long term outcome data is only beginning to emerge. It is difficult to know what constitutes an acceptable rate of recurrence in these patients, as data on outcomes in radically resected patients with cCR is sparse. The purpose of this study was to determine the long term oncologic outcomes and factors associated with recurrence in patients with clinical stage II or III rectal cancers who underwent a radical excision and had a complete pathologic response (pCR) following nCRT. This data should serve as a benchmark from which to compare watch and wait strategies.

Methods/Interventions: All patients diagnosed with clinical stage II and III rectal cancer from January 1, 2005 to December 30, 2013 in two major urban centers were identified. Those treated with neoadjuvant chemoradiotherapy with curative intent, followed by surgery were examined. Patients with a pCR were included in the cohort. Demographic, clinical and pathologic data were collected via retrospective provincial e-chart review.

Results/Outcome(s): 581 patients met the inclusion criteria. 102 patients (17.6%) had a pCR following nCRT. Seventy-three patients were male (71.6%) and the average age was 60.0 years (28-84). Thirty-nine patients had clinical stage II and sixty-three patients had clinical stage III disease. 30-day mortality was 1.0%. Seventeen (16.7%) patients have died. Nine patients (8.8%) experienced disease recurrence. Eight patients experienced distant disease recurrence and one patient experienced local and distant disease recurrence. Median follow up was seventy-one months (14-144). Increasing age was associated with decreased overall survival (OS) and disease-free survival (DFS) ($p < 0.001$ and $p = 0.001$). Smoking status ($p = 0.83$ and $p = 0.76$), gender ($p = 0.14$ and $p = 0.29$), diabetes ($p = 0.72$ and $p = 0.67$) and height of tumour (0.92

and 0.96) were not related to OS or DFS. Kaplan-Meier estimated five year OS and DFS were 87.8% (95% CI 79.5 - 92.9) and 86.8% (95% CI 78.4 - 92.2) respectively.

Conclusions/Discussion: Patients treated with a radical resection after pCR have favourable OS and DFS. Increasing patient age was associated with decreased OS and DFS. Centers employing a watch and wait strategy in patients with a cCR following nCRT should use these results as benchmarks when analyzing outcomes.

PRIMARY ANASTOMOSIS WITH OR WITHOUT DIVERSION IS SAFE IN THE MANAGEMENT OF PERFORATED COLON CANCER.

P401

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Purpose/Background: Short-term outcomes after primary anastomosis with diverting ileostomy for perforated diverticulitis are comparable to Hartmann's procedure, but markedly decrease the likelihood of permanent stoma. We sought to compare perioperative outcomes of primary anastomosis with or without diverting ileostomy to Hartmann's colostomy in perforated colon cancer.

Methods/Interventions: Data were obtained from the ACS-NSQIP database from 2012-2015. We identified patients who underwent emergency surgery for perforation with a diagnosis of colon cancer. Patients with wound class 1 and 2 were excluded, as these operations likely did not represent free perforation. Using CPT coding, we stratified three groups for analysis: anastomosis without diversion, anastomosis with diversion, and Hartmann's procedure. Patient characteristics, comorbidities, perioperative variables, and postoperative complications were compared between groups. Multivariate logistic regression was used to determine predictors of 30-day morbidity and mortality; age, sex, BMI, ASA class, diabetes, preoperative hematocrit and albumin were used as covariates.

Results/Outcome(s): 453 patients were included in the analysis, of which 157 (34.6%) underwent anastomosis without diversion, 44 (9.7%) anastomosis with diversion, and 252 (55.6%) Hartmann's procedure. Age, ASA score and BMI were similar between groups. Operative time was significantly shorter ($p < 0.01$) for anastomosis without diversion (133 minutes) compared to Hartmann's procedure (150 minutes) and anastomosis with diversion (164 minutes). There was no difference in length of stay, readmission, discharge to facility, or death within 30 days of admission. Rate of intra-abdominal abscess, anastomotic leak, pulmonary embolism, pneumonia, renal failure, sepsis, and shock were similar between groups. The incidence of urinary tract infection was significantly higher ($p < 0.01$) in the anastomosis with diversion cohort (9.1%), compared to the anastomosis without diversion (0.6%)

or Hartmann's cohort (2.0%). On multivariate analysis, surgical strategy was not a significant predictor of 30-day morbidity or mortality.

Conclusions/Discussion: Patients managed with primary anastomosis with or without proximal diversion have similar short-term outcomes to those undergoing a Hartmann's procedure. Primary anastomosis is a safe alternative to end colostomy in many patients requiring emergency surgery for perforated colon cancer.

A COMPARISON OF PERIOPERATIVE NUTRITIONAL STATUS AMONG PATIENTS WITH SURGICALLY CURABLE GASTRIC OR COLORECTAL CANCER: A PROPENSITY SCORE-MATCHED ANALYSIS.

P402

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Purpose/Background: Patients with gastrointestinal tract cancers can suffer from nutritional inadequacies that are caused by the cancer itself, impaired absorption of nutrients, disrupted secretion of enzymes, disturbed passage of intestinal contents and consequences from surgery of the GI tract. Because most patients with GI tract cancer undergo curative surgery, the change in nutritional status preoperative vs. postoperative is very important. We investigated the change in nutritional status after curative surgery in patients with gastric cancer (GC) or colorectal cancer (CRC) using various nutritional screening tools preoperative and postoperative. Also, we compared the nutritional effects of different types of surgery

Methods/Interventions: In our hospital, 407 patients (206 patients with GC and 201 patients with CRC) underwent surgery between July 2011 and June 2012. Of these, 195 patients with GC and 176 patients with CRC underwent curative resection. We matched patients from the two groups using the propensity score and then analyzed the data from 170 patients (85 patients in GC group and 85 patients in CRC group). Next, we retrospectively evaluated patients' nutritional status at the time of admission for surgery and at discharge after surgery using 4 nutritional screening tools: the malnutrition screening tool for cancer patients (MSTC), the Seoul National University Bundang Hospital Nutritional Screening Tool (SNUBH-NST), the Malnutrition Universal Screening Tool (MUST), and the Nutritional Risk Screening (NRS) 2002. Significance was defined as $P \leq 0.05$, and $P \leq 0.1$ was regarded as marginal significance.

Results/Outcome(s): In the preoperative period, the nutritional status in the GC group was slightly better than that in the CRC group according to MUST ($P < 0.001$) and NRS 2002 ($P = 0.079$). The preoperative risk of malnutrition was not related to incidence of postoperative morbidity. In both groups, the postoperative nutritional status was

significantly impaired compared to the preoperative status. In contrast to before the surgery, the postoperative nutritional status of CRC patients was significantly better than that of GC patients according to the MSTC ($P=0.004$) and MUST ($P=0.007$). At the time of hospital discharge after surgery, the incidence of lower serum albumin level ($P=0.002$) and more than 5% weight loss ($P=0.013$) were higher in GC group than in CRC group. Comparing the postOP nutritional status among the types of surgery in each group, total gastrectomy in the GC group ($P=0.015$) and proctectomy with diverting stoma in the CRC group ($P=0.06$) were related to more than 5% weight loss.

Conclusions/Discussion: Gastrointestinal cancer surgery might negatively affect patients' postoperative nutritional status, especially in GC surgery. Therefore, continued assessment of nutritional status and appropriate nutritional support is necessary to enhance recovery after surgery

SURGICAL OUTCOMES OF ROBOTIC SURGERY FOR COLORECTAL CANCER FOLLOWING NEOADJUVANT CHEMORADIATION THERAPY.

P403

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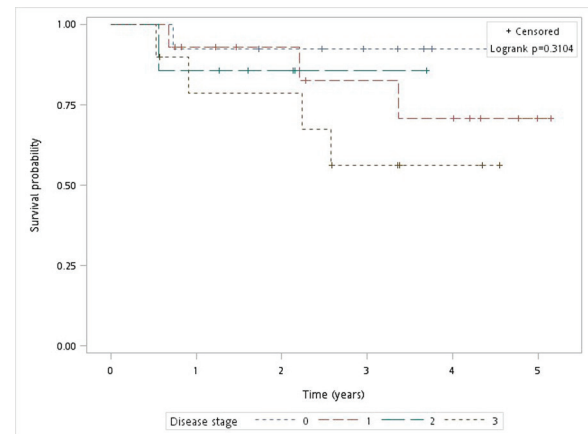
Purpose/Background: Laparoscopic surgery has gradually become a popular surgical option in colorectal cancer. It leads to shorter hospital stays and lower complication rates than open colorectal surgery. However, currently laparoscopic colorectal cancer surgery can be challenging due to straight laparoscopic instruments and compromised ergonomics in patients with difficult anatomy. Robotic surgery can alleviate some technical limitations. This study aimed to examine the surgical outcome of robotic surgery following neoadjuvant chemoradiation therapy for colorectal cancer.

Methods/Interventions: We included patients with colorectal cancer diagnosed at the National Taiwan University Hospital between March 2012 and February 2017. We reviewed retrospectively medical records of 62 patients who underwent robotic surgery after neoadjuvant chemoradiation therapy. The information about their demographics, clinical characteristics, and surgical outcomes were collected.

Results/Outcome(s): The 62 patients included 43 men and 19 women, 29-78 years of age, with an average age of 58.06 years. The distribution of clinical stage in the study was 3(5%) with stage I, 10(16%) with stage II, 34(55%) with stage III and 15(24%) with stage IV disease. Thirteen patients had a pathological complete response after neoadjuvant concurrent chemoradiotherapy. In the 62 patients with LNM, the mean number of harvested lymph node was 15.47 (SD = 8.73). All resection of primary tumor was complete. Among 62 patients, 47 (75.8%) patients received low anterior resection, 9 (14.5%) patients received pull

through procedure, and 6 (9.7%) patients received abdominoperineal resection. The mean operation time was 5.18 hours and the mean blood loss was 186.6ml. The majority of postoperative complication were urine retention (16%), ileus (8%) and anastomotic leakage (3%). Of 3 patients without protective stoma, one died due to septic shock. The 30-day mortality rate was 1.6%.

Conclusions/Discussion: Robotic surgery for colorectal cancer following neoadjuvant chemoradiation therapy is shown to be safe and feasible. Robotic technology provided a good pathological result and short-term outcomes.



Disease free survival

NOVEL SCORING SYSTEM EVALUATING PALLIATIVE PRIMARY TUMOR RESECTION PROVIDES SURVIVAL BENEFITS FOR PATIENTS WITH UNRESECTABLE METASTATIC COLORECTAL CANCER.

P404

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Purpose/Background: It remains controversial whether the palliative primary tumor resection (PPTR) in patients with synchronistic unresectable metastatic colorectal cancer (mCRC) can provide survival benefits. The aim of this study is to found a new scoring system to evaluate the survival benefits of PPTR in these patients.

Methods/Interventions: Consecutive patients with synchronistic mCRC and unresectable metastases admitted to Sir Run Run Shaw hospital between January 2005 and December 2015 were identified. A new scoring system (from 0 to 4 points) was established by the serum level of carcinoembryonic antigen (CEA), cancer antigen 19-9 (CA19-9), neutrophil/lymphocyte ratio (NLR), and lactate dehydrogenase (LDH). Patient with 0 or 1 point was considered as low score group. Patient with 2 to 4 point was considered as high score group. The overall survival (OS) was compared between PPTR group and Non-PPTR group, low score PPTR group and high score PPTR group.

Results/Outcome(s): A total of 133 eligible patients were identified, including 103 who underwent PPTR and 30 who did not. The median OS of Non-PPTR and PPTR group was 15.90 months and 26.17 months ($p < 0.01$). However, the subgroup of PPTR with high scores (2-4 point) showed no OS benefit (19.23 months) compared with Non-PPTR group (15.9 months, $p = 0.11$). The subgroup of PPTR with low scores (0 or 1 point) had better OS than Non-PPTR group (31.20 vs 15.90 months, $p < 0.001$).

Conclusions/Discussion: A new scoring system composed of CEA, CA19-9, NLR and LDH is a reliable method to evaluate whether mCRC patients would benefit from PPTR. It might guide clinical decision-making in patients with unresectable mCRC.

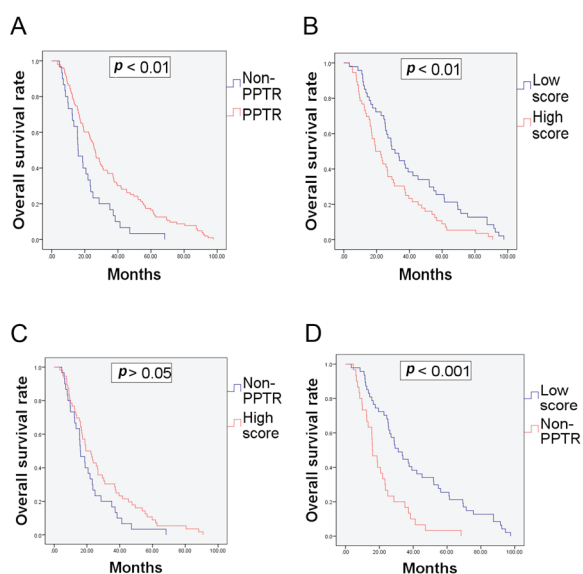


Figure 1 Overall Survival Stratified by Primary Resection and Scoring System
PPTR, palliative primary tumor resection; Non-PPTR, without palliative primary tumor resection; High score, 2, 3 or 4 points; Low score, 0 or 1 point

LONG-TERM ONCOLOGIC OUTCOMES AFTER ROBOTIC VERSUS LAPAROSCOPIC RIGHT COLECTOMY: A PROSPECTIVE RANDOMIZED STUDY.

P405

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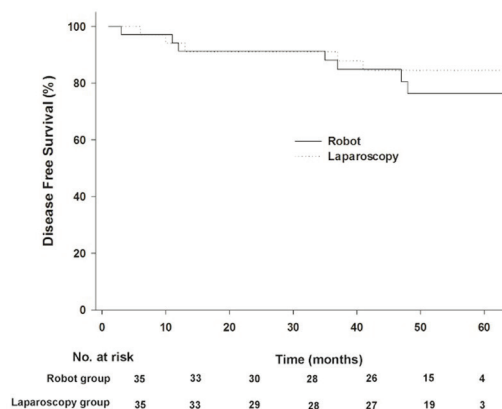
Purpose/Background: There is increasing enthusiasm for the use of robotic techniques to treat colorectal malignancies. However, the oncologic safety of robot-assisted right colectomy (RAC) has not been defined. The aim of this study was to compare the long-term outcomes of RAC with those for conventional laparoscopy-assisted right colectomy (LAC) for treating right-sided colon cancer.

Methods/Interventions: From September 2009 to July 2011, 71 patients with right-sided colon cancer were included in the study, randomized into two groups treated

with RAC or LAC. Adjuvant therapy and postoperative follow-up were similar in both groups. The primary and secondary endpoints of the study were hospital stay and survival, respectively. Data were analyzed by intention-to-treat. This trial was registered with ClinicalTrials.gov, number NCT00470951.

Results/Outcome(s): The RAC and LAC groups did not differ significantly in terms of baseline clinical characteristics. Compared with LAC, RAC was associated with longer operation times (195 min vs. 129 min, $P < 0.001$) and higher cost (\$12,235 vs. \$10,319, $P = 0.013$). The median follow-up was 49.2 months (interquartile range, 40.6–56.2). The combined 5-year disease-free survival for all tumor stages was 77.4 % (95% confidence interval [CI], 60.6–92.1%) in the RAC group and 83.6% (95% CI, 72.1–97.0%) in the LAC group ($P = 0.442$). The combined 5-year overall survival rates for all stages were 91.1% (95% CI, 78.8–99.9%) in the RAC group and 91.0% (95% CI, 81.3–99.9%) in the LAC group ($P = 0.678$). Using multivariate analysis, RAC was not a predictor of recurrence.

Conclusions/Discussion: RAC appears to provide similar survival outcome to LAC, but we did not observe any long-term clinical benefits that could compensate for the increase in the cost of RAC compared with LAC.



Disease-free survival

PREDICTING FACTORS OF BOWEL DYSFUNCTION AFTER SPHINCTER-PRESERVING SURGERY IN RECTAL CANCER PATIENTS.

P406

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Purpose/Background: With increasing rate of sphincter-preservation owing to advances in preoperative chemoradiation (pCRT), restoration of bowel continuity (BC) has been regarded as one of main goals in treating rectal cancer (RC). However, many of them suffer from bowel dysfunction (BD) postoperatively, and it negatively affects their quality of life. Therefore, the aim of this study is

to assess BD and analyze predicting factors of BD after sphincter-preserving surgery (SPS) in RC patients.

Methods/Interventions: A total of 316 patients with RC who underwent SPS between Feb 2009 and April 2017 in Severance hospital were included. All the patients had no cognitive impairment and no previous anal surgery. The Memorial Sloan Kettering Cancer Center Bowel Function Instrument (MSKCC BFI) was used as an assessment tool. A health-care provider who was educated for MSKCC BFI interviewed the patients in outpatient clinic from Nov 2015 to June 2017. We dichotomized the patients with the median of the total MSKCC scores (> 65 (good function, $n=151$) vs. ≤ 65 (poor function, $n=161$) for analysis. Time interval (TI) was calculated from the day of restoration of BC by SPS or ileostomy take-down.

Results/Outcome(s): Mean age was 60.0 ± 12.11 . Upper, mid and low RC comprised of 27.5%, 48.15% and 24.4%, and 46.8% of the patients received pCRT. The patients underwent LAR (76.6%), uLAR (17.7%) or ISR (5.7%). Half of the patients had loop ileostomy. The median TI between restoration of BC and assessment was 10 months (interquartile range (IQR) 3~37), and the median total MSKCC score in the whole population was 65 (IQR 58~73). Median frequency of bowel movement for a day was five (IQR 3~10/day). Total MSKCC score was positively correlated with TI with rho of 0.279 in Spearman's rank correlation test ($p < 0.001$). In the univariable analysis, tumor level (low rectum), pCRT, operation type (uLAR or ISR), stoma formation, method of anastomosis (hand-sewn), length of distal margin (close margin) and TI (short interval) were associated with poor function ($p < 0.001$ for each). In multivariable analysis, hand-sewn anastomosis

and TI were independently associated with BD with odds ratio (OR) of 2.997 (95% confidence interval (CI) 1.466~6.125) and OR of 2.964 (95% CI 1.832~4.795), respectively (Table 1). In subgroup analyses according to the TI, for the patients within 1 year of restoration of BC, hand-sewn anastomosis was the only independent factor of BD with OR of 3.339 (95% CI 1.346~8.280). For the patients over 1 year after restoration of BC, loop ileostomy was the only independent factor with OR of 3.353 (95% CI 1.421~7.914).

Conclusions/Discussion: BD after SPS seems to be recovered by time after SPS or ileostomy take-down. Hand-sewn anastomosis and short TI were significantly associated with BD after SPS in RC patients. When patients with RC is planned to undergo SPS, surgeons should carefully discuss about postoperative BD with their patients before operation.

COSTS ANALYSIS OF ROBOTIC RECTAL RESECTION WITH TME: A COMPARISON BETWEEN THE DA VINCI SI AND XI.

P407

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Purpose/Background: While several studies have been published regarding clinical and surgical benefits of robot-assisted colorectal surgery since the da Vinci Surgical System was introduced, to date few studies have reported a structured cost analysis, and none have

P406 Table 1. Multivariable analysis of associating factors of postoperative bowel dysfunction

	Odds Ratio (95% Confidence Interval)	p-value
Level of tumor		
Upper ($10 < AV \leq 15$ cm)	1	
Mid ($6 \leq AV \leq 10$ cm)	0.953 (0.515~1.762)	0.848
Low ($AV < 6$ cm)	1.049 (0.299~3.682)	0.941
Preoperative treatment		
No	1	
Chemoradiation	1.237 (0.700~2.188)	0.464
Chemotherapy	0.279 (0.030~2.619)	0.264
Operation		
Low anterior resection	1	
Ultra-low anterior resection	1.106 (0.235~5.200)	0.899
Intersphincteric resection	0.945 (0.126~7.108)	0.956
Anastomosis method		
Stapled	1	
Hand-sewn	2.997 (1.466~6.125)	0.003
Stoma creation	1.699 (0.986~2.927)	0.056
Distal margin (mm)	0.991 (0.974~1.008)	0.274
Time from surgery (≤ 1 year)	2.964 (1.832~4.795)	< 0.001

analyzed the possible differences in costs between da Vinci Si and new da Vinci Xi. The aim of this study is to compare surgical parameters and costs of robotic surgery in rectal cancer with the use of da Vinci Si and Xi surgical system.

Methods/Interventions: From April 2010 to April 2017, 90 robotic rectal resections were performed at our Institute with the da Vinci Si (Si-RobTME), until December 2015, or with the da Vinci Xi (Xi-RobTME), since January 2016.

Based on CUSUM analysis two comparable groups of 40 consecutive Si-RobTME and 40 consecutive Xi-RobTME were identified, and data of the prospectively collected database were retrospectively compared. Costs of the two procedures were collected and analyzed against the device specific robotic learning curve.

Results/Outcome(s): The CUSUM learning curves of the two groups were identical and were divided into two phases: Si1 and Xi1: cases 1–19; Si2 and Xi2: cases

P407

	Median [Q1-Q3]	P-value Mann-Whitney	P-value Mann-Whitney
Operative Time (min)			
Robot Si phase 1 (n=19)	325 [310-330]	<0.001	
Robot Si phase 2 (n=21)	290 [255-320]		P=0.003 vs S1
Robot Xi phase 1 (n=19)	310 [265-350]		P=0.246 vs Si1 P=0.307 vs Si2
Robot Xi phase 2 (n=21)	265 [240-280]		P<0.001 vs Si1 P=0.052 vs Si2 P=0.009 vs Xi1
Overall variable costs (Euro)			
Robot Si phase 1 (n=19)	10445 [9610.2-11798.4]	<0.001	
Robot Si phase 2 (n=21)	10231.9 [9566.7-10811.5]		P=0.421 vs Si1
Robot Xi phase 1 (n=19)	7598.3 [7083.2-8334]		P<0.001 vs Si1 P<0.001 vs Si2
Robot Xi phase 2 (n=21)	7983 [6931.1-10791.7]		P=0.002 vs Si1 P=0.009 vs Si2 P=0.592 vs Xi1
Personnel costs (Euro)			
Robot Si phase 1 (n=19)	1412.3 [1347.2-1434.1]	<0.001	
Robot Si phase 2 (n=21)	1260.2 [1108.2-1390.6]		P=0.003 vs S1
Robot Xi phase 1 (n=19)	1347.2 [1151.6-1521]		P=0.246 vs Si1 P=0.307 vs Si2
Robot Xi phase 2 (n=21)	1151.6 [1043-1216.8]		P<0.001 vs Si1 P=0.052 vs Si2 P=0.009 vs Xi1
Costs of hospital stay (Euro)			
Robot Si phase 1 (n=19)	4245.4 [3773.7-4717.1]	0,001	
Robot Si phase 2 (n=21)	4717.1 [3773.7-5660.5]		P=0.258 vs Si1
Robot Xi phase 1 (n=19)	2830.3 [2358.6-3773.7]		P<0.001 vs Si1 P<0.001 vs Si2
Robot Xi phase 2 (n=21)	3302 [2358.6-6132.2]		P=0.205 vs Si1 P=0.046 vs Si2 P=0.503 vs Xi1
Consumable costs (Euro)			
Robot Si phase 1 (n=19)	4380.8 [4380.8-5324.5]	<0.001	
Robot Si phase 2 (n=21)	3869.7 [3741.5-4059.5]		P<0.001 vs Si1
Robot Xi phase 1 (n=19)	3464.4 [3082.8-3464.4]		P<0.001 vs Si1 P<0.001 vs Si2
Robot Xi phase 2 (n=21)	3464.4 [3464.4-3464.4]		P<0.001 vs Si1 P<0.001 vs Si2 P=0.872 vs Xi1

20–40. No differences in the preoperative data, surgical procedure and pathological data were documented. A hybrid laparoscopic/robotic approach was used in 17 cases (42.5%) in the Si-RobTME group, in contrast to the full robotic approach used in all cases of Xi-RobTME group ($p < 0.001$). Overall median operative time (OT) was significantly lower in Xi-RobTME than in Si-RobTME (275 vs 312.5 min, $p = 0.021$). A statistically significant change in OT by phase of robotic experience was detected ($p < 0.001$), and median OT of phase Xi2 was lower than phase Si2 (265 vs 290 min, $p = 0.052$) with a reduction of personnel costs (1151.6 vs 1260.2, $p = 0.052$). Statistically significant reductions in overall variable costs were found between robotic phases ($p < 0.001$) and resulted lower in the Xi2 phase respect to the Si2 phase (7983 vs 10231.9, $p = 0.009$). A statistically significant reduction in consumable costs by robotic phase was detected ($p < 0.001$) and consumable costs of the Xi2 phase were significant lower than Si2 phase ($p < 0.001$).

Conclusions/Discussion: The similar learning curve for both groups were likely due to a ‘proficiency-gain effect’ related mainly to the use of a new robotic technology and not to the surgical operation itself. In fact, facing the new technology the surgeon must deal with new trocar dispositions, robotic cart position, new functions (pointing, targeting, camera hopping, etc.), new docking system and robotic arms regulation. Nevertheless, we found a significant optimization of costs with surgeon’s experience and shifting from the old to new technology as well. We found this result as mainly due to the shorter OT, personnel costs and to the reduction of the consumable costs because of the higher number of full robotic approach registered with the da Vinci Xi.

PROGNOSTIC FACTORS FOR EARLY RECURRENCE AFTER NEOADJUVANT CHEMORADIO THERAPY FOLLOWED BY TOTAL MESORECTAL EXCISION IN RECTAL CANCER.

P408

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Purpose/Background: Over the past two decades, outcomes of patients with rectal cancer has improved dramatically. Improvements in surgical techniques, new imaging modalities, and widespread use of neoadjuvant therapy have reduced local recurrence rates, increased survival rates and quality of life. But still locally recurrent rectal cancer is associated with high morbidity and mortality especially with early recurrent patients. We aimed to evaluate the risk factors and prognostic impact of early recurrence in the patients who received preoperative chemoradiotherapy followed by total mesorectal excision (TME) for rectal cancer.

Methods/Interventions: Among 1033 patients who were taken a curative resection after pCRT of rectal cancer from January 2000 to December 2014, 226 patients who developed recurrence after resection for rectal cancer stage I-III were included. The patients were divided into two groups: early recurrence (ER), diagnosed <12 months after primary surgery, and late recurrence (LR), diagnosed ≥ 12 months after primary surgery. Clinicopathological characteristics and survival rate between two groups were compared and a Cox proportional hazards model was used to determine the relationship of early recurrence to survival after adjusting for preoperative covariates.

Results/Outcome(s): Among 1033 patients, 106 patients experienced early recurrence and 120 had late recurrence. There was no significant differences in clinicopathologic results between two groups. Multivariate analysis revealed that tumor regression grade (HR 1.976, 95% CI 1.090-3.582 $P = 0.025$), abdominoperineal resection (HR 2.564, 95% CI 1.387-4.742, $P = 0.003$) correlated with the early recurrence. The pattern of systemic recurrence was more common in early recurrence than late recurrence (65.1% vs. 58.3%). The overall survival rates for early and late recurrence were significantly different (57.3% vs. 72.7%, $P < 0.001$). In multivariate analysis, early recurrence (OR 3.383, 95% CI 2.225-5.143, $P < 0.001$), histologic grading (OR 2.673, 95% CI 1.664-4.293, $P < 0.001$) and ypT stage (OR 2.2992, 95% CI 1.759-5.091, $P < 0.001$) and abdominoperineal resection (OR 1.538, 95% CI 1.019-2.322, $P = 0.04$) was an independent predictor for unfavorable overall survival.

Conclusions/Discussion: Rectal cancer patients with early recurrence after neoadjuvant chemoradiotherapy followed by TME showed poor survival outcome. Furthermore early recurrence, T4 tumors and worse histologic grading and abdominoperineal resection cause inferior oncologic outcomes in rectal cancer patients. Therefore we need to evaluate tumor response more early for neoadjuvant chemoradiotherapy and updated treatment protocol for high risk rectal cancer patients.

DISTINCT PROGNOSIS OF HIGH VERSUS MID/LOW RECTAL CANCER: A PROPENSITY SCORE MATCHING STUDY.

P409

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Purpose/Background: To evaluate the prognostic difference between high and mid/low rectal cancer.

Methods/Interventions: Patients with rectal adenocarcinoma in stage I-III undergoing curative-intent surgery were enrolled between 2007 and 2013 in this retrospective analysis. Cases following neoadjuvant therapy or with concurrent cancers were excluded. Propensity score

matching as well as Cox regression analysis were performed to identify the difference of overall survival (OS) and cancer-specific survival (CSS) between high and mid/low rectal cancer.

Results/Outcome(s): Among 646 enrolled patients, there were 440 cases (68.1%) with high rectal carcinoma and 206 cases (31.9%) in the mid/low rectal region. Before matching, tumors in high rectum were inclined to have more differentiated histological type, pT4 stage, negative lymph node, preoperative ileus and lower serum albumin concentration than those in mid-low rectum. Kaplan-Meier curves showed that high rectal tumor had no statistical difference in 5-year OS (78.8% versus 71.7%, $p=0.070$), but a better 5-year CSS (87.1% versus 80.5%, $p=0.016$) compared to mid/low rectal tumor. After matching (206 patients in each group by propensity score), most baseline characteristics (ie.length of stay, operative time and surgical procedure) were balanced between two groups except some location-related datas. The 5-year OS rate of high rectal cancer was better than the mid-low one (78.8% versus 67.5%, $p=0.027$). A similar result was found in 5-year CSS rate (87.1% versus 79.8%, $p=0.030$). As stratified analysis illustrated, significant difference was only found in stage III carcinomas (OS: 66.9% versus 45.7%, $p=0.009$; CSS: 74.7% versus 57.1%, $p=0.011$), but not in stage I (OS: 93.8% versus 74.6%, $p=0.058$; CSS: 100.0% versus 94.4%, $p=0.239$) and stage II (OS: 81.2% versus 86.1%, $p=0.449$; CSS: 90.9% versus 93.4%, $p=0.712$) carcinomas. Multivariate analysis indicated that high tumor location was a significant independent prognostic factor both for OS (HR=0.559, 95%CI: 0.359-0.868) as well as CSS (HR=0.471, 95% CI: 0.256-0.866). Further analysis showed that Charlson Comorbidity Index (CCI), tumor stage, histology grade, lymphovascular invasion, carcinoembryonic antigen(CEA) level and Clavien–Dindo Classification were strongly associated with overall survival. Moreover, all these factors except CEA level and CCI significantly correlated with cancer-specific survival.

Conclusions/Discussion: High rectal adenocarcinoma demonstrated better overall and cancer-specific survival than the mid/low in stage III, and tumor location was an independent prognostic factor for patients with rectal carcinomas. This validates previous studies that tumor located in the high rectum might not necessarily receive intensive therapy just as the latter.

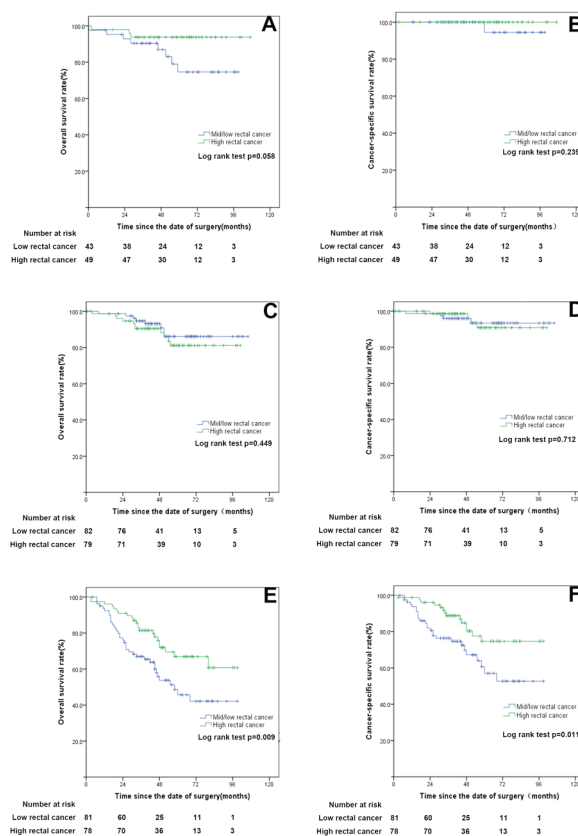


Figure 1. Kaplan-Meier curves for overall and cancer-specific survival after propensity score matching. Panels (A, C, and E) depict the overall survival in stage I-III, while panels (B, D, and F) depict the cancer-specific survival in stage I-III. The number of rectal cancer patients at risk are given below each plot.

RECTAL CANCERS AS A PROPORTION OF THE COLORECTAL CANCER BURDEN IN PATIENTS WITH HEREDITARY COLORECTAL CANCER SYNDROMES: A CLUE TO WHAT IS HAPPENING IN THE YOUNG SPORADIC PATIENTS TODAY?

P410

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Purpose/Background: Over the last two decades there has been a surge in the incidence of sporadic left sided colorectal cancers in people under age 50. In fact two thirds of colorectal cancers in patients under age 50 are rectal. The reasons for this surge are unknown, but may include genetic phenomena. There are now several recognized syndromes of hereditary colorectal cancer, each due to a different genetic mechanism. We hypothesized that a review of rectal cancer incidence in these syndromes may provide a clue to the genetic mechanism underlying sporadic colorectal cancer in the young. This study aimed to test the hypothesis.

Methods/Interventions: We used Cologene™ our IRB approved database for Hereditary Colorectal Cancers to identify all incident colorectal cancers presenting in patients with hereditary syndromes of colorectal cancer.

Familial adenomatous polyposis (FAP) was defined by genotype or typical phenotype. Lynch syndrome and MYH associated polyposis (MAP) were defined by the presence of deleterious germline mutations, serrated polyposis was defined by the latest WHO criteria, HNPCC was defined by Amsterdam II criteria, and familial colorectal cancer was defined as a family history of colorectal cancer with at least 2 first degree relatives affected. We abstracted demographic and racial information on the patients affected. The proportion of cancers that were in the rectum was tabulated according to syndrome. This is the primary end point. Secondary endpoints include demographics, ethnicity and gender.

Results/Outcome(s): The proportion of cancers in each syndrome occurring in the rectum are listed in table. Rectal cancer is significantly more common in FAP, and in FAP cancer as a whole occurred in significantly younger patients. Gender distribution of rectal cancer favored men except in MAP where numbers were small.

Conclusions/Discussion: Rectal cancers are relatively uncommon in the two major syndromes of hereditary cancer caused by mutations in DNA repair genes. Rectal cancer is more common when the genetic defect is a germline APC mutation. This confirms other studies downplaying microsatellite instability and hypermethylation in the rectal mucosa. We conclude that the rectal epithelium seems vulnerable to loss of function of the wnt /wingless signal transduction pathway, especially in the young.

MULTIVISCERAL RESECTION IN COLON CANCER.

P412

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Purpose/Background: Multivisceral resection (MVR) of involved contiguous organs in locally advanced colon cancer is known to offer long term survival, especially if an RO resection is achieved. Careful decision making is essential in patient selection, considering the extent of surgery required for an RO resection, the surgical fitness of the patient and the competing co-morbid conditions.

Methods/Interventions: This is a retrospective analysis of a prospectively maintained database of all patients undergoing a curative MVR for colon cancer at the Tata Memorial Centre, Mumbai from June 2013 to July 2017. Perioperative outcomes and survival were analysed.

Results/Outcome(s): During the study period, a total of 646 colon resections were performed, 76 of these were curative MVRs of at least one contiguous organ involved by tumour adhesion. There were 54 male and 22 female patients with a median age of 57 years (28-82 years). Majority of patients were ASA 1/2 (89.4%) with a mean BMI of 21.65 kg/m². 3 patients in this series had MVR for recurrent disease. The site of primary and involved contiguous organs are mentioned in table 1. 19 patients had > 1 contiguous organ resection [2 organs (15 pts), 3 organs (3 pts), 4 organs (1 pt)] and 4 patients received an en-bloc pancreaticoduodenectomy. An R0 resection was achieved in 93.4% patients with a mean blood loss of 500ml (0.1-3.8L). Poorly differentiated adenocarcinoma was seen in 25% patients and 39.4% had node positive disease. Pathological infiltration of the resected contiguous organ (T4b) was seen in 35.5%. Clavien Dindo Grade III/IV complications were seen in 11.8% and median hospital

P410 The proportion of cancers in each syndrome occurring in the rectum

	Number of Cancers	% of Rectal Cancers	Mean Age at Cancer Diagnosis (years)	% Caucasians with Rectal Cancer	% African American with Rectal Cancer	M:F Colon Cancer	M:F Rectal Cancer
Familial Adenomatous Polyposis	228	47	29.6	49.1	14.3 (2/14)	55:66	56:51
MYH Associated Polyposis	32	25	45.7	25.0	0	13:11	3:5
Lynch Syndrome	62	15	42.7	15.0	0	27:27	6:2
HNPCC by Amsterdam Criteria	305	22	48.7	29.0	22.2 (2/9)	131:108	38:28
Serrated Polyposis	31	13	65.0	12.0	33.3 (1/3)	16:11	3:1
Familial Colorectal Cancer	71	28	57.7	27	40.0 (2/5)	25:26	13:7
Total	729	29				267:249	119:94

stay was 10 days (5-48 days). There were 3 post-operative deaths, 2 of which involved patients operated as emergency procedures; one with a perforated tumour and fecal peritonitis and the second with an obstructed and bleeding tumour. The third perioperative mortality in this series was an 80yr old male, with hypertension and chronic renal disease and a bulky sigmoid mass with a fistulous communication with the bladder. At the time of analysis, median follow up duration was 15.7 months and neither the median overall survival (OS) nor disease free survival (DFS) were reached. 3 year estimated OS and DFS were 94.1% and 58.2% respectively. Recurrent disease (local and/or distant) was significantly associated with nodal positivity ($p=0.016$).

Conclusions/Discussion: MVR can be undertaken with acceptable morbidity and mortality for the treatment of locally advanced colon cancer with high rates of R0 resection and encouraging results of long term cancer control.

ROBOT-ASSISTED SURGERY FOR COLORECTAL LIVER METASTASIS: A SINGLE CENTER EXPERIENCE.

P413

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Purpose/Background: Although minimally invasive surgery (MIS) of the liver is increasingly widespread, its role in the treatment of colorectal metastasis (CRLM) remain uncertain. Frequent issues regard feasibility and oncological safety of MIS for CRLM are considered:

multiple localization, inherent limitations of the intra-operative laparoscopic probes in performing a complete study of the liver, synchronous presence of primary tumor to be resected or previous surgery. In this setting, the role of robot-assisted surgery (RAS) has not been evaluated in literature yet. The aim of this study, is to report our experience with RAS for treatment of CRLM.

Methods/Interventions: Surgical and oncological data of all the robot-assisted liver resections for CRLM performed at our center, were retrieved from the prospectively-collected Institutional database, and retrospectively analyzed. All the resections were performed with the da Vinci platform (Si since 2012, and Xi since 2015 for multiple organs resections), through a combined used of monopolar scissors (right hand), and of bipolar Maryland forceps or Gyrus PK SuperPulse Generator (left hand). Intra-operative US scan was obtained with a dedicated robotic probe using the TilePro™ function.

Results/Outcome(s): Sixteen patients underwent robot-assisted resection of CRLM, between May 2012 and July 2017. Four patients (25%) had multiple synchronous CRLM resections (median = 2; range 2 – 3). The tumor size averaged 3.1 ± 1.6 cm. All the lesions were removed following a parenchymal sparing approach, with R0 resection margins. In two cases, with the aid of da Vinci Xi, a synchronous colon resection was performed, whereas in the remaining cases the primary cancer had already been removed (8/14, 57%, with MIS and 6/14, 43%, with traditional approach). There was no conversion to open surgery and no intraoperative complications. Mean hospital stay was 4.5 ± 1.4 days. The mean follow up was 27.3 ± 19 months. During the study period there were no local recurrences; while 7 patients (43%) developed new

P412 Table 1: Site of Primary and Contiguous organ involvement

Organ involved	No. of Patients	Site of Primary	No. of Patients
Abdominal wall	20	Caecum, appendix, ascending colon, hepatic flexure	44
Small bowel	17	Transverse colon	8
Ilio-psoas	10	Splenic flexure, descending colon	13
Duodenum	10	Sigmoid, rectosigmoid	11
Retroperitoneal perinephric fat	9		
Urinary bladder	8		
Stomach	7		
Duodenojejunal Flexure	4		
Distal pancreas	4		
Pancreatic Head	3		
Liver	2		
Gall bladder	2		
Iliac bone	1		
Femoral Nerve	1		
Colon	1		
Diaphragm	1		

systemic metastasis. Eight patients (50%) were treated with pre-operative systemic chemotherapy whereas eleven cases (68%) underwent post-operative chemotherapy. All patients are still alive with a 1 and 3 years disease-free survival of 77.5% and 36.3% respectively.

Conclusions/Discussion: In our experience, RAS for CRLM surgical treatment was feasible, and played a positive role even in multiple localization and previous or synchronous surgery. The availability of a dedicated US scan intraoperative probe, managed directly with the dominant hand of the surgeon, similarly to the open approach, could improve safety in the management of multiple localization. The da Vinci Xi could improve ability to perform multiquadrant surgery, particularly useful in presence of synchronous primary tumor to be resected. RAS seemed to be oncologically safe in this setting, as no patients experienced local relapse in the treated area.

NEOADJUVANT CHEMORADIATION IMPROVES ONCOLOGICAL OUTCOMES IN MIDDLE AND LOWER CT3N0 RECTAL TUMOURS.

P414

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Purpose/Background: Controversial data exists in the current literature in regard of using neoadjuvant chemoradiation (nCRT) in patients with clinical T3N0 (cT3N0) rectal cancers, in particular based on location and relation to peritoneal reflection. In this study we aimed to analyse nCRT impact on oncological outcomes among cT3N0 rectal cancers. We hypothesized that oncological outcomes would be variable depending the tumour height from anal verge (HAV) and was analysed on centimetre basis.

Methods/Interventions: Patients with cT3N0 rectal cancers were included after querying a prospectively maintained rectal cancer database from 1980-2016. Clinical stage was determined with abdominopelvic CT, transrectal endoscopic ultrasound, and/or pelvic MRI. Exclusion criteria were cN+, hereditary colorectal syndromes, inflammatory bowel diseases, lack of preoperative nodal staging, intraoperative radiotherapy. Patients' cohort was divided into 2 groups based on nCRT use. Oncological outcomes were analysed in regard to HAV (by each cm from anal verge) using Kaplan Meier curves. Multivariate models were developed taking into account only preoperative factors, including age, gender, body mass index (BMI), type of surgery (APR vs. other), location of rectal cancer, use of nCRT.

Results/Outcome(s): A total of 592 patients with cT3N0 were identified. 364 (61.4%) patients received nCRT and 228 (38.6%) patients did not. Patients who

received nCRT were younger and had higher BMI. Groups were comparable in regard of tumour location and grade (**Table**). Kaplan Meier analysis demonstrated significantly improved disease free survival (DFS) in nCRT group [0.86 (0.82 – 0.90)] vs. non nCRT group [0.68 (0.61 – 0.77)] for rectal cancers at any heights below 8 cm from AV ($p < 0.001$). For lesions above 8 cm and higher nCRT did not influence DFS [0.84 (0.72 – 0.98)] vs. non nCRT [0.71 (0.57 – 0.86)], ($p = 0.08$). A multivariate analysis identified use of nCRT [OR 0.38 (95% confidence interval (CI) 0.24 – 0.59), $p < 0.0001$] and distance from AV [1.15 (95% CI: 1.05 – 1.27), $p = 0.003$] as significant factors for DFS for patients with lower rectal cancers < 8 cm. Multivariate analysis for higher rectal cancers identified only age [1.02 (95% CI: 1.00-1.05), $p = 0.04$] as significant factor associated with DFS, while use of nCRT [0.54 (95%CI: 0.29 – 1.03), $p = 0.06$] and distance from AV [0.87 (95% CI: 0.73 – 1.03), $p = 0.12$] did not reach statistical significance.

Conclusions/Discussion: nCRT significantly improves DFS outcomes in cT3N0 rectal tumours lower than 8 cm. With tumours higher than 8 cm significant benefit is lost.

ROBOTICS CONFERS AN ADVANTAGE IN RIGHT HEMICOLECTOMY WITH INTRACORPOREAL ANASTOMOSIS WHEN MATCHED AGAINST CONVENTIONAL LAPAROSCOPY.

P415

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Purpose/Background: When laparoscopic colectomy was first proposed as an alternative to open surgery, most surgeons were performing anastomoses after exteriorizing the bowel. One of the reasons for eschewing an intracorporeal anastomosis is the technical challenge of laparoscopically suturing close the staple enterocolotomy. The introduction of robotics addressed this issue, resulting in many of the publications on robotic hemicolectomies describing intracorporeal instead of extracorporeal anastomoses. Comparisons between robotic and laparoscopic right hemicolectomy have thus been confounded by variations in operative technique. This study evaluates the two procedures after standardizing the intraoperative steps and perioperative management.

Methods/Interventions: Patients who underwent robotic right hemicolectomy using the da Vinci Xi between July 2015 and June 2017 were matched with a laparoscopic group. Only cases with intracorporeal anastomoses were included. Perioperative management was in accordance to an Enhanced Recovery protocol. Outcomes and histopathologic data were compared.

Results/Outcome(s): Thirty two patients were included. Amongst the patients who did not undergo complete mesocolic excision (CME), the median operative time did

not differ between the two groups ($p=0.413$). The robotic group recorded a statistically shorter time for intracorporeal anastomosis (13 vs 19 min, $p=0.024$). Postoperative recovery and complication rates were similar, except for a greater lymph node harvest in the robotic group (41 vs 31, $p=0.038$).

Conclusions/Discussion: Right hemicolectomy with complete mesocolic excision and intracorporeal bowel anastomosis can be performed safely by laparoscopy and robotics, with the latter platform providing superior ergonomics and potential advantages in oncological outcomes at the expense of added operative time.

LONG TERM SEXUAL FUNCTION IN RECTAL CANCER SURVIVORS.

P416

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Purpose/Background: Recent improvements in rectal cancer treatment has resulted in an increased incidence of cancer survivors. Multimodality rectal cancer treatment causes bowel, urinary and sexual dysfunction, however, there is limited quantitative data on long term sexual dysfunction in the literature, especially in female rectal cancer survivors. This study was designed to quantify rates

of sexual dysfunction in rectal cancer survivors, with the secondary aim to query patient interest in intervention for sexual dysfunction.

Methods/Interventions: The electronic medical record was queried for patients who underwent surgery for rectal cancer in the preceding five years using CPT code. Patients were deidentified and a questionnaire mailed to the available addresses. Patients were reimbursed with a \$15 gift card after survey completion. The patient questionnaire included the following validated surveys: Quality of Life measure for oncology (QoL-30), Quality of Life Questionnaire Colorectal Cancer Module (QLQ-CR29), Female Sexual Function Index (FSFI) and International Index of Erectile Function (IIEF). Frequencies and percentages were used to summarize responses to individual items. Means and standard deviations were computed for continuous scales. Chi-square tests and Fisher exact tests were used to compare categorical variables. Spearman rank correlation analyses were used to assess associations between sexual and bowel dysfunction scales.

Results/Outcome(s): Response rate was 21%, 16 females and 28 males ($n=44$). At the time of survey 32% of respondents were sexually active, with 68% not sexually active. 50% of males recalled one of their physicians asking about sexual function during or after treatment, as compared to 19% of females ($p=0.041$). The percentage of males and females who wished one of their physicians

P414 Patients' characteristics between groups.

Parameter	nCRT (n=364)	No nCRT (n=228)	p value
Age, years	60 ± 12	66.2 ± 13	<0.001
Body mass index, kg/m ²	25 ± 11.1	21 ± 14	<0.001
Gender, male	247 (68)	140 (61.5)	0.10
ASA classification			0.77
1-2	155 (42.6)	98 (43)	
3-4	209 (57.4)	129 (57)	
Location			0.78
Low (<5 cm from AV)	208 (57.2)	133 (58.5)	
Middle (5-10 cm from AV)	118 (32.4)	72 (32)	
Upper (>10 cm from AV)	38 (10.4)	22 (9.5)	
Pathological stage			
cPR	38 (10.4)	0	n/a
I	120 (33)	55 (24)	0.02
II	105 (29)	74 (32.5)	0.35
III	69 (19)	76 (33.5)	0.42
IV	27 (7.6)	23 (10)	0.77
Grade			
Well differentiated	27 (7.5)	16 (7)	0.85
Moderately differentiated	278 (76.5)	166 (73)	0.33
Poorly differentiated	59 (16)	46 (20)	0.48
Surgical procedure (APR vs. other)	109 (30)	67 (29.3)	0.95

Data represented as n, percentage, mean and standard deviation (SD), unless otherwise specified. nCRT = neoadjuvant chemoradiation therapy. AV = anal verge. cPR = complete pathologic response. APR = abdominoperineal resection.

had discussed the possibility of sexual dysfunction was the equivalent: 57% versus 56% respectively. In males, the QoL-30 significantly correlated with orgasmic function ($r=0.45$, $p=0.017$) and overall satisfaction ($r=0.55$, $p=0.003$), whereas in females, sexual dysfunction was not significantly associated with quality of life.

Conclusions/Discussion: Our findings indicate that rectal cancer patients experience sexual dysfunction postoperatively and desire intervention. Other studies have shown that patient and provider attitudes toward this topic impact its recognition and treatment. Our data suggests that men and women are counseled differently regarding postoperative sexual dysfunction. The importance of sexual function on quality of life is less important to women than to men. Limitations in this study include reliance on patient recall and that not all patients answered all the survey questions. This small retrospective study demonstrates the need for further discussion and treatment of sexual dysfunction in rectal cancer survivors. Design of a prospective trial and ultimate development of a treatment algorithm for sexual dysfunction in these patients are the next steps.

RADIATION DOSE ESCALATION AND STOMA-FREE SURVIVAL IN RECTAL CANCER PATIENTS UNDERGOING NEOADJUVANT CHEMORADIATION AT A SINGLE INSTITUTION.

P417

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Purpose/Background: Neoadjuvant chemoradiation (CRT) improves local control and sphincter preservation for cT3-4 or cN+ rectal cancer. Several studies have suggested that increase in radiation dose leads to improved rate of pathologic complete response (pCR), but its effect on permanent stoma rate and complications is less well described. We examined the effect of increase in radiation dose (54Gy vs. ≤ 50.4 Gy) on stoma-free survival, postoperative complications, and pCR.

Methods/Interventions: Defined data was abstracted from a retrospective chart review of patients with rectal adenocarcinoma treated at our institution from 2010 to 2017. Patients with metastatic disease on presentation or incomplete records were excluded. Patients treated with 54Gy of radiation were compared to those treated with ≤ 50.4 Gy. Uni- and multivariate Cox proportional hazard models were used to assess factors associated with stoma-free survival. Stoma-free survival probability data were plotted using the Kaplan-Meier method with survival differences assessed using the log-rank test. Significance was set at p -value <0.05 .

Results/Outcome(s): Sixty-seven patients with cT3-4 or cN+ rectal adenocarcinoma were included in the analysis. Out of the entire cohort, 30% received 54Gy of radiation. APR, diverting ileostomy or colostomy was created in 82% of patients. Overall, of the patients not initially treated with an APR, 30% of patients did not have reversal of a diverting ileostomy or did have a conversion to an end colostomy resulting in a permanent stoma rate of 35% in the 54Gy vs. 30% in the ≤ 50.4 Gy group, $p=0.67$. Amongst the reasons for a permanent stoma were presence of postoperative complications and tumor recurrence. The 5-year stoma-free survival was 44.1% in those who had a complication vs. 71.8% in those who did not (Fig 1). Postoperative complications were identified in 25% in the 54Gy vs. 36% in the ≤ 50.4 Gy group, $p=0.37$. The overall pCR rate was 10% in the 54Gy vs. 26% in the ≤ 50.4 Gy group, $p=0.15$. However, in the 54Gy group 30% of the patients pursued a watch and wait protocol vs. 4% in the ≤ 50.4 Gy group, $p=0.2$. The overall clinical complete response (cCR) rate was 40% in the 54Gy vs. 30% in the ≤ 50.4 Gy group, $p=0.4$.

Conclusions/Discussion: In our cohort of rectal cancer patients undergoing neoadjuvant CRT, the permanent stoma rate in those undergoing a procedure with sphincter sparing intent was 30%. This was not significantly affected by radiation dose escalation or increasing use of watch and wait protocol. There was a trend towards shorter 5-year stoma-free survival in patients with postoperative complications.

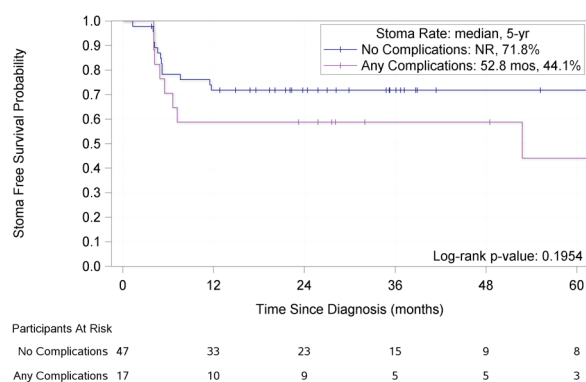


Figure 1. Stoma-free survival with respect to presence of complications

RETURN TO THE OPERATING ROOM WITHIN 30 DAYS AFTER COLORECTAL RESECTION.

P418

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Purpose/Background: This study's purpose was to assess the patients and indications for Return To the Operating Room (RTOR) within 30 days after elective colorectal resections in 1 hospital.

Methods/Interventions: A retrospective review of all colorectal resections over a 10 year period was carried out. The data was obtained from a prospective IRB approved perioperative database and the hospital/office records. The students T test and chi square, where appropriate, were used for data analysis.

Results/Outcome(s): A total of 2069 patients underwent colorectal resections (MIS 1329 [67%], Open 648 [32.8%]). Within 30 days of initial surgery, 92 (4.4%) patients had complications that required RTOR for definitive management. Of the RTOR patients, initial indications for surgery were: cancer, 51 (55.4%); colitis 29 (31.5%); and benign neoplasm/other 12 (13%). The location of initial pathology in the RTOR group was: right colon, 22.9%; transverse colon, 2.2%; left colon, 4.4%; sigmoid colon, 31.5%; rectum, 38%; and total colectomy 1.1%. In the RTOR group there were disproportionately more rectal patients (38% vs 16.8%) and fewer right colectomy patients (22.9% vs 36.8%) than in the no RTOR group ($p < 0.05$). Of note, there were disproportionately more Open RTOR and fewer MIS patients than in the no RTOR group (Open, 60 vs 33%; MIS 40 vs 67%, $p < 0.05$). Although not significant, the proportion of RTOR patients who had preop RT or chemo was greater than in the no RTOR group (RT 15.7% vs 9.8%; chemo 17.3% vs 11.2%). Average days to return to OR after initial surgery was 9.5 (0-30) days. The majority of re-operations (67, 72.8%) occurred on the same admission as the initial surgery. The most frequent indications for return to OR were: abscess/leak, 38%; wound complications (infection/dehiscence/ evisceration), 14.1%; bleeding, 13%; bowel obstruction, 12%; and genitourinary (GU) issues (ureteral obstruction/injury), 9.8%. Of note, the majority of the GU complications were bilateral ureteral obstruction related to removal of ureteral stents. These were treated with cystoscopy and placement of double J stents. The remainder were ureteral injuries in non stented patients. As regards all complications, the RTOR group incidences were significantly higher (examples: MI 5.4 vs 0.8%; pneumonia 12 vs 0.2%; DVT 5.4 vs 0.6%). The RTOR perioperative mortality was significantly higher (5.4%) than in the no RTOR group (0.4%). As expected, patients requiring return to OR had a significantly increased length of stay (22.9 days vs 6.7 days).

Conclusions/Discussion: Patients undergoing colorectal resection have a low rate of complications requiring RTOR. The most frequent indications for return to OR were complications related to the anastomosis, wound, bleeding, bowel obstruction and ureteral obstruction/injury. There were disproportionately more rectal resection and open RTOR patients. As expected, the overall morbidity and mortality of the RTOR patients is notably higher than the no RTOR group.

COLORECTAL LYMPHOMA: A CONTEMPORARY CASE SERIES.

P419

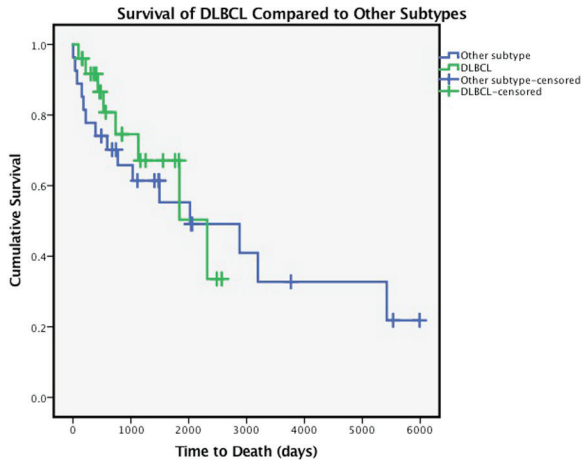
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Purpose/Background: Primary colon and rectal lymphomas are rare, comprising <1% of all colon and rectal malignancies and 10-20% of gastrointestinal lymphomas. Colon and rectal lymphoma can also occur in the context of post-transplant lymphoproliferative disorder (PTLD). The aim of this study was to characterize the presentation, diagnosis, and management of colorectal lymphoma and identify potential differences within the transplant population.

Methods/Interventions: Retrospective review of all patients evaluated for colorectal lymphoma at 4 hospitals within a single health system from 2000 through 2017 was performed. Patients were identified through a combination of diagnosis codes and clinical note keyword queries. Patients with a follow up of less than 3 months were excluded.

Results/Outcome(s): 52 patients (64% male, mean age 64 [26-91] years) were identified. Most common presentations were rectal bleeding (27%), abdominal pain (23%), and diarrhea (23%). Diagnosis was confirmed by endoscopic biopsy (60%), surgical resection (31%) and surgical biopsy (9%). 21% of cases required multiple diagnostic interventions including repeat endoscopic biopsies to diagnose lymphoma. The most common primary location was the cecum (62%). Eleven (21%) patients had multifocal disease, including 3 with lymphomatous polyposis. The most frequent histopathologic subtypes were diffuse large B-cell (DLBCL) (48%) and mantle cell (25%) lymphomas. Eight (15%) patients had PTLT. The most frequent tumor locations in PTLT were the cecum ($n=4$) and the rectum ($n=4$); 3 patients had multifocal disease. The most common PTLT histology was DLBCL (75%). Most patients with PTLT (63%) were treated with chemotherapy alone. Of the entire cohort, 20 patients were initially managed with chemotherapy. Three (15%) of these patients (all DLBCL) returned with perforation requiring emergency surgery. In 28 patients managed with primary resection, 5 (18%) required *en-bloc* resection of additional organs or abdominal wall. Seven (25%) patients had deep or organ-space surgical site infections and only one patient was diverted. The median overall survival for all patients was 77.3 (IQR 24.5 to 180) months, with similar survivals for DLBCL versus other histologies (77 versus 67 months; $p=0.73$; Figure 1). In patients with recurrent lymphoma, the median time from recurrence to death or last follow up was 44 (IQR 6-66) months. Of the 23 deaths, 57% were due to lymphoma.

Conclusions/Discussion: Colorectal lymphoma is rare and often requires multiple interventions to establish the diagnosis. This study demonstrated a 15% risk of perforation in patients treated with upfront chemotherapy. Patients had reasonable overall survival, often with long survival after recurrence, potentially due to the effectiveness of an aggressive management by oncology.



ARE RECTAL CANCER PATIENTS WITH PRETREATMENT N2-POSITIVE DISEASE SUITABLE FOR “WATCH AND WAIT” PROTOCOLS? AN ACS-NSQIP ANALYSIS.

P420

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Purpose/Background: Following neoadjuvant chemoradiotherapy (CRT), up to 20% of patients will achieve pathological complete response (pCR), which has been associated with excellent long-term outcomes. As such, nonoperative management or “Watch and Wait” protocols were introduced in 2004 and are gaining interest across the globe. The purpose of this study was to use a large multicenter validated database to assess predictors of pCR following neoadjuvant CRT.

Methods/Interventions: After institutional review board approval, all elective cases of cT2-4, N0-2 rectal cancer treated with neoadjuvant CRT followed by proctectomy in 2016 were identified from the American College of Surgeons National Surgical Quality Improvement Program Proctectomy-Specific database. Patients with metastatic disease or missing clinical or pathologic stage were excluded. Demographics, comorbidities, operative details and tumor characteristics were collected. Carcinoembryonic antigen level and tumor size were not captured in this database.

pCR was defined as ypT0N0 on final pathology. Predictors of pCR were assessed by multivariate logistic regression.

Results/Outcome(s): Of 597 patients who underwent proctectomy for cT2-4, N0-2 rectal cancer, 369 received neoadjuvant CRT. Of these patients, 53 (14.4%) achieved pCR. There was no difference in mean age, sex or other patient characteristics when comparing patients who achieved pCR to those who did not (Table 1). When comparing patients who achieved pCR to those who did not achieve pCR, the groups were similar with regards to tumor location (upper 1/3, 8.2% vs. 9.4%; middle 1/3, 46.9 vs. 34.3%; lower 1/3, 44.9% vs. 56.2%; $p=0.23$), pretreatment T-stage (cT2, 11.3% vs. 8.9%; cT3, 75.5% vs. 77.5%; cT4, 13.2% vs. 13.6%; $p=0.85$) and pretreatment N-stage (cN0, 43.4% vs. 38.9%; cN1, 50.9% vs. 42.4%; cN2, 5.7% vs. 18.7%; $p=0.06$). On multivariate regression, after controlling for gender, BMI, pretreatment T-stage and tumor location, N2 disease was identified as an independent negative predictor of pCR (OR 0.18, 95%CI 0.04-0.82, $p=0.02$). N1 disease, however, was not a negative predictor of pCR.

Conclusions/Discussion: Clinical N2 disease is a negative predictor of pCR. As such, inclusion of patients with pretreatment N2 disease in “Watch and Wait” protocols should be revisited. More data are needed to validate the other known risk factors for achieving pCR.

Table 1. Patient Characteristics

Factor	No pCR (n=316)	pCR (n=53)	p-value
Age (years), mean (SD)	59.8 (13.2)	58.6 (13.7)	0.54
Sex, n (%)			
Male	195 (61.7%)	31 (58.5%)	0.66
Race, n (%)			
White	248 (85.5%)	36 (80.0%)	0.60
Black	21 (7.2%)	5 (11.1%)	
Other	21 (7.2%)	4 (8.9%)	
ASA, n (%)			
1	6 (1.9%)	1 (1.9%)	0.99
2	119 (37.7%)	21 (39.6%)	
3	186 (58.9%)	30 (56.6%)	
4	5 (1.6%)	1 (1.9%)	
BMI, (kg/m ²), mean (SD)	28.0 (6.4)	28.4 (6.4)	0.68
Diabetes, n (%)	49 (15.5%)	6 (11.3%)	0.43
Hypertension, n (%)	121 (38.3%)	20 (37.7%)	0.94
Smoker, n (%)	64 (20.3%)	11 (20.8%)	0.93
Dyspnea, n (%)			
Moderate or severe	8 (2.5%)	1 (1.9%)	0.78
Bleeding disorder, n (%)	8 (2.5%)	1 (1.9%)	0.78
Preoperative steroid use, n (%)	9 (2.8%)	3 (5.7%)	0.29
Wound classification, n (%)			
Clean or Clean-contaminated	269 (85.1%)	44 (83.0%)	0.83
Contaminated	39 (12.3%)	8 (15.1%)	
Dirty	8 (2.5%)	1 (1.9%)	
Pre-operative WBC (x10 ⁹ /L), mean (SD)	5.5 (1.8)	5.3 (1.7)	0.48
Pre-operative Hematocrit (%), mean (SD)	38.6 (4.1)	39.3 (4.0)	0.68
>10% weight loss in 6 months prior to surgery, n (%)	27 (8.5%)	2 (3.8%)	0.23
Pre-operative dialysis, n (%)			
No	315 (99.7%)	53 (100.0%)	0.68

COMBINED PROCTECTOMY AND HEPATECTOMY FOR STAGE IV RECTAL CANCER IS SAFE WITH SIGNIFICANT 5-YEAR SURVIVAL RATES.

P421

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Purpose/Background: Approximately 40,000 new cases of rectal cancer were diagnosed in 2017. Combined proctectomy and resection of synchronous liver metastases remains controversial due to concerns for increased morbidity and mortality, and the unclear impact on long-term survival.

Methods/Interventions: Patients diagnosed with stage IV rectal cancer between 2010-2015 were identified using the National Cancer Data Base. Patient with lung, brain and bone metastases were excluded, including only patients with "liver metastasis at diagnosis". Patients who underwent combined proctectomy and hepatic resection were identified by presence of a proctectomy code in "surgery of the primary site" field and a code for simultaneous "non-primary surgery to distant site" in the "other surgery" field. Univariate analysis was used to examine 30- and 90-day mortality by age. Overall survival was determined by the Kaplan-Meier method. Multivariable logistic analysis was performed to identify patient and hospital characteristics associated with receipt of combined resection (CR).

Results/Outcome(s): We identified 9,012 patients diagnosed with stage IV rectal cancer with hepatic metastasis between 2010-2015; 1,331 (14.8%) underwent CR. The rate of CR decreased with age; 21% of the patients <50 years old underwent CR, compared to 17% of those 50-69 and 11% of those over 70 ($p < 0.001$). The 30-day mortality for patients <50, 50-69, and >70 was .32%, .31%, and 1.8% respectively ($p = 0.04$). In patients <50 and 50-69, the 90-day mortality was 0.63% and 0.92%, respectively. In 70+ patients, this rate was 4.1% ($p = 0.001$). The median overall survival for patients <50, 50-69, and >70 was 54 months, 50.6 months, and 45.5 months respectively (Figure 1). On multivariable analysis, patients and hospital factors were associated with receipt of CR. Older patients were much less likely to undergo CR. African Americans and Hispanics were almost 60% (OR 0.42, $p < 0.001$) and 45% (OR 0.55, $p < 0.001$), respectively, less likely to undergo CR. Compared to patients with private insurance, those with Medicaid (OR 0.57, $p < 0.001$) or those uninsured (OR 0.29, $p < 0.001$) had significantly lower odds of undergoing CR. Finally, patients diagnosed at academic hospitals (OR 3.7, $p < 0.001$) or integrated cancer programs (OR 1.94, $p < 0.001$) had significantly greater odds of CR compared to those diagnosed at community hospitals.

Conclusions/Discussion: We demonstrated that simultaneous proctectomy and hepatic resection can be performed with low 30- and 90- day mortality, and can provide significant 5-year survival. Disparities, however, exist in receipt of CR with minority patients and those diagnosed at community hospitals being much less likely to undergo this aggressive approach. Understanding the reasons for these disparities will be key in increasing access to safe and efficacious treatment for advanced rectal cancer.

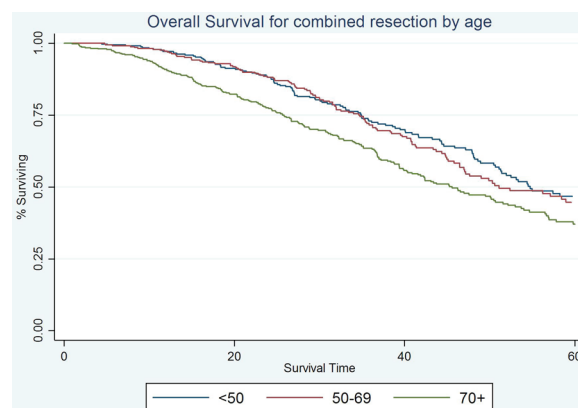


Figure 1

UTILIZING 18F-FDG PET/CT TO PREDICT POSTOPERATIVE OUTCOMES IN PATIENTS WITH PRIMARY COLORECTAL CANCER: A RETROSPECTIVE ANALYSIS.

P422

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Purpose/Background: Recent staging systems for colorectal cancer (CRC) demonstrate a shift towards more individualized algorithms. These models do not include preoperative 18F-FDG PET/CT characteristics. It has been documented in certain malignancies that standardized uptake value (SUV) of the primary tumor is an independent predictor of prognosis. We aimed to investigate a relationship between preoperative 18F-FDG PET/CT characteristics, tumor pathology and postoperative outcomes in the setting of CRC.

Methods/Interventions: This single institution, retrospective study identified patients between July 2004 and February 2013 with biopsy-proven CRC, a preoperative staging 18F-FDG PET/CT and available pathology report following surgical resection. Patient demographics, characteristics of the preoperative 18F-FDG PET/CT images and features of the resected tumor from the surgical pathology

report were recorded. Final analyses included descriptive statistics and analyses focusing on mortality as the dependent variable of interest. Continuous data were analyzed using independent samples t-test; and categorical data were analyzed using chi-squared analysis or Fisher's Exact Test where appropriate. Additional analyses included multivariate logistic regression (MLR) to control for the effect of possible confounding variables.

Results/Outcome(s): Data were collected for a total of 81 patients (41 male, 40 female). The median age for patients was 61 years (range 30-94 years). The median size of the primary tumor was 4 cm (range: 0-8.5 cm). Distribution of nodal status: pN0, 29 patients (39%); pN1, 26 patients (35%); and pN2, 20 patients (26%). The median SUV_{max} was 12.5 (range: 2.2-27.1). Descriptive statistics of the cohort are summarized in Table 1. The final logistic regression model included the following variables: age, sex, race, tumor size, nodal status, and SUV_{max} of the primary tumor. Of these, SUV_{max} was the only variable significantly associated with mortality (SUV_{max}-Low: OR = 0.25, 95%CI = 0.06-0.87, p < 0.05). Further analysis showed this model sufficiently discerned between the binary levels of our outcome variable (AUC = 0.70); and sufficiently explained the data without overfitting (Hosmer and Lemeshow Goodness of Fit test > 0.05).

Conclusions/Discussion: Preoperative SUV_{max} of the primary tumor is a significant predictor of mortality and should be considered in patients diagnosed with colorectal cancer.

LAPAROSCOPIC TOTAL PELVIC EXENTERATION IN LOCALLY ADVANCED ADENOCARCINOMA OF RECTUM POST CHEMORADIOTHERAPY: SINGLE CENTRE EXPERIENCE IN TEN CASES.

P423

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Purpose/Background: Since last two decades minimally invasive techniques have revolutionized surgical field. In 2003 Pomel first described laparoscopic pelvic exenteration, since then very few reports have described minimally invasive approaches for total pelvic exenteration.

Methods/Interventions: We report the ten cases of locally advanced rectal adenocarcinoma which were operated between the periods of 1.3.2017 to 5.11.2017 at Tata memorial hospital, Mumbai. All male patients had lower rectal cancer with prostate involvement on MRI. One female patient had uterine and fornix involvement. All perioperative and intraoperative parameters collected retrospectively from prospectively maintained electronic data.

Results/Outcome(s): Nine male patients with diagnosis of non metastatic locally advanced lower rectal adenocarcinoma were selected. All patients were operated with minimally invasive approach. All patients underwent abdominoperineal resection with permanent sigmoid stoma. Ileal conduit was constructed with Bricker's procedure through small infraumbilical incision (4-5 cm). Lateral pelvic lymph node dissection was done only when post CRT MRI showed enlarged pelvic nodes. All ten patients received neoadjuvant chemo radiotherapy while eight patients received additional neoadjuvant chemotherapy. Mean

P422 Descriptive Characterization of the Data

Variable	Result
Age	61 (30-94)
Sex	Male: 41 (51%)
Race	White: 57 (71%) Black: 13 (16%) Other: 10 (12.5%)
CEA	10.1 (0.05-8400 ng/mL)
Size of Primary Tumor	4 (0.6-8.5 cm)
pT	pT0: 3(4%) pT1:1(1%) pT2: 10(13%) pT3: 52(68%) pT4: 11(14%)
pN	pN0: 29 (38%) pN1:26 (35%) pN2: 20 (27%)
Positive Nodes	1 (0-12)
Metastases	37 (47%)
Chemotherapy/	67 (83%)
Chemoradiation	
Progression at Follow Up	40 (49%)
Pathology	Adenocarcinoma: 72(89%) Mucinous: 9 (11%)
SUVmax of Primary Tumor	12.5 (2.2-27.1)
Mortality	20 (26%)

Continuous variables are described as: median (range); categorical values are described as: number (%)

BMI was 21.73 (range 19.5–26.3). mean blood loss was 1000 ml (range 300–2000ml). Mean duration of surgery was 9.13 h (range 7–13 h). One patients developed paralytic ileus which was managed conservatively. One patient developed intestinal obstruction due to herniation of small intestine behind left ureter and ileal conduit. Same patient developed acute pyelonephritis which was managed with antibiotics. Mean postoperative stay was 14.6 days (range 9–25 days). On postoperative histopathology all margins were free of tumour in all cases.

Conclusions/Discussion: Minimally invasive approaches can be used safely for total pelvic exenteration in locally advanced lower rectal adenocarcinoma. All patients had fast recovery with less blood loss. In all patients R0 resection was achieved with adequate margins. Long term oncological outcomes are still uncertain and will require further follow up.

FAT STRANDING AS A FINDING IN COMPUTED TOMOGRAPHY SCAN AND ITS ACCURACY IN IDENTIFYING DEPTH OF TUMOR INVASION.

P424

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Purpose/Background: Colorectal cancer accounts for 9% of worldwide cancer incidence and is a major cause of morbidity and mortality. CT scan has been a valued modality in the diagnosis of colorectal cancer, staging recurrent disease, and evaluation of extent of intraabdominal spread. Besides these information, the authors aim to determine whether CT scan can accurately detect tumor invasion beyond the bowel wall and assess its pre-operative use in defining extent of disease. This study aims to determine the accuracy of CT scan in the detection of tumor invasion into the pericolonic fat in colon cancer.

Methods/Interventions: A four-year retrospective cross-sectional study was conducted from 2013-2016. This study included 139 biopsy-proven colon cancer patients treated with surgery who had a pre-operative CT scan done at the Institute of Radiology, St. Luke's Medical Center, Quezon City. Depth of tumor invasion was based on the histopathologic findings obtained from Institute of Pathology. CT scan images and official reports were retrieved from the Radiology Department of the said institution. This is a retrospective cross-sectional study. Data will be encoded in SPSS16 will be utilized for data processing and analysis. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy were extracted from the data.

Results/Outcome(s): Among T1 lesions sensitivity and specificity of fat stranding in CT scan were 50% and 45.99%, respectively. Among T2 lesions, sensitivity and specificity of fat stranding in CT scan were 46.15% and 44.25%, respectively. Among T3 lesions,

sensitivity and specificity of fat stranding in CT scan were 59.34% and 56.26%, respectively. Among T4 lesions, sensitivity and specificity of fat stranding in CT scan were 57.14% and 46.4%, respectively. Accuracy of T1, T2, T3, and T4 lesions were 46.04%, 44.6%, 58.27%, and 47.48%, respectively.

Conclusions/Discussion: Among the level of tumor depth, fat stranding as seen in Computed Tomography scan is most sensitive and specific and most accurately correlated with a T3 lesion.

EXTRAMAMMARY PAGET'S: TIME FOR A CHANGE IN MANAGEMENT?

P425

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Purpose/Background: Extramammary Paget's disease (EMPD), a rare neoplastic condition of intra-epithelial adenocarcinoma, has been described in the axilla, groin, thigh, scrotum, vulva and perineum. Standard of care is wide local excision. However, this approach is plagued by high local recurrence rates, outlet dysfunction, and risk of progression to invasive adenocarcinoma. Here we describe our institution's management experience with EMPD

Methods/Interventions: A retrospective study was performed of all patients diagnosed with EMPD between 1992-2017. Patients were identified from the institutional tumor registry. Medical records were reviewed for detailed information regarding demographics, comorbidities, disease location and treatment. Disease recurrence and progression to invasion were primary endpoints

Results/Outcome(s): Twenty patients with non-invasive EMPD were identified; 12 were female. Median age was 69 (45-87) years old. Table 1 shows disease location, treatment, time to recurrence and follow up. Initial treatment was wide local excision (WLE) in 14 patients and non-excision (NE) treatment (fulguration, laser, Topical 5-FU or Imiquimod) in 6 patients. Disease recurrence occurred in 9 patients after WLE and 7 after NE requiring 19 re-excisions and 13 repeated episodes of NE. Margins were microscopically positive in 12 patients corresponding to 24/33 WLEs. 1 patient managed with WLE progressed to invasive disease. Median time to recurrence following initial treatment was 12.4 months for WLE and 9.5 months for NE, $p=0.6$.

Conclusions/Discussion: Despite aggressive surgical resection, the recurrence rate for EMPD is high and not improved compared to non-excision treatment. Overall, the rates of disease progression irrespective of treatment modality are rare. Non-excision therapies with close follow up should be favored as primary treatment over excisional procedures as outcomes appear similar.

IMPACT OF ROBOTIC LEARNING CURVE ON CIRCUMFERENTIAL MARGIN AND QUALITY OF TOTAL MESORECTAL EXCISION IN RECTAL CANCER.

P426

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Purpose/Background: A beneficial impact of robotic proctectomy on the depth of the circumferential resection margin (CRM) is expected due to the robot's articulating instruments in the pelvis. There are however concerns about a detrimental impact of robotic proctectomy on the quality of total mesorectal excision (TME) due to the lack of tactile feedback. The aim of this study was to assess how CRM and TME quality are affected by the surgeons' learning curve.

Methods/Interventions: Individual patient data of robotic proctectomies for resectable rectal cancer performed by 5 internationally recognized expert surgeons

were pooled. Learning curve was defined as the number of cases needed before reaching competency and included learning phase (LP) and plateau phase (PP). CRM was histologically measured by pathologists in mm. TME quality was macroscopically assessed by pathologists and classified as complete, nearly complete or incomplete. Statistical analysis was carried out using SPSS software (version 18: SPSS Inc., Chicago, IL, US). T-test and Chi-squared tests were used to compare continuous and categorical variables, respectively. P-value less than 0.05 was considered significant.

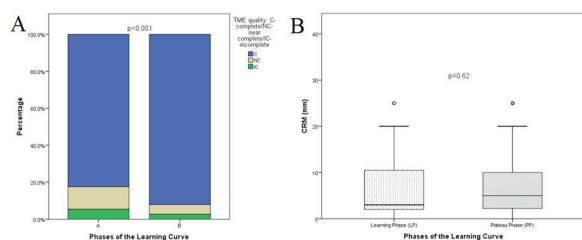
Results/Outcome(s): Data on 235 patients were available. 83 LP patients were comparable to 152 PP patients for age ($p=0.2$), gender (67.5% vs. 65.1% males; $p=0.72$), BMI ($p=0.82$), ASA score ($p=0.86$), previous abdominal surgery ($p=0.923$), stage ($p=0.17$), neoadjuvant-chemoradiation ($p=0.13$), distance of tumor from anal verge (5.8 ± 4.4 vs. 5.5 ± 3.3 ; $p=0.56$). TME quality was significantly improved in PP patients as compared to LP patients (73.5%:10.8%:4.8% vs. 92.1%:5.2%:2.6%;

P425 Table 1. Disease location, treatment and recurrences

Location	Treatment	Recurrences (N)	Time to Recurrence (Med. Mons)	Length of Surveillance (mons)
Groin	WLE	0	0	6.1
Groin	WLE	3	57.0	116.5
Groin	Laser Ablation	3	5.7	19.4
Perianal	Fulguration	0	0	47.7
Perianal	Topical 5-FU	3	79.2	90
Perianal	Topical 5-FU	0	0	12.8
Perianal	Imiquimod	0	0	43.5
Perianal	WLE	1	3.3	133.9
Perianal	WLE	2	23.2	95.3
Perianal	WLE	0	0	36.9
Perianal	WLE	1	53.0	56.3
Perianal	WLE/Top 5-FU	4	5.3	40.8
Perianal	WLE/Fulguration	13	7.7	112.8
Perianal	WLE	13	14.7	303.6
Scrotum	WLE	0	0	49.5
Scrotum	WLE	0	0	31.1
Scrotum	Topical 5-FU	2	28.5	7.7
Vulva	WLE/Fulguration	2	6.3	21.8
Vulva	WLE/Imiquimod	4	10.9	108
Vulva	WLE	0	0	48.7
				Significance
Median Follow up			48.2 months (6.1-303.6)	
	Single treatment		40.2 months (6.1-49.5)	
	>1 Treatment		92.7 months (7.7-303.6)	$p=0.05$
Median time to recurrence				
	WLE		12.4 months (3.0-111.3)	
	Non-Excision		9.5 months (2.8-92)	$p=0.6$

$p < 0.001$) (Figure 1A). CRM did not differ (7.7 ± 11.4 mm vs. 8.4 ± 10.3 mm; $p = 0.62$) (Figure 1B).

Conclusions/Discussion: While the circumferential resection margin was not affected by the surgeons' learning curve, the quality of total mesorectal excision significantly improved during the surgeons' plateau phase. This study confirms that lack of tactile feedback in robotic surgery entails a learning curve.



OUTCOMES OF PATIENTS WITH POSITIVE CIRCUMFERENTIAL RESECTION MARGIN AFTER NEOADJUVANT CHEMORADIATION IN RECTAL CANCER – DOES ADDITION OF INDUCTION CHEMOTHERAPY WORKS.

P427

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Purpose/Background: The standard treatment of locally advanced rectal cancer is neoadjuvant chemoradiation (NACTRT). There is a wide spread use of induction chemotherapy in such patients without solid evidence who have magnetic resonance imaging (MRI) based positive circumferential resection margin

Methods/Interventions: Study Design: Retrospective analysis of prospectively maintained database **Inclusion criteria:** Patients with locally advanced rectal cancer who had persistent positive CRM on (MRI) pelvis after NACTRT **Exclusion Criteria:** Unresectable disease Upfront metastatic disease Prior malignancy /prior Pelvic irradiation Patients who got operated elsewhere

Results/Outcome(s): 780 patients got operated for rectal cancer in our centre from July 2013 to June 2016 out of which 158 patients had positive CRM on MRI pelvis after NACTRT. 92 patients underwent curative resection.

66 patients received induction chemotherapy before curative resection. Median follow up was 26.9 months (4.5 to 47.9 months). Analysis of oncological outcomes are shown in the table 1. Surprisingly, there is significantly less exentration in NACTRT arm than NACTRT and induction chemo arm but no statistically significant difference in local and systemic recurrences, disease free and overall survival. This might be explained by the fact that most of the tumors invading anterior structure (prostate, uterus, vagina) had received induction chemo before curative resection

Conclusions/Discussion: Induction chemotherapy after neoadjuvant NACTRT in patients with MRI based positive CRM in rectal cancer neither reduce the extent of resection nor improve the oncological outcomes. So, the practice of induction chemotherapy in rectal cancer should be strongly discouraged.

CLINICAL UTILITY OF POST-CHEMORADIATION THERAPY RESTAGING WITH MRI FOR STAGE II-III RECTAL CANCER PATIENTS.

P428

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Purpose/Background: Neoadjuvant chemoradiation is currently standard of care in stage II-III rectal cancer. MRI is recommended as the imaging modality of choice for local staging. However, consensus on local restaging after chemoradiation therapy (CRT) is lacking. The aim of this study was to investigate the clinical utility of reimaging stage II-III rectal cancer, post-CRT with magnetic resonance imaging (MRI) of the pelvis.

Methods/Interventions: All patients who underwent definitive treatment for stage II-III rectal cancer at University of Florida within the last 5 years were included in this IRB-approved study. Inclusion was narrowed to non-metastatic, curable rectal cancer patients, who had both a pre- and post-CRT MRI, followed by surgical resection. All MRI's were re-reviewed by 2 radiologists with an interest in rectal cancer MRI imaging using a standardized template (Toronto protocol). Utility of post-CRT MRI

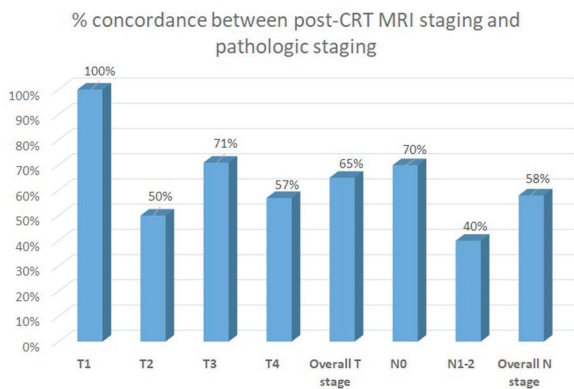
P427 Table 1

PARAMETER	NACTRT	NACTRT + Induction Chemo	P value
Pathologic Positive Margin	8 (5.1%)	7 (4.5%)	0.39
Exentration	8 (5.1%)	16 (10.1%)	0.007
Local Recurrence	9 (6.2%)	11 (7.5%)	0.31
Systemic Recurrence	29 (19.9%)	27 (18.5%)	0.48
3year Disease Free Interval	40.1%	44.6%	0.65
3year Overall Survival	68.9%	76.4%	0.82

was evaluated by assessing its impact on change in surgical planning, and concordance with pathologic staging. SPSS v.21 was used for statistical analysis. Pre- and post-CRT MRI findings were correlated with pathological staging using concordance percentages *as well as* weighted kappa (k) inter-rater statistical agreement ($k < 0.5$ implied an absence of consistent agreement).

Results/Outcome(s): A total of 31 rectal cancer patients were eligible for analysis; 67% had clinical stage III and 33% had stage II disease, based on pre-CRT MRI. Post-CRT MRI findings did not lead to a change in the originally determined surgical and therapeutic plan in any patient. The post-CRT MRI could not accurately predict either T stage ($k = 0.486$) or N stage ($k = 0.197$).

Conclusions/Discussion: Due to poor concordance with pathologic staging and the absence of a demonstrable change in surgical treatment, use of post-CRT restaging with MRI is of limited clinical utility.



PREDICTING THE RISK OF MALIGNANCY IN RECTAL ADENOMATOUS POLYPS: WHAT IS THE OPTIMAL RESECTION TECHNIQUE?

P429

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Purpose/Background: Colonoscopic biopsies of rectal lesions do not always identify an invasive malignancy found in the final resection specimen. Local resection techniques include transanal minimally invasive surgery (TAMIS) or transanal excision (TAE). Improvements in preoperative evaluation are needed to more accurately predict malignancy in the resected specimen to help better guide treatment strategy. Our aims were to define preoperative factors that more accurately predict invasive malignancy in specimens initially deemed to be benign and determine the optimal technique for transanal resection.

Methods/Interventions: All pts at a single institution between 2010-17 who had rectal adenoma or adenocarcinoma by preoperative colonoscopy and underwent transanal resection with TAMIS or TAE were included.

Partial-thickness resections were excluded. Presenting symptoms and pathologic features were analyzed for risk of malignancy. Primary outcome was final pathologic diagnosis of invasive adenocarcinoma in preoperatively presumed benign disease. Secondary outcome was specimen quality defined by rate of fragmentation, margin positivity, and presence of lymph nodes to determine optimal resection technique.

Results/Outcome(s): Of 185 pts who underwent full-thickness transanal resection, 104 pts had premalignant or malignant adenomatous lesions. Median age was 62yrs and 58% were male. Forty-nine percent ($n = 51$) of pts had symptoms, the most common being rectal bleeding (37%; $n = 38$). Among the 92pts who underwent preoperative colonoscopic biopsy, 65% ($n = 60$) had benign lesions. Of these 60pts, 20% ($n = 12$) were found to have invasive adenocarcinoma on final pathologic diagnosis after resection. For pts with preoperatively diagnosed benign lesions, those with rectal bleeding were more likely to have invasive adenocarcinoma on final pathology compared to those without bleeding (38% vs 10%, $p = 0.026$). Patients with high grade dysplasia (HGD) on preoperative biopsy also tended to have invasive adenocarcinoma on final pathology compared to those without (33% vs 13%, $p = 0.13$). 30% of patients with both bleeding and HGD had invasive cancer. Age, gender, tumor size, tumor position, and distance from the anal verge were not associated with malignancy on final pathology. Specimens removed via TAMIS were more likely to have no fragmentation (98.3% vs 77.3%, $p = 0.002$), negative margins (94.8% vs 81.6% and $p = 0.082$), and resected lymph node tissue (13.6% vs 0%, and $p = 0.030$) compared to traditional TAE technique.

Conclusions/Discussion: The presence of rectal bleeding and/or high grade dysplasia on preoperative biopsy of adenomatous rectal lesions places patients at high risk for harboring invasive adenocarcinoma. Full-thickness resection with a TAMIS technique yields the highest quality specimen and should thus be considered the optimal transanal approach for premalignant and malignant rectal lesions.

VALIDATION OF A 5-ITEM MODIFIED FRAILTY INDEX FOR PATIENTS UNDERGOING COLORECTAL CANCER SURGERY USING THE ACS-NSQIP DATABASE.

P430

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Purpose/Background: Frailty is being increasingly recognized as a predictor of adverse outcomes following surgery in older adults. Based on the accumulating deficits model of frailty, an 11-item modified frailty index (mFI)

was described and validated using the American College of Surgeons National Quality Improvement Program (ACS-NSQIP) database. However, use of the 11-item mFI is limited by a significant proportion of patients missing 1 or more required variables. Thus a condensed 5-item mFI was developed, but it was only validated for upper GI surgery. The aim of this study was to assess and validate the 5-item mFI in patients who had undergone colorectal cancer surgery.

Methods/Interventions: After institutional review board approval, patients ≥ 65 years old who underwent colorectal cancer surgery between 2005-2016 were identified from the ACS-NSQIP database. Variables included in the 5-item mFI were congestive heart disease, pulmonary disease, hypertension requiring medication, diabetes mellitus, and dependent functional status. Agreement between the 11- and 5-item mFI was assessed using a weighted Kappa. Multivariate regressions were used to determine the validity of the 5-item mFI as a predictor of postoperative mortality, major morbidity, length of stay, readmission, and discharge to a location other than home.

Results/Outcome(s): A total of 4760 patients had complete data for the 11-item mFI, whereas 58,885 patients had complete data to score the 5-item mFI. The scoring agreement between the 5- and the 11-item indices was strong with a weighted Kappa of 0.937. After controlling for age, ASA class, surgical approach (open vs. laparoscopic), procedure timing (emergent vs. non-emergent), type of procedure (colon vs. rectal), BMI, weight loss, smoking status, bleeding disorder, transfusion, steroids, ascites, and operative time, a score ≥ 2 on the 5-item mFI remained predictive of major morbidity (OR 1.46, 95%CI 1.15-1.88), longer hospital length of stay (IRR 1.15, 95% CI 1.07-1.23), and non-routine discharge (OR 1.41, 95%CI 1.01-1.97). The 5-item mFI was not predictive of mortality. Readmission could not be assessed given that the outcome was missing in a significant proportion of patients.

Conclusions/Discussion: The 5-item mFI is a good predictor of major morbidity, length of stay, and non-routine discharge, while allowing for a significantly increased sample size compared to the 11-item mFI. Therefore, the 5-item mFI is a satisfactory alternative to the 11-item mFI in assessing frailty as defined by the accumulating deficits model in patients undergoing colorectal cancer surgery for large database research. However, further study is needed to validate the 5-item mFI with physiological frailty scores to determine its role as a clinical tool.

SIMILAR SHORT-TERM ONCOLOGICAL OUTCOMES FOR ROBOTIC AND OPEN TOTAL MESORECTAL EXCISION IN PATIENTS WITH RECTAL CANCER.

P431

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Purpose/Background: The minimally invasive approach to total mesorectal excision (TME) is controversial. Two prospective randomized trials have failed to prove non-inferiority for laparoscopic compared to open TME in patients with curable locally advanced rectal cancer, and do not support the use of laparoscopy in these patients. However, laparoscopy is commonly used as the standard control group in retrospective case series and prospective trials investigating the outcomes of robotic TME for rectal cancer. We compared the pathological and short term-outcomes in patients with rectal cancer treated with standard open TME (oTME) or robotic TME (rTME) in a high volume cancer center.

Methods/Interventions: A retrospective review of patients with rectal cancer (within 15 cm from the anal verge) treated with TME or tumor specific TME at a single institution from 2008 to 2017. Patients with carcinoma-in-situ, prior local excision, recurrent tumor, perineal reconstruction requiring flaps, M1 at diagnosis, and ypT0 tumors were excluded. Clinical and pathological variables, recurrence and survival were recorded. Primary outcome was a positive circumferential resection margin (CRM) defined as ≤ 1 mm between the deepest extent of tumor invasion and the inked surface on the fixed specimen. Comparisons between patients treated with oTME or robotic rTME were performed using chi square test for categorical variables and t-test for continuous variables.

Results/Outcome(s): A total of 753 patients, 286 treated with oTME and 467 treated with rTME, meet the inclusion criteria. Conversion to open was required in 18 (3.8%) patients; they were analyzed per intention to treat. The CRM was positive in 24/286 (8.39%) in oTME and 36/467 (7.7%) in the rTME group ($p=0.74$). Clinical and pathological variables and short term outcomes are presented in Table 1.

Conclusions/Discussion: This study suggests that in patients with rectal cancer amenable to curative resection a rTME provides comparable pathologic and short-term outcomes compared to the standard oTME. Operating time was longer, but the risk of complications was lower and hospital stay shorter in rTME compared to oTME. A longer follow-up and a health economics analysis will be required to determine the value of rTME compared to oTME.

INCREASED LYMPH NODE YIELD USING FLUORESCENCE-IMAGING TECHNIQUE DURING ROBOTIC LATERAL PELVIC LYMPH NODE DISSECTION.

P432

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Daegu, Korea (the Republic of)

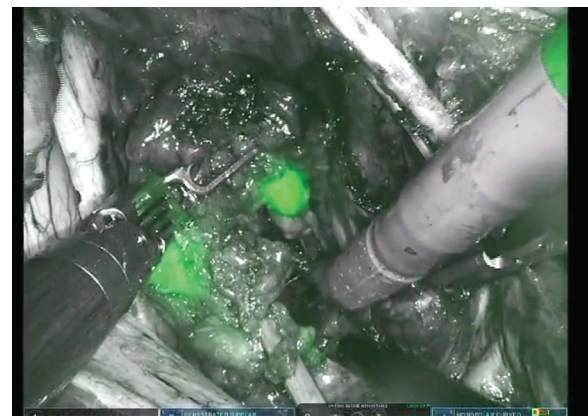
Purpose/Background: Lateral pelvic lymph node dissection (LPND) is suggested to treat suspected lymph node metastasis in pelvic side-wall in patients with rectal cancer who underwent preoperative chemoradiotherapy (CRT). However, technical difficulties make it possible that lateral pelvic lymph nodes (LPNs) are not dissected completely and, thus, remained in the pelvis. Near-infrared fluorescence imaging (FI)-guided surgery is expected to help visualization and complete excision of nonvisible lymph nodes during cancer surgery. This study aimed to evaluate the efficacy of FI using indocyanine green (ICG) to identify LPNs during robotic LPND.

Methods/Interventions: 48 rectal cancer patients who were suspected LPN metastasis and had received preoperative CRT were prospectively enrolled. ICG in a dose of 2.5mg was injected around tumor preoperatively. All procedures were performed with a totally robotic approach. After completing LPND, FI was checked again for identifying remained LPNs and resecting them completely.

Results/Outcome(s): The LPNs were successfully detected in 42 (87.5%) of the 48 patients. However, after accounting for eight cases, having finished adjusting ICG injection, the LPNs were successfully detected in 39 (97.5%) of 40 patients. The FI-guided LPND group

(N=42) showed similar mean operative time for unilateral pelvic dissection and complication rate, compared to patients who underwent conventional robotic LPND (N=62). However, the mean number of unilateral harvested LPNs was 11.0 in the FI-guided LPND group, which was greater than the mean of 6.5 in the conventional group. LPN metastasis was identified in 40.5% of the FI-guided LPND group, which was higher than that of the conventional group, 31.7%.

Conclusions/Discussion: FI-guided LPND identifies lymph nodes in pelvic side-wall with great reliability. This contributes to increased LPNs yield compared to conventional robotic LPND. This technique should be considered to dissect them completely by preventing subsequent missing of nonvisible LPNs.



ICG-staining lymph nodes

P431 Table 1

Table1	oTME (286)	rTME (467)	p
Age (years)	58.4±13.6	55.2±13	0.001
Gender	175 (61.2%)	275 (60%)	0.53
Male (%)			
Procedure (%)	231 (80.8%)	403 (86.3%)	0.04
LAR	55 (19.2%)	64 (13.7%)	
APR			
Distance from the anal verge (cm)	7.3±3.7	8.4±3.9	<0.001
Neoadjuvant therapy (%)	209 (73.1%)	307 (65.7%)	0.04
Operative time (mean, min)	264.9±91.9	306.7±105.6	<0.001
EBL (mean, mL)	303.8±276.8	123±204.6	<0.001
Pathology stage (%)	107 (37.4%)	191 (41%)	0.35
I	86 (30.1%)	118 (25.3%)	
II	93 (32.5%)	157 (33.7%)	
III			
Distal margin (mean, mm)	28.0±19.2	31.3±21.2	0.03
Complications (%)	129 (45.1%)	130 (27.8%)	<0.001
LOS (mean, days)	8±4.7	5.4±2.7	<0.001

ATTEMPTS AT ANEMIA CORRECTION BEFORE COLORECTAL CANCER SURGERY: A SINGLE INSTITUTION'S EXPERIENCE.

P433

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Purpose/Background: The purpose of this retrospective review was to identify what is being done to correct anemia in colorectal cancer patients at our institution and to determine whether our interventions have any effect on a large number of outcome measures.

Methods/Interventions: A retrospective chart review was performed on over 350 colorectal cancer cases between 2015-2016 at our institution. All anemic patients were identified and their charts were reviewed for evidence of anemia treatment with IV or PO iron. After identifying the patients in question, data was abstracted from their charts for statistical review.

Results/Outcome(s): The treatment group was significantly more anemic and more female than the untreated group. There was also a significant association between treatment of anemia and decreased hospital length of stay even though treatment of anemia did not seem to improve hematocrit before surgery.

Conclusions/Discussion: Preoperative treatment of anemia before colorectal cancer surgery is associated with a decreased hospital length of stay. More prospective study is needed to determine the best way to treat anemia preoperatively and if correction of anemia is associated with better post operative outcomes.

DEVELOPMENT AND VALIDATION OF A PREDICTION MODEL FOR ANASTOMOTIC LEAKAGE RISK DURING LAPAROSCOPIC LOW ANTERIOR RESECTION: A DECISION-MAKING TOOL FOR THE CHOICE OF PROTECTIVE STOMA.

P434

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Purpose/Background: A protective stoma may reduce the risk of clinical anastomotic leakage (AL) after laparoscopic low anterior resection, but this is overtreatment for most patients. More accurate predictive tool of AL would be helpful for tailoring stoma creation. We aimed to develop a prediction model to calculate AL risk during the operation in laparoscopic low anterior resection for rectal cancer and validate it.

Methods/Interventions: Between 2005 and 2012, 666 rectal cancer patients who underwent laparoscopic low anterior resection with double-stapled anastomosis and without protective stoma, were included in this study. A

prediction model was constructed based on the probability risk score and was validated for 188 patients collected from 2013 to August 2014.

Results/Outcome(s): AL rate was noted in 62 patients (9.3%). Male, preoperative chemoradiation, clinical advanced tumor stage, multiple firings of the linear stapler, and the lower location of anastomosis were used in this prediction model. When applying this model, AL was predicted in 216 patients (32.4%) and among them actual AL occurred in 45 patients (6.8%). It can translate that if we make 32.4% of protective stoma, clinical AL can be reduced from 9.3% to 2.5%. The predictive accuracy of this model was 71.8% (sensitivity, 72.6%; specificity, 71.7%). On the validating this model in difference treatment period, the predictive accuracy was 70.2% (sensitivity, 66.7%; specificity, 70.4%).

Conclusions/Discussion: A prediction model for AL risk may be a valuable decision making tool that can help surgeons reliably identify patients at high risk for AL. Further large cohort study would be required to generalize this single-center study.

INCIDENCE AND REASONS FOR FAILURE TO CLOSE A DYSFUNCTIONING ILEOSTOMY FOLLOWING LOW ANTERIOR RESECTION FOR LOCALLY ADVANCED RECTAL CANCER.

P435

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Purpose/Background: Background: In patients with locally advanced rectal cancer, who receive neoadjuvant treatment and undergo a low anterior resection (LAR), a dysfunctioning ileostomy is commonly constructed to reduce anastomotic complications. The ileostomy is constructed with the intent to be temporary and to be closed after few months. However, data suggests that the non-closure rate is between 6%-32% of patients. Aim: To determine the incidence and reasons for failure to close the dysfunctioning ileostomy fashioned during LAR.

Methods/Interventions: Retrospective analysis of prospectively collected database

Results/Outcome(s): Results: 203 patients who underwent LAR with protective ileostomy for locally advanced rectal cancer after neoadjuvant therapy, during years 2000-2016 were included. Mean follow up 84 months. In 177 patients (87%) the ileostomy was reversed and in 26 (13%) it was not. There was no difference between the two groups in age, gender, pre-treatment stage, and surgery time. There were more patients with ASA 3 and 4 in the group of non-reversed ileostomy, than in the group which ileostomies were reversed (34.6% and 13.6% respectively, $p=0.039$). Patients in the non-reversed group had much more reoperations (23.1% vs 5.1%, $p=0.006$), anastomotic complications that required reoperation (30% vs 5.3%,

p=0.004) and their postoperative complications were more severe. There was a trend of difference in postoperative staging between the groups. Patients whose ostomies were not reversed had much shorter disease-free survival, than those with reversed ostomies (2.8 years vs 10.9 years, p <0.0001). The same was true with overall survival time between the groups.

Conclusions/Discussion: Conclusion: In our cohort 12.8% of temporary ileostomies become permanent. This group of patients had more severe postoperative complications and a much worse oncological outcome.

TREATMENT ASSESSMENT OF COLORECTAL CANCER BY ACTIONABLE NEXT-GENERATION-SEQUENCING MULTIGENE PANEL.

P436

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Purpose/Background: The targeted next generation sequencing (NGS) method is designed to capture genomic regions of interest for the selected genes on the basis of their known impact as actionable targets for novel anti-cancer treatment modalities and their prognostic features including the mutation recurrence frequency. This study aimed to review the potential benefits of actionable mutation panel for colorectal cancer (CRC) in relation to clinicopathologic features.

Methods/Interventions: Between August-2016 and August-2017, patients underwent colorectal surgery, with curative or palliative intent, for pathologically confirmed carcinoma were identified from a prospectively maintained database. Formaline fixed paraffin embedded tumor tissues were analyzed for actionable set of 773 variant positions in 12 genes of KRAS, NRAS, KIT, BRAF, PDGFRA, ALK, EGFR, ERBB2, PIK3CA, ERBB3, ESR1 and RAF1 via NGS (GeneReader NGS System, Qiagen).

Results/Outcome(s): The molecular profile of 87 samples from primary tumors (right-sided: n=19; left-sided: n=24; rectum: n=44) were analyzed. Overall, KRAS, PIK3CA, ERBB2 and KIT mutations were identified in 34.5, 4.6, 3.4, 1.1 and 1.1 percent of CRC patients, respectively. 12.6% (n=11) of patients had two or more somatic mutations in the region of interest (hot spots) of whom the disease was locally advanced or metastatic. EGFR c.2184+19G>A mutation was identified and classified as variant of unknown clinical significance in one patient who had aggressive phenotype.

Conclusions/Discussion: The utility of actionable multi-gene panel show the value of a well-designed NGS workflow in the practical use of clinical outcomes via the prediction of responsiveness to therapeutic agents or indications for novel treatment modalities in addition to prognosis estimate.

P436 Demographic characteristics and distribution of gene mutation rates in primary tumors based on location

	Right-sided n=19		Left-sided n=24		Rectum n=44		Overall n=87		
	n	%	n	%	n	%	n	%	
Age	56.6±15.7		60.6±7.9		58.6±11.6		58.7±11.7		0.543
Female gender	8	42.1	10	41.7	18	40.9	36	41.4	0.996
ASA Score									0.135
I-II	14	73.7	21	87.5	35	79.5	70	80.5	0.9
III-IV	5	26.3	3	12.5	9	20.5	17	19.5	
Stage									0.9
I-II	5	26.4	7	29.2	9	23.5	21	24.1	
III-IV	14	73.6	17	70.8	35	76.5	66	75.9	
Gene									0.078
EGFR	2	10.5	1	4.2	1	2.3	4	4.6	
ERBB2	0	0	1	4.2	0	0	1	1.1	
KIT	1	5.3	0	0	0	0	1	1.1	
KRAS	9	47.4	7	29.2	14	31.8	30	34.5	
PIK3CA	2	10.5	0	0	1	2.3	3	3.4	

IMPROVED SURVIVAL IN RECTAL CNACER PATIENTS WHO ARE TREATED WITH LONG-COURSE VERSES SHORT-COURSE NEOADJUVANT RADIOTHERAPY: A PROPENSITY-MATCHED ANALYSIS OF THE NCDB.

P437

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Purpose/Background: Randomized controlled trials have demonstrated comparable long-term outcomes for short-course (SCRT) and long-course neoadjuvant radiotherapy (LCRT) in patients with rectal cancer. Despite this evidence, LCRT remains the preferred modality for stages II-III rectal cancer in the USA. The aim of this study was to compare the outcomes of SCRT and LCRT in rectal cancer patients who were included in the National Cancer Database (NCDB).

Methods/Interventions: The NCDB (2004-15) was used to identify 6,371 patients with T2-T4, Any N, M0 rectal adenocarcinoma who received neoadjuvant SCRT (20-25 Gy in 5 fractions; n=400) or LCRT (50-50.4 Gy in 25-28 fractions; n=5,971). A 1:2 propensity score was used to match 359 patients who received SCRT to 718 patients who received LCRT based on patient and tumor characteristics including clinical T- and N-stage. Overall survival (OS) was calculated using the Kaplan-Meier method and a multivariate Cox proportional hazard model was applied.

Results/Outcome(s): Among matched patients, there were no differences in patient and clinical tumor characteristics. SCRT was more likely to be used at an academic center (58% vs. 34%; p<0.05) and high-volume (>35 cases/year) institutions (31% vs. 8%; p<0.05). There was no difference in resection rates between groups (SCRT 83% vs. LCRT 81%; p=0.5). Among surgical patients, abdominal perineal resection and low anterior resection were performed in 64% and 29%, and 65% and 26% in the SCRT and LCRT groups, respectively (p=0.2). Patients in the LCRT group were significantly more likely to have tumor (T) (39% vs. 31%) and nodal (N) (16% vs. 13%) down-staging compared to the SCRT group (p<0.05). Additionally, patients in the LCRT were more likely to have a complete pathological response (9% vs. 4%; p<0.05). The LCRT group had a shorter length of stay (median 6 vs. 7 days), lower readmission rate (8% vs. 12%), and reduced 90-day mortality (2% vs. 6%) (all p<0.05), but no difference in 30-day mortality (1% vs. 3%; p=0.1). There was no difference in the use of adjuvant chemotherapy between groups (LCRT 29% vs. SCRT 30%; p=0.3). LCRT was associated with a significantly higher 10-year OS (58% vs. 47%; p<0.05). After adjusting for patient and tumor-related characteristics, LCRT was

associated with a 38% reduction in mortality compared to SCRT (HR 0.62, 95% CI 0.47-0.81).

Conclusions/Discussion: In this analysis of the NCDB, LCRT was superior to SCRT in terms of tumor response to neoadjuvant therapy, postoperative outcomes, and overall survival. While the NCDB data is discordant with the results of randomized prospective trials it provides evidence for the efficacy of current rectal cancer practice in the USA and supports the use of LCRT when neoadjuvant therapy is indicated.

POST-TES SYNDROME: A CONSTELLATION OF SYNDROMES RESULTING FROM LOCALIZED INFLAMMATORY CHANGES FOLLOWING TRANSANAL ENDOSCOPIC SURGERY (TES).

P438

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Purpose/Background: Transanal endoscopic surgery (TES) is a safe and effective surgical therapy for the local excision of rectal lesions. We present the first description of "post-TES syndrome", a cluster of symptoms seen in a subset patients following TES. The syndrome is thought to result from a local inflammatory process in the pelvis after resection. Aspects of the presentation and management of the syndrome have similarities to post-polypectomy syndrome following colonoscopy.

Methods/Interventions: A prospectively collected database of all patients undergoing TES has been collected and maintained at St. Paul's Hospital (SPH) in Vancouver. Patients presenting with a combination of pain, fever and imaging findings consistent with "post-TES syndrome" were reviewed. The experience of this group of patients was described and used to create a definition of post-TES syndrome. Similar reports of infectious complications in the literature are reviewed.

Results/Outcome(s): 753 patients underwent TES at SPH from 2006 to 2017. 55 patients presented with post-operative pain or fever. Twenty-five patients were determined to have post-TES syndrome based on our definition and chart review. Sixteen patients presented within the first two post-operative days, with all patients presenting within a week. All patients who underwent cross-sectional imaging (N=11) had a combination of inflammatory change with stranding and free fluid and/or small bubbles of free intraperitoneal, retroperitoneal or mesorectal air; without signs of free perforation or abscess at the surgical site. Most patients' (92%) symptoms resolved within a week with conservative treatment, 80% of which were treated with antibiotics. Nearly all patients (96%) did not progress to further infectious complications and there were no long-term complications.

Conclusions/Discussion: This is the first report in the literature describing a constellation of symptoms occurring in a subset of patients post-TES from a localized inflammatory response. Nearly all patients recover with conservative management without a need for more invasive intervention. Patients presenting with signs and symptoms consistent with post-TES syndrome benefit from a trail of conservative management with expected good clinical outcomes.

COMPARISON OF THE DA VINCI SI AND XI PLATFORMS FOR MULTIQUADRANT ROBOTIC RECTAL RESECTIONS WITH TOTAL MESORECTAL EXCISION.

P439

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Purpose/Background: The evolution of minimally invasive laparoscopic technology in the field of surgery has revolutionized how surgeons pursue surgical treatment options in colorectal cancer. The introduction of robotic technology in 2000 with the da Vinci S Surgical System, da Vinci Si in 2009 and its latest alteration da Vinci Xi in 2014 (Intuitive Surgical, Sunnyvale, CA, USA) have expanded minimally invasive surgical options. The aim of this study was to compare the short-term operative outcomes using the da Vinci Si and Xi Surgical Systems for robotic rectal resection with total mesorectal excision (TME).

Methods/Interventions: We compared the two robotic platforms and laparoscopic in multi-quadrant colorectal surgery at a major colorectal referral center at Lankenau Medical Center. Multi-quadrant operation was defined as concomitant pelvic dissection and splenic flexure mobilization. Using the prospectively maintained database, we reviewed all patients from 2011 to 2017 with a primary diagnosis of rectal cancer undergoing elective robotic LAR, APR, Transanal Transabdominal (TATA) rectal resection. Data recorded included patient demographics, operative variables, and postoperative outcomes including TME and CRM. Results were analyzed using Chi² and weighted t-test.

Results/Outcome(s): A total of 91 patients with rectal cancer who underwent elective robotic LAR, APR and TATA resections were included in this study. The da Vinci Si group included 55 patients and the da Vinci Xi group included 36 patients. There was no significant difference in operative time, blood loss, length of stay, or overall complications between the da Vinci Si and Xi groups. Similarly, there were no significant differences between the two groups with respect to obtaining a complete/near complete TME (89.0% in da Vinci Si group and 94.6% in da Vinci Xi group; $p = 0.1738$). Negative involvement of circumferential resection margins (CRM) also did not

show any significant difference (98.2% in da Vinci Si group and 97.2% in da Vinci Xi group; $p = 0.4224$).

Conclusions/Discussion: Robotic surgery offers possible advantage for deep pelvic surgery is a natural evolution of minimal invasive surgery. The da Vinci Xi platform allows improvement in the surgical experience, ideal for deep narrow pelvic operations without jeopardizing the quality of TME and CRM rectal resections. While the results are encouraging, the XI shows no documentable improvement in surgical TME outcomes. Rectal cancer surgery continues to represent a formidable surgical challenge. Robotic TME surgery has been proposed as a method to improve TME surgery. Advances in robotic platforms from SI to XI systems has expanded approaches of colorectal robotic surgery.

Table 1. Operative and pathological results for the da Vinci Si and Xi groups. TME, total mesorectal excision; CRM, Circumferential resection margins.

	da Vinci Si (55 patients)	da Vinci Xi (36 patients)	p
Overall Operative Time, min; mean (range)	433.8 (362 – 641)	421.6 (216 – 746)	0.763
Estimated Blood Loss (mL)	281	214	0.321
Complete TME; n (%)	49 (89.0)	34 (94.6)	0.1738
Negative CRM; n (%)	54 (98.2)	35 (91.9)	0.4224
Negative Distal Margin; n (%)	55 (100)	36 (100)	NA

TUMOR SCATTER: NOT JUST A ONE-HIT WONDER.

P440

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Purpose/Background: The scatter of irradiated rectal cancer cells outside the visible ulcer has been demonstrated previously. However, the clock-face technique was limited in accuracy by the size and number of sections. We created a new mapping technique in order to better define tumor scatter in locally advanced rectal cancers treated with neoadjuvant chemoradiation followed by radical resection.

Methods/Interventions: 20 consecutive rectal cancer specimens were sliced in entirety into 3mm slices. They were mapped into 3 columns: 1) normal tissue proximal to visible ulcer, 2) visible ulcer 3) and normal tissue distal to the visible ulcer. Each slice was then stained for the presence of microscopic tumor cells and then superimposed onto pictures of the gross specimen.

Results/Outcome(s): Of the 20 rectal cancer specimens, all but one had an initial T-stage of T3 and 52.6% had node-positive disease. Mean largest diameter of the pre-treatment tumor was 4.8 cm (2-8) and median distance from anal verge was 6 cm (0-10). The mean time interval between completion of radiation and surgery was 9 weeks (5-14). 4 patients showed complete pathologic response (20%). No patients had completely normal

appearing mucosa however, 3 did not show any obvious ulceration. Of the 16 specimens with residual cancer, 11 (68.8%) showed cancer cells outside of the visible ulcer. The distance of scatter outside of the ulcer ranged from 3-15 mm. 7 (43.8%) specimens had scatter extending proximally from the proximal margin of the gross ulcer up to 12 mm (mean 4.7, median 3.0) and five (31.3%) specimens had scatter distally, up to 15 mm (mean 6.6, median 3.0) from the distal edge of the ulcer. If selecting a 1 cm distal resection margin or circumferential margin for local excision based on the gross residual tumor, 2 out of 16 (12.5%) patients would have had cancer cells left behind.

Conclusions/Discussion: With the more accurate mapping system of 3 mm slices performed for the entire specimen, tumor scatter occurred more frequently than previously reported. Almost 70% of specimens showed microscopic cancer cells outside of the visible ulcer. These findings should caution those who equate complete clinical response to pathological response and those who select the resection margin based on the visible ulcer during local or radical resection for rectal cancer after radiation.

RACIAL DISPARITIES IN SHORT-TERM ONCOLOGICAL OUTCOMES IN STAGE I-III RESECTED RECTAL CANCER.

P441

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Purpose/Background: Background: Limited studies on racial disparities in rectal cancer management have shown that Black patients are less likely to have surgery, have higher surgical margin positivity, and have a higher rate of sphincter preservation. It is not known if choice of sphincter preservation and its associated margin positivity contributes to worse surgical outcomes in Black patients. We sought to compare the rate of positive margins in patients undergoing sphincter preserving surgery (LAR) versus abdominoperineal resection (APR).

Methods/Interventions: Methods: A retrospective analysis of the National Cancer Database between 2008 and 2012 was performed. The data were examined to determine differences seen between Black patients and non-Hispanic White patients undergoing LAR or APR for adenocarcinoma of the rectum. Variables examined included socioeconomic status, primary payor, time from diagnosis to treatment, facility type, stage at presentation, tumor grade, histology, size, and surgical margin.

Results/Outcome(s): Results: Rates of households making under \$38,000/year (LAR 43.2% versus 14.9%; APR 47.1% versus 16.6%) and uninsured or those on Medicaid (LAR 17% versus 7.4%; APR 21.1% versus 9.9%) were higher in Black patients compared with non-Hispanic Whites. The rate of positive surgical margin in patients

undergoing LAR was significantly higher in Black patients (7.9% versus 5.9%, $p < 0.001$) and remained significantly higher when stratified by stage. No difference was seen in those undergoing APR (10.2% vs 9.25%, $p = 0.234$). No differences were seen in tumor grade, histology, size of the tumor, number of lymph nodes harvested, and receipt of neoadjuvant therapy. There was a slight delay to surgery, chemotherapy and radiation therapy in Black patients in both groups.

Conclusions/Discussion: Conclusions: These data suggest that a component of the racial disparity seen in rectal cancer outcomes is related to the operation received. The driving factors behind this disparity are not known. One possibility is inappropriate selection of candidates for sphincter preservation. However other factors, such as differences in operative difficulty, cannot be excluded. The absence of distance of tumor from anal verge as a variable reported in the NCDB limits the ability to further delineate contributing factors.

CLINICAL PRESENTATION AND FEATURES OF PATIENTS WITH LOBULAR BREAST CANCER METASTATIC TO THE COLON AND PERICOLONIC LYMPH NODES.

P442

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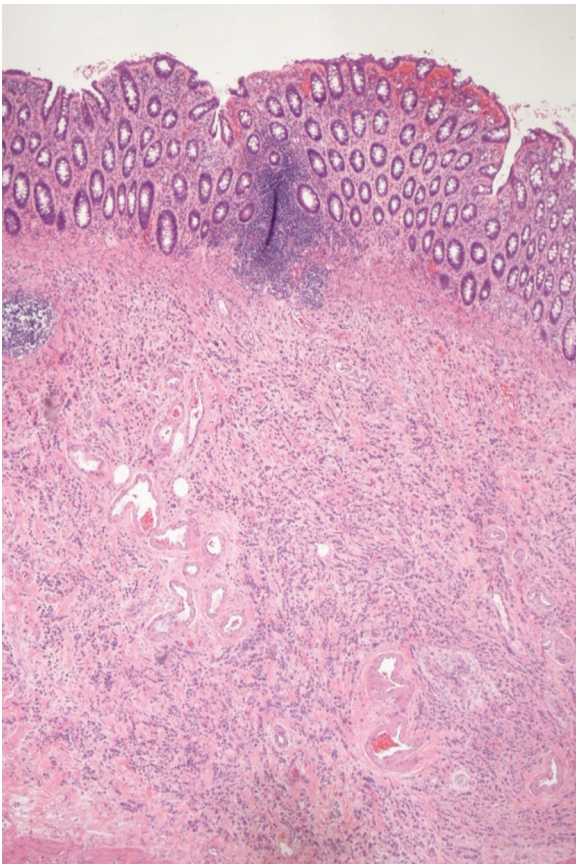
Purpose/Background: We recently performed minimally invasive colectomies on four patients with metastatic lobular breast cancer involving the colon and pericolic lymph nodes. This is a rare phenomenon encountered by colorectal surgeons. We performed a retrospective review to study the clinical presentation and features of patients with this unusual clinical scenario.

Methods/Interventions: We treated four patients between 2014 and 2017 with lobular breast cancer metastatic to the colon. We reviewed hospital charts, operative notes, pathology, and radiology studies. We also performed a literature search on lobular breast cancer metastatic to the colon.

Results/Outcome(s): The ages of our patients ranged from 57 to 70 years old, and the average age was 64. All four patients were women. Three of the patients presented with signs and symptoms of partial large bowel obstructions, such as intermittent abdominal pain and constipation. These three patients underwent palliative partial colectomies and were treated with systemic chemotherapy afterward. A fourth patient was found to have metastatic lobular breast cancer in the colon wall of a specimen removed for colon cancer in the setting of chronic ulcerative colitis. Only one of the four patients was known to have metastatic breast cancer prior to their abdominal surgery, and two of the four patients had no prior diagnosis of breast cancer. All four patients are receiving systemic

chemotherapy with followup from 2 to 42 months. All patients had metastatic lobular breast cancer in the colon wall and in pericolic lymph nodes. The number of involved mesenteric lymph nodes ranged from 1 to 31. We found only small series and case reports of metastatic breast cancer to the gastrointestinal tract reported in the literature.

Conclusions/Discussion: We presented four recent cases of lobular breast cancer metastatic to the colon. In all four women, tumor was also found in pericolic lymph nodes. Two of the four patients had no prior diagnosis of lobular breast cancer. Three of the patients underwent successful, palliative partial colectomies which allowed them to receive systemic therapy for their metastatic lobular breast cancer. These patients presented with symptoms typical of partial bowel obstructions such as abdominal pain and constipation. In the fourth patient, the metastatic breast cancer was an incidental finding in a specimen removed for colon cancer in the setting of ulcerative colitis. Patients with metastatic lobular breast cancer to the colon are candidates for minimally invasive surgical techniques.



Colon wall with metastatic lobular breast cancer in the submucosa.

DOES THE COMBINED TREATMENT OF NEOADJUVANT CHEMO-RADIATION AND RECTAL RESECTION CAUSE HIGHER MORBIDITY IN PATIENTS WITH RECTAL CANCER?

P443

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Purpose/Background: Background: The standard treatment for mid and low locally advanced rectal cancer is neoadjuvant therapy followed by surgical resection. This study aimed to examine whether this combined treatment causes higher morbidity or mortality in elderly patients.

Methods/Interventions: MATERIALS AND METHODS: Between 2000 and 2016, data on 332 patients who underwent neoadjuvant chemo-radiation followed by rectal resection for low and mid rectal cancer were retrieved from a retrospective database. Patients were divided according to age to two groups, younger and older than 71 (75 percentile). The clinicopathological characteristics and outcomes were assessed and compared between the 2 groups of patients.

Results/Outcome(s): Results: 248 (75%) younger patients and 84 (25%) elderly patients were included in this study. The median age was 63 years. The elderly group had a significantly higher ASA score (P 0.039). There were 29.2% of abdominoperineal resections, 69.9% of low anterior resections and 0.9% of low Hartman's procedures. No postoperative mortality was found in the present study. The pretreatment staging was 65.4%- stage 2, and 31.3%-stage 3. Pathologic complete response rates were not significantly different between the 2 groups. Surgical site infection rates and urinary tract complication rates were higher in the elderly group compared with the younger group (22% vs 13% P= 0.036, 20% vs 12% P= 0.049, respectively). There was no statistical significant difference between the 2 groups in the rate of anastomotic complications, pulmonary complications and reoperations. There was also no statistical significant difference between the groups in the severity of complications.

Conclusions/Discussion: Conclusions: Neoadjuvant chemo-radiation followed by rectal resection was safe for elderly patients over 71 years of age. Overall there was no difference in the complication rates and severity of complications between the groups.

TOTAL NEOADJUVANT THERAPY DOES NOT INCREASE POST-OPERATIVE MORBIDITY COMPARED TO LONG COURSE NEOADJUVANT CHEMORADIATION IN THE TREATMENT OF RECTAL CANCER.

P444

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Purpose/Background: Conventional long course chemoradiation (LC) remains the standard neoadjuvant therapy for locally advanced rectal cancer in most U.S centers. We have previously shown in our institution that total neoadjuvant therapy (TNT), consisting of short course radiation therapy (500 CGy x 5 days) followed by neoadjuvant full-course chemotherapy (FOLFOX or CAPOX), has similar oncologic outcomes. The purpose of this study was to compare post-operative morbidity (POM), length of stay (LOS) and operative times (OT) in patients undergoing proctectomy following different neoadjuvant therapies.

Methods/Interventions: We performed a retrospective review of institution-specific NSQIP data on patients undergoing proctectomy for rectal cancer in a tertiary care center. We included adult patients of all stages who underwent surgery (low anterior resections – LAR; abdominoperineal resections – APR; and multi-organ resections) from 2011 to 2016. We identified 3 groups with different neoadjuvant treatments: patients who received LC, those who received TNT, and those who did not receive any neoadjuvant treatment. Our primary measured outcome was 30-day POM; our secondary outcomes were LOS and OT.

Results/Outcome(s): There were 216 patients included in our study population. 42 (19%) received no neoadjuvant therapy, 121 (56%) received LC, and 53 (25%) TNT. Composite POM rates were 23.8%, 27.3%, and 35.8% respectively, with multivariate regression analysis showing no significant difference in POM rates with the 2 different neoadjuvant therapy modalities compared to no neoadjuvant therapy (Table 1). No difference in POM was found when the TNT group was compared to the LC group either (OR=1.42; $p=0.38$). Our mean LOS was 6.3 days, and did not significantly differ among all 3 groups. Overall, patients undergoing APR ($n=66$) had significantly higher POM rates compared to those undergoing LAR ($n=126$) (42.3% vs 21.9%; $p=0.003$). There was also a higher LOS in the APR group (6.7 vs 5.9 days; $p=0.002$). OT was higher in the APR group than in the LAR group (242 vs 212 minutes; $p<0.001$). Subsequent subset analyses of the APR group and of the LAR group showed no differences in POM rates, LOS or OT regardless of neoadjuvant treatment.

Conclusions/Discussion: In our institution's unique experience with TNT using short course radiation therapy

followed by chemotherapy, POM, LOS and OT did not differ compared to patients who received LC. As expected, there were higher morbidity rates in the APR group compared to the LAR group, but no differences were found within each operative approach group when comparing the 3 different neoadjuvant treatment modalities. We therefore believe TNT is a safe alternative to conventional LC as a neo-adjuvant treatment for patients with rectal cancer.

Variable	Odds Ratio	Low 95%	High 95%	p-value
LC vs. None	0.70	0.20	2.43	0.579
TNT vs. None	1.00	0.27	3.68	1.000
LAR vs. APR	0.46	0.23	0.92	0.028
Tstage 3/4 vs. Tstage 1/2	1.62	0.59	4.49	0.349
ASA: 3or4 vs 1or2	2.13	1.11	4.10	0.023
Age of Diagnosis	1.02	1.00	1.05	0.070
BMI	0.97	0.92	1.02	0.185

CD44 IN RECTAL CANCER: A POTENTIAL MARKER FOR TUMOR RESPONSE TO NEOADJUVANT CHEMORADIATION? R.

P445

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Purpose/Background: CD44 is a cancer stem cell (CSC) which has been associated with colorectal cancer tumorigenesis and resistance to chemotherapy. It has been evaluated as a potential therapeutic target, yet its role in the response of rectal cancer to radiation has not been examined.

Methods/Interventions: 21 patients with locally advanced rectal cancer were included in the study. Sections from both normal and cancerous tissue of the same patient were taken before and after treatment with chemoradiation. CD44 expression was evaluated by immunohistochemistry performed on these sections using a 4-tier grading system for intensity of expression (0=none, 1=low, 2=moderate, 3=high) and percentage of CD44-positive cells. Linear mixed model and repeat measures MANOVA was used to compare the % positivity and differences in expression intensity between normal and cancerous tissue both pre- and post-radiation.

Results/Outcome(s): For normal rectal tissue, CD44% positivity was only 6.0% both before and after radiation. There was also no significant difference in intensity of expression before and after treatment [mean grade of expression was 0.86 and 1.13 and % with moderate or high expression was 5.6 and 22.2 before and after radiation, respectively (both NS)]. When normal rectal tissue was compared to cancerous tissue before radiation, cancer specimens had significantly higher levels of expression and CD44-percent positivity ($p=0.0001$ and $p=0.001$, respectively). In cancer biopsies, both percent positivity (48.4% vs. 21.1%, $p=0.000$) and intensity of expression

(mean 2.26 vs. 1.53, $p=0.02$) significantly decreased after radiation. The percent of rectal cancer specimens with moderate or high grade of expression was 88.9% before chemoradiation which decreased to 50.0% after treatment.

Conclusions/Discussion: In our study, intensity of expression and percentage of CD44+ cells are higher in rectal cancer tissue when compared to the normal tissue of the same patient. In cancerous tissue, CD44 expression and percent positivity are also found to significantly decrease after treatment with chemoradiation. These effects were not seen in normal tissue. Our findings suggest that CD44 may have a potential role in the tumorigenesis pathway of rectal cancer as well as to serve as a potential maker for tumor response of rectal cancer after neoadjuvant radiation. Clinical correlation will help elucidate these roles.

APPENDIX ORIFICE POLYP: A STUDY OF 691 LESIONS AT A SINGLE INSTITUTION.

P446

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Purpose/Background: Mucosal lesions in and around the appendix orifice present significant challenges in management. Histologically they can be neoplastic or non-neoplastic and often this distinction is only possible with excision and biopsy. Excision of appendix orifice lesions is tricky because the orifice itself is usually a small hole and the contour of the surrounding cecum is cone-shaped. Because data on the management of appendix orifice lesions remain quite limited we reviewed our

experience. A secondary aim was to examine differences in the histology of the lesions by race.

Methods/Interventions: This is a retrospective analysis of all patients with lesions at the appendix orifice in the years 2000-2017. Patients were accessed by review of the institutional histology database searching for reports with the term "appendix orifice lesion/polyp". We excluded race other than African American or Caucasian, and all patients with inflammatory bowel disease. Patients were divided into 2 groups according to Race; African American (AA) and Caucasian.

Results/Outcome(s): 691 patients were included, 620 Caucasian (89.7%) and 71 (10.3%) African American. The mean age for both groups was similar (AA= 60 years Vs Caucasian= 59.8 years, $p=NS$). Both groups had a similar male to female ratio (1:1.2 vs. 1:1, $p=NS$). Mean polyp size was 5.6mm for AA Vs 6.2mm for the Caucasian group. There was a significant difference in the pathology of polyps between the racial groups with only 3/71 (4.23%) of AA patients having a pathology of Sessile Serrated Adenoma/Polyp (SSA/P) and 30/71 (42.25%) having tubular adenoma (TA). In the Caucasian group 120/620 (17.9%) and 170/620 (28.77%) polyps were SSA/P and TA respectively ($P < 0.05$). Roughly 30% (210/691) of polyps were only biopsied. Cold biopsy forceps were the most commonly used method for polyp excision (36.3%) followed by Hot snaring (9.3%), cold snaring (8.5%), Jumbo cold forceps (6.7%), hot biopsy (6.8%), saline lift technique combined with snare or biopsy forceps (3.3%) and Endoscopic Mucosal resection (EMR)/ Endoscopic submucosal dissection (ESD) (0.7%). Complete polypectomy was done in 67% of patients. Recurrence rate (AA= 0, Caucasian =19, $P < 0.05$) was 2.8% (19/691). Size was not a significant factor since 42% (8/19 recurrences) were

P446 Histology of appendix orifice polyps

Histology	Number (n)	Percentage of all lesions(%)	Percentage of neoplastic lesions(%)
Tubular adenoma	200	28.94	46.95
Tubulovillous adenoma	17	2.46	3.99
Villous adenoma	1	0.14	0.23
adenoma with low grade dysplasia	6	0.87	1.41
adenoma with high grade dysplasia	3	0.43	0.70
Sessile serrated adenoma/polyp	123	17.80	28.87
Hyperplastic polyp	61	8.83	14.32
Traditional serrated adenoma	8	1.16	1.88
Adenocarcinoma	3	0.43	0.70
Carcinoid tumor	3	0.43	0.70
Leiomyoma	1	0.14	0.23
Lymphoid follicle	153	22.14	
Normal mucosa	86	12.45	
Inflammatory polyp	11	1.59	
Colitis	15	2.17	

less than 5mm and 42% were more than 10mm with a mean size of 10.1mm. 84% of the recurrent polyps were neoplastic, including 42% SSP, 26% TA, and 16% Tubulovillous adenoma (TVA). Surgery was performed in 45/691 (6.5%), mostly in Caucasians. (42/45, 93.3%). 6/45 polyps were malignant. Polyps >10mm in size represented 42.2% (19/45) while polyps <5mm represented 6.67% (p<0.05).

Conclusions/Discussion: Appendix orifice polyps can be safely managed endoscopically using cold/hot biopsy forceps, cold/hot snares and saline lift injection techniques without the need for special expertise in the form of EMR/ESD. Also, In the AA population, SSA/Ps are rare compared to the Caucasian population.

A SINGLE INSTITUTION REVIEW OF ENDORECTAL ULTRASOUND AND RECTAL - MRI FOR STAGING RECTAL CANCER.

P447

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Purpose/Background: It is now widely accepted that rectal- MRI with phased array coil is the standard of care for staging rectal cancer. Data suggest that endorectal ultrasound (ERUS) for staging rectal cancer can be used as a complementary tool and not as an alternative. For the past 2 years, our surgeons have performed endoscopic ultrasound in conjunction with rectal- MRI for staging rectal cancer.

Methods/Interventions: We retrospectively reviewed charts of colorectal surgeons within our academic practice from 2015 to 2017. Patients who underwent both rectal – MRI and 3D - ERUS for preoperative staging were selected for review. Final pathologic diagnosis was compared to preoperative staging. Our primary outcome variable focuses on comparing T stage interpretation between ERUS and rectal MRI. A secondary outcome variable will evaluate the diagnostic accuracy of endoscopic ultrasound compared to rectal - MRI for early rectal cancer.

Results/Outcome(s): From 2015 until 2017, 62 patients were evaluated for newly diagnosed rectal cancer. Of these patients, 30 had both rectal -MRI and 3D- ERUS for preoperative work- up. Two patients were diagnosed with T1 cancer on ERUS. There were zero patients that had a positive correlation between ERUS and MRI for T1. When evaluating T2 lesions, only 25% (2/8) of the time did ERUS positively correlate with MRI. Fifty-three percent (8/15) of T3 lesions on ERUS positively correlated to rectal MRI. Two patients were diagnosed with T4 disease on ERUS and of these two patients, only one had a positive correlation with rectal MRI. Seven of 30 patients were diagnosed with T1 or T2 N0 disease by endoscopic ultrasound. Four of 7 (57%) patients showed agreement between ERUS and

rectal MRI interpretation. Of the remaining patients that failed to correlate, rectal-MRI upstaged the cancer as T3 in one patient, upstaged the rectal cancer as N1 disease in a second patient, and failed to identify the rectal tumor in the final patient and reporting the patient as T0. Only one patient underwent induction chemoradiation therapy secondary to upstaging by rectal-MRI. The remaining 6 patients underwent definitive treatment with transanal endoscopic microsurgery or low anterior resection. In those 6 patients, ERUS interpretation correctly predicted final histopathologic diagnosis 67% of the time (4/6).

Conclusions/Discussion: Though rectal - MRI is now accepted as the gold standard for staging rectal cancer, our data show rectal-MRI has limitations in the evaluation for early rectal cancer. These results show, 3D – endorectal ultrasound fails to correlate with rectal - MRI for staging of early rectal cancer. When evaluating patients for suspected early rectal cancer, endorectal ultrasound should be implemented and serve as a complementary staging tool with rectal -MRI.

PREOPERATIVE SYSTEMIC INFLAMMATORY RESPONSE MARKERS AS PROGNOSTIC FACTORS IN NON-METASTATIC COLON CANCER.

P448

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Purpose/Background: The host inflammatory response to tumor can be an important role in clinical outcomes. In this study, we analyzed the neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR) and lymphocyte to monocyte ratio (LMR) with clinical outcome in non-metastatic colorectal cancer patients

Methods/Interventions: Between 2002 and 2010, 2,183 patients who underwent curative surgical resection for non-metastatic colon cancer were included for this study. We excluded patients with other malignant disease, inflammatory conditions and emergency operations. We retrospectively analyzed the association between the overall survival (OS) and systemic inflammatory marker

Results/Outcome(s): The 2,183 patients included 1,328 male and 1,274 female. All patients were performed curative resection of colon cancer. The cut-off value for NLR is 2.5, 175 for PLR, 3.8 for LMR as a mean value. In univariate analysis, increased NLR showed poorer OS (5 year-OS 86.5% vs. 76.9%, p<0.001). Also, increased PLR and decrease LMR showed poorer OS (5 year-OS 86.9% vs. 80.0%, p=0.001 and 86.7% vs. 72.4%, p<0.001, respectively). In multivariate Cox proportional hazards analysis, NLR and LMR were independently significant prognostic

factor (HR 1.310, 95% CI 1.029-1.668, $p=0.028$ and HR 1.426, 95% CI 1.052-1.934, $p=0.022$) adjusted with age, gender, American Society Anesthesiologist score, tumor differentiation, lymphatic invasion, tumor stage and preoperative carcinoembryonic antigen. But PLR showed no statistical significant in multivariate analysis

Conclusions/Discussion: The NLR and LMR can be independent prognostic markers for non-metastatic colorectal cancer.

LONG-TERM ONCOLOGIC OUTCOMES AFTER CURATIVE TREATMENT OF STAGE I-III COLORECTAL CANCER IN OCTOGENARIANS.

P449

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Purpose/Background: Significant number of colorectal cancer patient is found in octogenarian. The same treatment strategy as younger patient is usually offered. However, long-term outcomes after curative treatment is limited. This study is aimed to evaluate long-term outcomes after curative treatment of stage I-III colorectal cancer in octogenarians comparing to younger age group.

Methods/Interventions: A retrospective cohort study was performed in pathological stage I-III colorectal cancer patients who underwent curative surgery in our unit between 2007 and 2011. Long-term oncologic outcomes including 5-year overall survival and 3-year disease-free survival were compared between octogenarians (age ≥ 80) and younger age group (age 50-79).

Results/Outcome(s): Total 537 patients were included in the cohort; 71 octogenarian and 466 younger age group. Octogenarian group had shorter median follow up time and operative time but more postoperative ICU stay as well as more cardiovascular, respiratory and neurological comorbidities. The proportion of right-sided colon cancer in octogenarian group was higher. There were no difference in pathological stage between two groups but octogenarian group received less adjuvant treatment (Table). Kaplan-Meier survival analysis showed lower 5-year overall survival in octogenarian group (52.1% vs. 71.7%; log rank test $p < 0.001$). However, 3-year disease-free survival was comparable (84.9% vs. 74.4%; log rank test $p = 0.05$).

Conclusions/Discussion: Although octogenarians have shorter life-expectancy after curative treatment in stage I-III colorectal cancer, surgery in octogenarians provides the same disease-free survival comparing to younger patients.

P449 Patient's characteristics between octogenarian and younger age group

	Age 50-79 (n=466)	Age ≥ 80 (n=71)	p-Value
Male gender	252 (54.1%)	34 (47.9%)	0.330
Comorbid disease			
Cardiovascular disease	56 (12.0%)	21 (29.6%)	<0.001*
Respiratory disease	26 (5.6%)	11 (15.5%)	0.005*
Neurological disease	35 (7.5%)	13 (18.3%)	0.003*
Location of tumor			0.027*
Right-side colon	71 (15.2%)	20 (28.2%)	
Left-side colon	176 (37.8%)	20 (28.2%)	
Rectum	219 (47.0%)	31 (43.7%)	
Operative time (Min.)	210 (155,270)	180 (135,260)	0.022*
Postoperative ICU stay	55 (11.8%)	21 (29.6%)	<0.001*
Pathological stage			0.065
I	101 (21.7%)	15 (21.1%)	
II	142 (30.5%)	31 (43.7%)	
III	223 (47.9%)	25 (35.2%)	
Follow-up time (years)	5.53 (2.40,7.56)	3.49 (0.93,6.06)	<0.001*
No postoperative adjuvant treatment	192 (41.2%)	53 (74.6%)	<0.001*

SURGICAL MANAGEMENT FOR THE RETRORECTAL-PRESACRAL TUMORS: A MULTICENTRIC NATIONWIDE COHORT STUDY.

P450

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Purpose/Background: Operative management of retrorectal-presacral (R/P) tumors is challenging and associated with dilemmas due to its heterogeneous and rare nature. The aim of this study was to identify nationwide status, postoperative outcomes and factors associated with operative morbidity in patients undergoing surgery for R/P tumors.

Methods/Interventions: Between 1996-2017, patients operated by 10 surgical teams with curative intent for R/P tumors were included. All patients had magnetic resonance imaging and a colonoscopy preoperatively. A biopsy was made at the discretion of the individual surgeon before surgery. Patient characteristics, operative strategy, pathological results, factors associated with postoperative morbidity, short and long-term outcomes were evaluated. Overall morbidity rate was calculated by considering the number of patients who had at least one postoperative complication.

Results/Outcome(s): 127 (44 male) patients with a mean age of 46 and body mass index of 27 kg/m² were included. Anal pain (69%) was the chief symptom. 7% of the patients had prior history of sacral surgery. 58 % of the patients had low sacral (below the S3) lesions. Preoperative biopsy was performed in 16 % of the patients. The operative approaches were transabdominal (17%), transsacral (65 %) and abdominosacral (17 %). Postoperative morbidity was 19 %. 30 % of the patients were diagnosed with a malignant lesion. Chordomas (6 %) and tail gut cysts (28 %) were the most common malignant and benign tumors, respectively. Abdominosacral approach (p=0.0001) and high sacral (above the S3) tumors (p=0.0004) were associated with an increased risk of postoperative morbidity. There was no short-term mortality. 9 % and 12 % of the patients underwent adjuvant radio and chemotherapy, respectively. Overall long-term postoperative recurrence and mortality was 6% and 5 % respectively within 3-year mean follow-up time.

Conclusions/Discussion: While R/P tumors requiring surgery is usually benign, diagnostic work-up and surgical approach should be planned considering risk of malignancy. Perioperative care should be calibrated to reduce morbidity in risky conditions such as having high sacral tumors and an abdominosacral surgery.

AN UNUSUAL CASE REPORT OF A CECAL MASS ON CT SCAN NOT SEEN ON COLONOSCOPY.

P451

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Purpose/Background: The majority of neoplasms arising in the colon are adenomas and adenocarcinomas, however, other tumors may present. Although primary colonic lymphomas account for 0.4% of all colonic malignancies, there has been a recent increase in incidence over the last decade. We present a 55 year old male with a 2 month history of abdominal pain and 200 pound intentional weight loss over the last 5 years. He denied any medical history, and his family history was significant for a brother with colon cancer. Abdominal exam revealed a right lower quadrant mass with tenderness to palpation. A computed tomography (CT) scan performed showed cecal enlargement and inflammation. On colonoscopy, no intraluminal mass was identified; instead, a hyperemic appendiceal base was noted and biopsies taken, later found to be negative for malignancy. The patient underwent a repeat CT scan, which showed a 6 centimeter (cm) mass with irregular margins centered in the cecum.

Methods/Interventions: Several differential diagnoses were entertained: adenocarcinoma, submucosal cecal mass, carcinoid, terminal ileal mass with intrusion into cecum, or appendiceal tumor. Given the patient's worsening symptoms, there was concern this mass could perforate or lead to appendiceal obstruction. We proceeded to the operating room for a diagnostic laparoscopy. Upon entering the abdomen, we found a large mass in the terminal ileum abutting the cecum, for which we performed a laparoscopic right hemicolectomy.

Results/Outcome(s): Gross pathology revealed an 8.0 x 6.0 x 5.2 cm mass predominantly involving the appendix, terminal ileum, and cecum (Figure 1a). Microscopically, the mass consisted of sheets of monotonous medium to large atypical lymphoid cells (Figure 1b) that stained positive for Bcl-2, Bcl-6, CD10, CD20 (Figure 1c), and MUM-1, with a high proliferation index, Ki-67 of 95-100% (Figure 1d), consistent with a diagnosis of diffuse large B-cell lymphoma. There were 21 reactive, benign lymph nodes included with the specimen. The patient's post-operative clinical course was uncomplicated, and was discharged home on post-operative day 2. He was scheduled to see Oncology and chemotherapy was initiated after a bone marrow biopsy.

Conclusions/Discussion: Diffuse large B-cell lymphoma is the most common histologic type of non-Hodgkin's lymphoma seen in the colon. Patients with colonic lymphomas that produce symptoms are best treated with surgical resection prior to chemotherapy. An alternative strategy is to treat with systemic chemotherapy and potentially avoid operation, however, a potential risk with this treatment strategy is bowel perforation if chemotherapy

causes tumor necrosis. Given the low incidence of colonic B cell lymphoma, there are no large randomized controlled trials to rely upon when making treatment decisions, and further prospective trials are needed to better evaluate the role of chemotherapy alone versus surgery followed by chemotherapy in the treatment of colonic lymphomas.

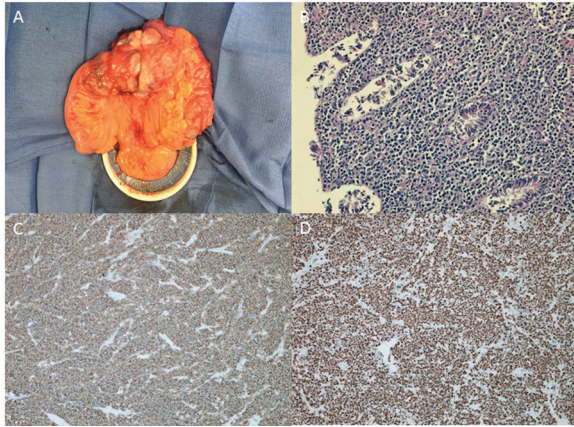


Figure 1. Gross and microscopic histopathology of ileocolonic lymphoma. (A) Gross pathology showing 8.0 x 6.0 x 5.2 cm mass predominantly involving appendix, terminal ileum, and cecum. (B) Sheets of monotonous medium to large atypical lymphoid cells. (C) Positive stain for CD 20. (D) High proliferation index, as measured by Ki-67 of 95-100%.

EARLY STAGE NEUROENDOCRINE TUMORS OF THE COLON AND RECTUM HAVE HIGH RISK OF NODAL INVOLVEMENT.

P452

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Purpose/Background: Neuroendocrine tumors of the colon and rectum are relatively rare neoplasms of the gastrointestinal tract. While the behavior of neuroendocrine tumors of the appendix has been more completely characterized, less is known about the behavior of tumors arising elsewhere in the large bowel, which may influence the extent of resection that is utilized. The aim of this study was to identify tumor- and patient-related factors associated with lymph node positivity in patients with non-appendiceal neuroendocrine tumors of the colon and rectum.

Methods/Interventions: Patients were identified within the National Cancer Database from 2004 to 2012 as having a tumor (1) with neuroendocrine histology, (2) at a site in the colon or rectum other than the appendix, and (3) without known metastatic disease. Patients were excluded if pathologic lymph node status, T stage, or tumor size were unknown. Lymph node positivity was modeled using patient- and tumor-related characteristics in multivariable logistic regression analyses.

Results/Outcome(s): A total of 1,881 patients meeting study criteria were identified: 282 (15.0%) with rectal and 1,599 (85.0%) with colonic neuroendocrine tumors. In patients with colonic disease, median survival time was 31.9 months (64.9% 5-year overall survival [OS]), and for rectal disease was 32.0 months (61.2% 5-year OS). The median size of colonic tumors was 30 mm (IQR 20-50 mm), whereas it was 20 mm for rectal tumors (IQR 8-40 mm). Overall, lymph node involvement was significantly higher in patients with colonic disease than those with rectal disease (73.1% vs. 47.9%, $p < 0.001$). In general, the rate of lymph node positivity increased with increasing depth of invasion for both colonic and rectal tumors (Table 1). After adjusting for underlying patient- and tumor-related characteristics, location within the cecum (odds ratio [OR] 1.84, $p < 0.001$) was associated with a significantly higher odds of lymph node positivity relative to elsewhere within the colon, whereas rectal location (OR 0.58, $p < 0.001$) was associated with lower odds of lymph node positivity. Increasing T stage was associated with higher odds of nodal positivity (OR 2.6 for T2, OR 5.0 for T3, and OR 5.9 for T4, all $p < 0.001$). Additionally, advanced patient age over 80 years (OR 0.58, $p = 0.002$) had lower odds of nodal positivity, while patients of black race had higher odds (OR 1.58, $p = 0.006$) when compared to those of white race.

Conclusions/Discussion: While the rate of nodal positivity was higher in patients with colonic neuroendocrine tumors compared to those within the rectum, particularly for lesions within the cecum, rates of nodal positivity were overall relatively high (ranging from 23% to 82%) and increased with increasing T stage. Caution should be exercised in considering patients for either endoscopic or transanal excision of either colon or rectal T1 lesions because of the high rate of nodal involvement.

P452 Table 1

T Stage	Colon		Rectum	
	% Lymph Nodes Positive	5-year Overall Survival	% Lymph Nodes Positive	5-year Overall Survival
T1	37.1%	78.8%	23.2%	89.2%
T2	70.4%	83.3%	43.1%	56.7%
T3	77.5%	63.4%	76.0%	42.4%
T4	82.0%	46.0%	53.3%	32.0%

LAPAROSCOPIC COLORECTAL CANCER (CRC) EMERGENCY SURGERY IS SAFE AND FEASIBLE.

P453

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Purpose/Background: Twenty percent of CRCs present as an emergency. Although laparoscopic elective CRC surgery is now the “gold standard” approach, its role in the emergency setting remains uncertain. The aim of this study was to evaluate surgical and oncological outcomes of laparoscopic vs open emergency CRC surgery.

Methods/Interventions: Consecutive patients between January 2014 to October 2017 undergoing emergency CRC surgery from the prospective National Emergency Laparotomy Audit (NELA) had their data analysed including patient demographics, operative details (laparoscopic/open) and surgical outcomes. Oncological results were collected retrospectively.

Results/Outcome(s): In the NELA database, 1090 patients underwent emergency surgery for various indications, of which 51% had an attempted laparoscopic approach (73% successfully completed). There were 74

patients who underwent emergency resectional surgery for histologically confirmed CRC of which 37 (50%) had a laparoscopic procedure. There were 8 conversions to open surgery (21%). Median age in the laparoscopic vs open was 68 vs 76 years ($p<0.05$), 46% were male in the laparoscopic group, 38% in open. Median pre-operative P-Poosum was 4.1% in laparoscopic and 15.4% in open group ($p<0.05$). Patients who underwent laparoscopic surgery had a significantly reduced 90-day mortality, 2.7% (1/37) vs. 18.9% (7/37), ($p<0.05$.); a decreased median length of stay of 7.6 days vs. 15.5 ($p<0.05$). R0 status, nodal harvest and histological grading were not statistically different between the two groups.

Conclusions/Discussion: Laparoscopic emergency CRC surgery can achieve comparable oncological outcomes to open procedures whilst shortening length of stay and improving mortality.

P453 : Comparison of laparoscopic and open resections for CRC

	Lap resection (n=37)	Open resection (n=37)
Age (years)	68 (33-85)	76 (44-90)
Sex M:F/%	46:54	38/62
ASA III and above	12	16
T 4	31	34
PPOSSUM Morbidity	61.6 (17.9-99.4)	86.2 (29.3- 99.6)
PPOSSUM Mortality	4.1 (0.7- 84.3)	15.4 (1.2- 86.9)
Indication:		
Obstruction	29	25
Perforation	4	9
Bleeding	3	1
Other	1	2
Conversion	10 (28%)	
R0 resection (n)	35	35
Length of Stay (days)	7.6 (3-83)	15.5 (5-76)
Median LN harvest (n)	22 (14-61)	21 (8-38)
90 day mortality (n)	1 (2.7%)	7 (18.9%)
Complications		
Ileus	2	4
Collections	6	1
Pulmonary Embolism	1	0
Aspiration Pneumonia	1	0
Hernia	1	1
High Stoma Output	1	0
Wound Infection	1	0

DECISION ANALYSIS: SEGMENTAL OR EXTENSIVE COLECTOMY IN LYNCH SYNDROME.

P454

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Purpose/Background: Lynch syndrome (LS) is associated with an 80% lifetime risk of developing colorectal cancer, as well as an associated increased risk of developing a metachronous cancer. Small series have previously evaluated the risk of developing metachronous cancer in LS patients following segmental colectomy (SEG) versus extended colectomy (EXT), firmly establishing that extensive resection decreases the risk of metachronous cancer. No studies to date have examined the probability of being alive and metachronous cancer free after SEG or EXT for colon cancer in LS patients, which this systematic review aims to evaluate. If EXT offers a survival advantage due to the risk of metachronous cancer in LS, preoperative diagnosis of LS is critical as it alters the recommended surgical procedure.

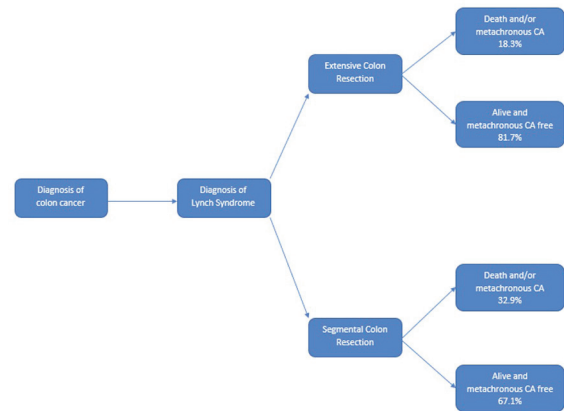
Methods/Interventions: A systematic review of major databases was performed using predefined terms. All original articles from 1950-2017 comparing the risk of developing metachronous cancer in LS patients who underwent SEG and EXT colectomy were included. A decision tree was constructed that compared 5 year freedom from cancer or death following SEG to EXT. Node probabilities for the decision tree were calculated via a meta-analysis using the fixed effects and random effects models. Overall odds ratio was calculated to determine significance and the magnitude of difference in outcome between the two approaches.

Results/Outcome(s): The search retrieved 123 studies. Six studies involving 1024 patients met the inclusion criteria. Of these, 762(74.4%) underwent SEG and 262 (25.6%) underwent EXT. 165 patients in the SEG cohort developed metachronous cancer (21.7%), while 12 patients in the EXT group developed metachronous cancer (4.6%). 86 (11.3%) patients died during the study period in the SEG group compared to 36 (13.7%) in the EXT group. When factoring in patients who died during the study periods and those who developed metachronous cancer in each group, the EXT group had an 81.7% probability of being alive and metachronous cancer free five years after initial resection compared to 67.1% probability for the SEG group. The EXT group had over three times higher odds of being alive and free of metachronous cancer five years after initial resection (OR 3.65, 95%CI: 2.42-5.48).

Conclusions/Discussion: This study suggests that EXT as the initial operation for LS patients diagnosed with Stage I-III colon cancer improves the probability of being alive and free of metachronous cancer five years after initial resection over three-fold compared to SEG. Given this large benefit to being alive and metachronous cancer free in just five years postoperatively, we recommend EXT

as the primary surgical option for initial colon cancer diagnoses in LS patients, consistent with recent national recommendations. However, in order to take advantage of this recommendation, preoperative diagnosis of LS is essential.

Figure 1. Decision tree with associated outcome probabilities



COMPLETE MESOCOLIC EXCISION: IS MORE MESOCOLON BETTER?

P455

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Purpose/Background: The detection of lymph nodes (LNs) metastasis is crucial in patients with colon cancer as one of the strongest pathological predictors of survival. Currently, a minimum of 12 harvested lymph nodes is required to appropriately stage these patients and is usually considered as a surrogate marker for the quality of surgery. Central vascular ligation (CVL) resulting in extended lymph node resection and complete mesocolic excision (CME) have been suggested to improve oncological outcomes among patients with colon cancer. Performance of routine CVL and CME could potentially minimize the risk for inappropriate surgical specimens with <12 harvested lymph nodes and impact overall survival of these patients. The aim of this study was to compare the pathological and oncological outcomes of patients with colon cancer according to the length of resected mesocolon/mesentery.

Methods/Interventions: Consecutive patients who underwent colectomy with curative intent for colon cancer between 2000 and 2012 were eligible for the study. All resected specimens had the length of the mesentery measured immediately after removal. Maximum mesenteric length (ML) was determined by direct measure from the edge of primary tumor to the most proximal vascular tie. Clinical and pathological outcomes were retrospectively reviewed from the institution's pathology database and patients' medical records. Patients were compared

according to the number of harvested nodes. A ROC curve was created for significant numerical variables associated with <12 harvested nodes to identify critical cutoff values predictive of this pathological variable

Results/Outcome(s): 349 patients were included in the study. 37 patients (10.6%) of whom had <12 harvested lymph nodes Mean ML was 9 cm. Patients with <12 harvested lymph nodes had significantly shorter ML (7.7cm vs. 9.2 cm; $p=0.03$). ML ≤ 7.5 cm predicted the presence of suboptimal lymph node harvest (<12 harvested lymph nodes - sensitivity: 72% specificity: 53% AUC: 0.6; $p=0.01$). Finally, 5yr overall survival was significantly better for patients with longer ML (80% vs 68%; $p<0.01$).

Conclusions/Discussion: A longer ML (≥ 7.5 cm) is associated with a lower risk for suboptimal nodal harvest and improved survival following resection of colon cancer. Surgeons should consider routine CVL and CME in order to minimize the risk of suboptimal nodal harvest and poor oncological outcomes.

INDOCYANINE GREEN VISUALIZATION OF LYMPH NODES DURING LAPAROSCOPIC RIGHT HEMICOLECTOMY COULD ACHIEVE MORE RADICAL D3 LYMPH NODE DISSECTION OF ADVANCED RIGHT-SIDED COLON CANCER.

P456

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Purpose/Background: The recent concept of complete mesocolic excision with central vascular ligation in colon cancer has been increasingly emphasized for radical resection of colon cancer. Central vascular ligation of right-sided colon cancer is aimed to remove all drainage lymph nodes, including lymph nodes along the SMA/SMV like

Japanese D3 lymph node dissection. This study is aimed to evaluate the pathologic radicality of indocyanine green (ICG)-guided D3 lymph node dissection for advanced right-sided colon cancer.

Methods/Interventions: We performed ICG-guided laparoscopic right hemicolectomy (RHC) with D3 lymph node dissection for patients with clinical T3/4 tumor after completing the informed consent form between June 2016 and October 2017. ICG was endoscopically injected before surgery on the submucosa of peritumoral area (total amount of ICG: 0.2-0.3ml; 2.5mg/ml). During laparoscopic RHC, lymphatic flow and lymph nodes were visualized using ICG fluorescence imaging before, during, and after D3 lymph node dissection and vascular ligation (Figure1). It was confirmed that there were no remnant fluorescing lymph nodes. The dissected lymph nodes were classified as n1 (pericolonic), n2 (intermediate), or n3 (main) lymph nodes. The clinicopathological outcomes of 24 patients in ICG group (white light plus ICG fluorescence) were compared with those of the conventional group (white light only).

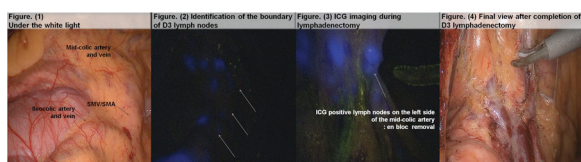
Results/Outcome(s): The fluorescing lymph nodes along the SMA and SMV were found in 23 patients (85%). In two patients (14.3% of patients hepatic flexure or transverse colon cancer), fluorescing lymph flow and lymph nodes were found along the right gastroepiploic vessels and en bloc resection was performed. There were no significant differences between the ICG and conventional groups regarding age, sex, BMI, tumor location, colon length, and pathologic tumor depth. The number of all harvested lymph nodes in the ICG group was significantly larger than that of the conventional group (41 vs 33; $p = 0.011$). The number of the harvested n1 and n2 lymph nodes were not different between the ICG group and the conventional group. The number of the harvested n3 lymph nodes was significantly higher in the ICG group than that of

P455

	Mesenteric length <7.5 cm n= 123	Mesenteric length >7.5 cm n=226	p
Age	69.9 ± 13	68.2 ± 14	0.28
Gender (m-f)	66-57(53.6%-46.4%)	136-90 (60.2%-39.8%)	0.25
pT			0.23
1-2	36 (29.3%)	81 (35.8%)	
3-4	87 (70.7%)	143 (64.2%)	
pN+	50 (40.6%)	70 (31%)	0.07
Total Number of LNs	22.5±12.4	28.8±18.2	<0.01
Patients with <12 LNs	21 (17%)	16 (7%)	<0.01
Tumor Size	4.5±2.6	4.5±2.5	0.90
Local recurrence	2 (1.6%)	9 (4%)	0.34
Systemic recurrence	14 (11.4%)	15 (6.6%)	0.15
Deaths	49 (39.8%)	57 (25.2%)	<0.01

the control group (16 vs 9; $p < 0.01$). In patients with pathologically positive lymph nodes, the numbers of n2 and n3 lymph nodes were significantly higher in the ICG group than those of the conventional group (6 vs 11, $p = 0.003$ and 7 vs 13, $p = 0.039$). The number of positive lymph nodes was not significantly different between the two groups.

Conclusions/Discussion: Indocyanine green visualization of lymph nodes facilitated to perform more radical D3 lymph node dissection during laparoscopic RHC for advanced right-sided colon cancer. The pathological radicality could be confirmed from the increased number of harvested lymph nodes.



EFFECT OF TRANSANAL TOTAL MESORECTAL EXCISION IN RECTAL CANCER: A CASE-MATCHED CONTROL STUDY OF OPEN, LAPAROSCOPIC AND COMBINED TRANSANAL APPROACHES.

P457

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Purpose/Background: Current options for surgical management of rectal cancer consist of the traditional open approach and a minimally invasive approach using laparoscopic transabdominal dissection. A novel and aesthetically appealing technique is a natural orifice approach where dissection of the total mesorectal excision (TME) specimen is performed transanally (Ta) and, in appropriate cases, extracted in similar fashion. This technique is called transanal TME (TaTME). This study compares the short-term outcomes of TME surgery for mid and low rectal cancer using transanal (TaTME), laparoscopic (LaTME), and traditional open (OpTME) approaches using case matched controls to determine whether TaTME is an oncologically safe and surgically feasible option in the management of low and mid rectal cancers.

Methods/Interventions: Patients with mid- and low rectal cancers who underwent TaTME between 2015 and 2017 were selected and matched to LaTME and OpTME cases according to sex, age, and BMI. The primary outcome is integrity of TME specimen. Secondary outcomes include distance to circumferential resection margin (CRM), distance of tumour to distal margin, lymph node harvest, duration of surgery, intraoperative blood loss, transfusion requirement, intraoperative complication, length of stay, and return to operating room. Chi-square and linear regression analysis will be performed.

Results/Outcome(s): A total of 50 TaTME cases were matched with 50 LaTME and 50 OpTME cases. At the time of this submission, pathology reports are pending for 3 of the TaTME cases however early data analysis shows comparable TME quality (47 of 47 complete or near complete TME) in TaTME cases. Average duration of TaTME cases is 296.7 minutes which is comparable to existing literature in TaTME.

Conclusions/Discussion: Our results will add to the growing body of literature on the short term outcomes of TaTME approach and may demonstrate non-inferiority of this evolving technique. Based on early data, TaTME is a technically feasible and safe oncologic surgical approach to rectal cancer.

ROLE OF ROBOTIC SURGERY FOR RECTAL CANCER: A COMPARATIVE ASSESSMENT WITH LAPAROSCOPY.

P458

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Purpose/Background: There are limited studies comparing the outcomes of totally robotic and totally laparoscopic rectal cancer surgery. In this study, the rationale behind using of robotic and laparoscopic surgery for rectal cancer performed by experienced surgeons was assessed by comparing perioperative and short-term outcomes.

Methods/Interventions: Patients underwent totally laparoscopic and totally robotic surgery for rectal cancer with curative intent between December 2014 and August 2017 were included. Patient demographics, perioperative and short-term postoperative outcomes were compared. A case matched subgroup analysis was performed based on BMI, tumor stage and tumor location. Additional subgroup analyses were performed to assess impact of gender, obesity ($BMI \geq 30 \text{ kg/m}^2$), increased age (≥ 65 years) and neoadjuvant treatment on the outcomes among the patients who had a total mesorectal excision for mid and low rectal tumors.

Results/Outcome(s): 178 patients were included to study ($n=100$ Robotic, $n=78$ Laparoscopic). TME was performed in 65 (65%) and 66 (85%) patients undergoing robotic and laparoscopic resections respectively ($p=0.003$). Conversion to open surgery [$n=2$ (2%) vs $n=1$ (1%) $p=0.7$], creation of diverting ileostomy [$n=67$ (67%) vs $n=56$ (72%) $p=0.49$], estimated blood loss (134 ± 62 vs 83 ± 46 ml $p=0.47$), time to bowel movement (2 ± 1 vs 2 ± 2 days $p=0.23$), overall complications [$n=23$ (23%) vs $n=19$ (24%) $p=0.83$], length of hospital stay (7 ± 4 vs 9 ± 4 days $p=0.5$) were similar between two groups. Operating time was longer in robotic group (321 ± 102 vs 204 ± 67 minutes $p=0.0001$). Incomplete mesorectum was

observed in 5% and 3% of the patients underwent TME robotically and laparoscopically respectively ($p=0.68$). Number of harvested lymph nodes (23 ± 12 vs 26 ± 11 , $p=0.72$) was similar between the groups in TME patients. Length of hospital stay was shorter (7 ± 2 vs 9 ± 4 days, $p=0.013$) and number of retrieved lymph node was higher (30 ± 19 vs 23 ± 10 , $p=0.018$) in the robotic group in obese patients underwent TME (Table)

Conclusions/Discussion: The results of our study reveal that both laparoscopic and robotic surgery for treatment of rectal cancer is safe and provide satisfactory short-term outcomes in experienced hands. Despite increased operating time, robotic technique for rectal cancer may improve quality and efficacy of surgical treatment in obese patients.

Table : Obese patients underwent TME

	ROBOT (n=15)	LAPAROSCOPY (n=12)	P [*]
Operative time (min), mean \pm SD	381 \pm 102	216 \pm 90	0.001
Length of hospital stay (days), mean \pm SD	7 \pm 2	9 \pm 4	0.013
Overall complications, n (%)	3 (20%)	4 (33%)	0.66
Radial margin involvement, n(%)	1 (7%)	0	>0.99
LN harvested, mean \pm SD	30 \pm 19	23 \pm 10	0.018
Mesorectum (incomplete) ^{††} , n (%)	2 (13%)	0	0.48

TME: Total mesorectal excision

SD: Standard deviation

LN: Lymph node

Obese Patients Underwent Total mesorectal excision

TEXTURE ANALYSIS AS AN IMAGING BIOMARKER FOR EARLY IDENTIFICATION AND STRATIFICATION OF HEPATIC METASTASIS IN RECTAL CANCER.

P459

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Purpose/Background: Despite improvements in staging, surgery, and adjuvant treatment, rectal cancer has high rates of metastases. The majority of these occur in the liver, and are associated with an inherently worse prognosis. Intrahepatic recurrence may arise from occult metastases present but not detected at the time of staging. Thus, novel imaging modalities are needed to better assess metastatic disease potential in rectal cancer at the initial staging. Texture analysis (TA) is a mathematical model that evaluates tumor heterogeneity or grey-level intensity variations. Preliminary work has shown TA can benefit diagnosis, staging, nodal status, and response to therapy.

No work to date has used TA to stratify pre-treatment scans of rectal cancer patients by susceptibility for developing hepatic metastasis. Our goal was to determine if analyzing the pre-treatment images with TA could discriminate different tissue textures indicative of metastatic liver disease not apparent on conventional imaging in rectal cancer patients.

Methods/Interventions: A validation study was performed on rectal cancer patients with histologically proven liver metastasis after intended curative surgery. The study group was matched to a control group with no evidence of metastases after ≥ 5 years. Groups had TA performed on the baseline pre-treatment staging CT and T2 pelvic MRI scans. Histogram analysis quantified the distribution of grey-levels, coarseness, and regularity within the cancer using the proprietary technology. Kaplan Meier analysis assessed time to recurrence between the study and control group on imaging. The main outcome measure was if a difference in TA parameters on pre-resection images between the study and control groups was present, which could indicate early tissue changes/ metastatic disease.

Results/Outcome(s): Twelve patients were included in both the study and control groups. On CT, TA was more heterogeneous and showed significantly different entropy, mean of positive pixels, standard deviation, and intensity in the study than control group ($P = 0.032$). The difference was more amplified at coarse versus medium filter levels. Kaplan Meier analysis found TA could pick up poor disease-free survival on CT. In evaluating the baseline pelvic MRIs, no statistical significance could be seen with TA between the study and control groups.

Conclusions/Discussion: Texture Analysis could distinguish patients likely to develop liver metastases on initial staging CT, providing more information than routinely acquired imaging. As these changes could be indicative of early metastatic disease, the addition of TA to staging CT may improve prognostication in rectal cancer. Thus, TA could be a promising imaging biomarker to stratify rectal cancer patients by susceptibility for development of hepatic metastasis. Further studies are underway to evaluate the relationship of this imaging model with pathology and survival outcomes.

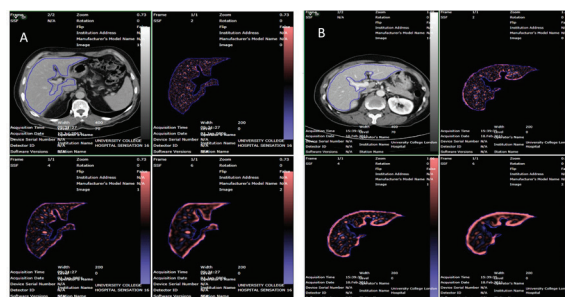


Figure 1: CT Texture Analysis in rectal cancer patients that A. Developed hepatic metastasis; and B. Did not develop hepatic metastasis after a 5 year or greater follow-up interval

ROBOTIC RESECTION FOR RECTAL CANCER: AN EVALUATION OF 10-YEAR RESULTS.

P460

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Purpose/Background: There are limitations in laparoscopic resection for rectal cancer and the outcomes are controversial. Robotic surgery can overcome some of these limitations. We reviewed our 10-year experience of robotic surgery for rectal cancer and evaluated the outcomes.

Methods/Interventions: Consecutive patients who suffered from adenocarcinoma of rectum and underwent robotic surgery from 2008 to Jun 2017 were included. The operation was performed with the da Vinci S robotic surgical system. The operations were mostly performed with hybrid technique with mobilization of the left colon and ligation of the inferior mesenteric vessels performed with conventional laparoscopy. The patients' demographics, operating details, post-operative outcomes and disease status were collected prospectively. The outcomes were evaluated in this study.

Results/Outcome(s): During the study period, 314 robotic resections were performed for rectal cancer. The median age of the patients was 66 years (range: 34-91 years). The median level of the tumor was 8 cm from the anal verge and the median level of anastomosis was 4 cm from the anal verge. Preoperative neoadjuvant chemoradiation was given to 123 patients (39.3%). Three patients had Hartmann's operation and 21 had abdominoperineal resection. The other 290 (92.3%) patients had sphincter saving resection. The median operating time was 255 min (range: 135-671 min) and the median blood loss was 100 ml (range: 10-2500 ml). Conversion was required in 4 patients (1.3%). Three patients died within 30 days after the operation and morbidity occurred in 58 patients (18.6%). Anastomotic leak occurred in 13 patients of the 290 patients with anastomosis (4.5%). Reoperation was required in nine patients (2.9%). The median size of the tumor was 3.0 cm and the median distal margin was 3 cm. Twenty-one patients had complete pathological response to chemoradiation and the stages of disease were: stage I: n=82; stage II: n=95; stage III: n=92; stage IV: n=26. The circumferential margin was positive in 12 patients (3.9%). The 5-year local recurrence rate was 5.9%. The 5-year overall survival rate and 5-year cancer specific survival rate were 71.9% and 79.8%, respectively.

Conclusions/Discussion: Robotic resection is a safe option for rectal cancer and is associated with a high sphincter preservation rate as well as a low conversion rate. The overall complication rate is less than 20% and the anastomotic leakage rate is low. The circumferential margin positive rate, the local recurrence rate and the survival of patients are also favorable when compared with other series of open or laparoscopic resection.

ROBOTIC SIMULTANEOUS RESECTION OF COLORECTAL CANCER WITH SYNCHRONOUS LIVER METASTASIS.

P461

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Purpose/Background: The liver is the most common metastasis site of colorectal cancer and twenty five percent of newly diagnosed colorectal cancer have synchronous liver metastasis. A curative resection is the only therapeutic chance of long term survival, for these patients. There are some reports about simultaneous minimally invasive surgery for these patients. However, there are no report about one-stage robot assisted surgery. We aimed to evaluate the efficacy and safety of one-stage robot assisted surgery for colorectal cancer with synchronous liver metastasis.

Methods/Interventions: We analysed our institution's medical database between January 2008 and march 2017. There were total twelve patients who received robotic surgery for the colorectal cancer with synchronous liver metastasis in our institution.

Results/Outcome(s): A total of two right colectomies, one left colectomy, and two anterior resections, and seven low anterior resections were performed. Liver resection was minor in 6 (50 %) patients and major in 6 (50 %) cases. Two patients with multiple liver metastases was managed by two staged ALPPS (Associated liver partition and portal vein ligation for staged hepatectomy). In one (8.33 %) patient, conversion to open laparotomy was done. The average length of hospital stay was 20 days (range, 7-63 days). There was no perioperative mortality within 30 days.

Conclusions/Discussion: In a selected patient, well designed simultaneous robot surgery of colorectal cancer with synchronous liver metastasis can be performed safely even in cases requiring major liver resections

SERIOUS COMPLICATIONS OF SEDATION FOR COLONOSCOPY: A SYSTEMATIC REVIEW AND META-ANALYSIS.

P462

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Purpose/Background: Sedation used for endoscopy can decrease patient-reported pain and improve the overall patient experience. However, sedative agents associated with agent-specific risks of cardiorespiratory and procedure-related complications. Previous meta-analyses of complications related to sedation for colonoscopy are limited to data from randomized clinical trials (RCTs). However, RCTs may not adequately capture uncommon,

but serious, complications. We, therefore, aimed to quantify the incidence of serious complications in patients who underwent routine colonoscopy under sedation by using data from a broader range of study designs.

Methods/Interventions: A rapid review methodology was used. PubMed, EMBASE, Cochrane, NHS Economic Evaluation Database were searched from inception to March 2, 2017 for RCTs and cohort studies including at least 100 patients undergoing colonoscopy under sedation and reporting uncommon complications. We pooled the incidence of uncommon complications using generalized linear random/mixed-effects meta-analysis models and an exact likelihood approach based on a Poisson distribution by type of sedation: propofol and traditional agents (narcotics and/or benzodiazepines); and sedation provider. Incidence of events by type of sedation was compared using incidence rate ratios (IRR).

Results/Outcome(s): 98 eligible studies: reporting uncommon outcomes of sedation for colonoscopy were included in the meta-analyses. The pooled rate of complication per 10,000 colonoscopies were: perforation 7.9 (3.4 to 18.3) with non-propofol sedation and 4.7 (1.7 to 13.2) with propofol (IRR: 0.73, 95% CI, 0.45 to 1.28); aspiration 10.0 (4.8 to 18.4) with non-propofol sedation and 1.7 (0.0 to 1,332.0) with propofol; respiratory distress 1.4 (1.2 to 1.7) with non-propofol sedation and 1.7 0.5 (0.1 to 2.2) with propofol (IRR: 0.5, 95% CI, 0.36 to 0.69); cardiac arrest 0.8 (0.2 to 3.3) with non-propofol sedation and 1.4 (0.4 to 5.7) with propofol; bleeding 12.7 (6.5 to 24.8) with non-propofol sedation and 24.1 (12.7 to 45.5) with propofol (IRR: 1.0, 95% CI, 0.87 to 1.15); admission to hospital 7.1 (1.5 to 32.9) with non-propofol sedation and 8.7 (1.8 to 43.0) with propofol (IRR: 0.82, 95% CI (0.64 to 1.05); and death 5.3 (0.2 to 186.3) with non-propofol sedation and 0.1 (0.0 to 0.2) with propofol. Similar rates of complications were observed with propofol sedation for colonoscopy by provider (anesthesiologist and non-anesthesiologist).

Conclusions/Discussion: Serious complications were uncommon, and no significant differences were observed by type of sedation. In addition, no differences between providers were observed for propofol sedation.

PRIMARY COLORECTAL LYMPHOMA: THE MAYO CLINIC EXPERIENCE.

P463

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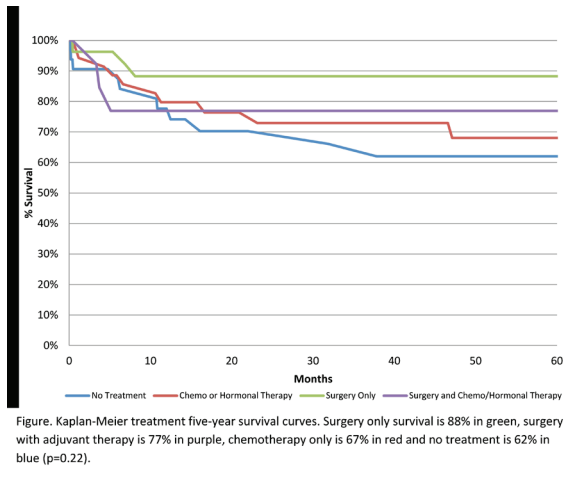
Purpose/Background: Primary colorectal lymphoma is rare, with an incidence of 0.2-0.6% of all colorectal cancers. Due to the low incidence of the disease, along with the lack of randomized controlled trials, no treatment guidelines currently exist. We performed a retrospective

review of Mayo Clinic data to investigate factors influencing survival.

Methods/Interventions: A retrospective review was performed of patients with primary colon and rectal lymphoma within the Mayo Clinic Enterprise (Rochester, Arizona, Jacksonville) from 1990 to June 2017. Demographics, tumor characteristics, treatment, and outcomes were obtained. Survival analysis was performed with univariate and multivariate analyses and Kaplan-Meier curves.

Results/Outcome(s): A total of 110 patients were identified with primary colorectal lymphoma within Mayo Clinic. Of these, 89 (81%) were located in the colon and 21 (19%) in the rectum. Mean age was 64 (range 3-87). A majority were female (67%), and white (91%). The main symptom at presentation was abdominal pain 37 (33.9%) followed by bleeding in 20 (18.3%) and unintentional weight loss 14 (12.8%). Perforation was seen in 2 (1.8%) patients. The majority of tumors were located in the right colon (57%), while the remaining were in the left colon and rectum (both 21%). Patients presented most often with stage I disease (58%; $p=0.31$). Diffuse large B-cell lymphoma was the most common tumor type (44%), followed by marginal zone B-cell (21%) and follicular lymphoma (16%). Most received only chemo- or hormonal therapy (36%); 26% underwent only surgery, 11% received surgery with adjuvant treatment, 28% had no treatment, and 2% received only radiation therapy. Of patients with stage I tumors, surgery was the most frequent treatment choice (37%), while chemo- or hormonal therapy was chosen most often for stage IV patients (53%). Overall five-year survival was 67%. Five-year survival for rectal tumors was 81% and 63% for colon tumors ($p=0.24$). Age less than 50 was associated with significantly higher survival on multivariate analysis compared to age over 70 (HR 0.24 95% CI 0.07-0.86). Left-sided colon masses were associated with significantly worse survival (HR 4.12 95%CI 1.16-12.62). As expected, stage IV patients had worse survival compared to stage I (HR 3.64 95%CI 1.18-11.23). Patients who underwent only surgery had the highest five-year survival (88%). Five-year survival was 77% following surgery with adjuvant therapy, 67% for chemotherapy only and 62% after no treatment. However, treatment modality was not significant ($p=0.22$) (Figure). Recurrence occurred in 16%, of which 40% were distant metastases.

Conclusions/Discussion: Data from the Mayo Clinic suggest poorer survival in elderly patients, stage IV disease, and left-sided tumors. More data is needed to generate treatment guidelines. Currently, optimal strategies should follow a patient-centered multidisciplinary approach.



IMPACT OF ROBOTIC COMPLETE MESOCOLIC EXCISION VERSUS CONVENTIONAL LAPAROSCOPIC RIGHT HEMICOLECTOMY ON SURGICAL SPECIMEN QUALITY AND SHORT-TERM OUTCOMES IN PATIENTS WITH RIGHT-SIDED COLON CANCER.

P464

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Purpose/Background: Complete mesocolic excision (CME) has been shown to improve oncological outcomes in colon cancer surgery. In the field of minimally invasive surgery, although the feasibility of laparoscopic CME has been demonstrated, this approach has not been widely used due to its technical complexities and potential complications. Robotic approach may have a role for better adoption of the CME technique through its visual and instrumental advantages. This study aimed to analyze if robotic CME (RCME) produces a better quality of surgical specimen with acceptable operative morbidity compared to those of standard conventional laparoscopic right hemicolectomy (CLRH) for right-sided colon cancer. To our knowledge, this is the first study comparing these two operative approaches.

Methods/Interventions: Between February 2015 and September 2017, patients undergoing a RCME and a CLRH with a curative intent at two tertiary referral centers were included.

Results/Outcome(s): 96 patients (RCME, n=35) were included in this study. The operative time (286 ± 77 vs 132 ± 40 min, $p=0.0001$) was significantly longer in the RCME group. There were no conversions in either groups. No significant differences existed between the groups regarding the mean estimated blood loss (75 ± 70 vs 73 ± 57 ml, $p=0.57$), time to first flatus (3 ± 1 vs 2 ± 1 days, $p=0.16$), length of hospital stay (6 ± 3 vs 6 ± 3 days, $p=0.64$) and follow-up times (15 ± 8 vs 16 ± 10 days $p=0.11$). The overall

complication rates [$n=10$ (29%) vs $n=15$ (25%), $p=0.67$] were similar. In the RCME group, vascular injury occurred in two patients, which were repaired robotically. The mean number of harvested lymph nodes (41 ± 12 vs 33 ± 10 , $p=0.04$) and length between the vascular tie and colonic wall (13 ± 3.5 vs 11 ± 3 , $p=0.021$) were significantly higher and longer in the RCME group, respectively.

Conclusions/Discussion: RCME appears to improve specimen quality without increasing perioperative short-term morbidity in the experienced hands. The value of robotic surgery in terms of the oncological aspects of CME necessitates further studies with long-term outcome data.

COST-CONSCIOUS ROBOTIC APPROACH IN RECTAL CANCER: LONG-TERM COMPARISON OF ROBOTIC VS. OPEN SURGERY.

P465

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Purpose/Background: Robotic system has emerged to compensate the limitations of laparoscopic surgery. Despite its' advantages, increased cost compared to other methods is the main reason of drawback for robotic surgery. In this study, we hypothesized that long-term outcomes and costs of open and robotic restorative proctectomies would not differ from each other.

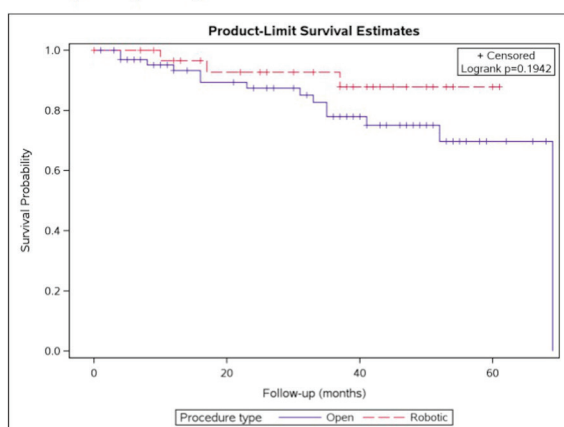
Methods/Interventions: Cost-conscious approach was defined as minimal usage of disposable robotic instruments, using clips instead of vessel sealer devices and advanced bipolar devices. Patients who underwent restorative proctectomy for rectal cancer by high volume surgeons (surgeons with more than 12 cases per year during study period) between 12/2011 and 10/2014 were collected from IRB-approved institutional database. One surgeon performed all robotic surgeries (RS) and open surgeries (OS) were performed by 4 other different surgeons. Characteristics, long-term outcomes and costs were compared. Presented cost was the ratio between the mean direct cost with standard deviation divided by mean direct cost of the open surgery.

Results/Outcome(s): A total of 100 patients were consecutively identified for the study. 68 OS was compared with 32 RS. After the first 5 robotic cases, costs of both surgeries equalized [1 ± 0.6 vs. 1.2 ± 0.6 , $p=0.10$]. Characteristics were comparable between both groups, age (60 ± 13 vs. 56 ± 11 , $p=0.30$), gender distribution [51 male (75%) vs. 22 male (69%), $p=0.51$], ASA score 3-4 [68 (100%) vs. 31 (97%), $p=0.32$], BMI (29 ± 7 vs. 30 ± 6 , $p=0.37$). Previous abdominal operations [29 (43%) vs. 15 (34%), $p=0.43$], neoadjuvant chemoradiation therapy [39 (57%) vs. 15 (47%), $p=0.33$] were also comparable within OS and RS, respectively. Although operative time was longer in RS group (232 vs. 280 minutes,

$p=0.003$), blood transfusion rates [8(12%) vs. 0, $p=0.04$] was found to be decreased in RS. 2 conversions to open was reported in RS. Lymph nodes (26 vs 27, $p=0.39$), tumor stage [Stage 3-4: 29(43%) vs 11(34%), $p=0.43$], distal margin [4(6%) vs. 0, $p=0.30$], radial margin [5(7%) vs. 2(6%), $p>0.99$] and postoperative chemotherapy rates (34% vs. 40%, $p=0.64$) were found similar between OS and RS. Mean follow-up was 33.2 ± 18 months. Disease free survival (DFS) in OS after 3 years was 76.5%, whereas DFS in RS was 84.4% ($p=0.37$), local recurrences [7(10.4%) vs. 2(6.3%), $p=0.50$], overall survival between groups was not statistically significant ($p=0.19$), which was shown in the Table 1. Reoperations [26(38.2%) vs 7(21.9%), $p=0.10$] and readmissions [29(43.3%) vs. 9(28.1%), $p=0.15$] didn't show any difference. Within the follow-up period including readmissions and reoperations, cost difference stayed [1 ± 0.6 vs. 1.09 ± 0.5 , $p=0.30$] not significant between OS and RS.

Conclusions/Discussion: Robotic surgery, when applied in high-case volume centers with experienced surgeons, shows similar surgical outcomes compared to open surgery while diminishing the cost difference between two methods in long-term period.

Table 1: Kaplan-Meier plot and log rank test for Overall Survival



COLORECTAL NEOPLASMS IN AN AFROCENTRIC POPULATION: HISTOLOGY, DISTRIBUTION AND CLINICAL SIGNIFICANCE.

P466

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Purpose/Background: To determine the histology, distribution and clinical significance of colorectal neoplasms in the Jamaican population and to compare our findings to trends in the literature.

Methods/Interventions: Neoplasms were identified from all colonoscopies performed from 2008 to 2016, and matched with the corresponding histology reports. Variables included demographics, indication, lesion(s) identified, location, size and histology of the lesion(s).

Results/Outcome(s): Of 3361 colonoscopies, 21% (698) had neoplasm(s), but 535 of these fulfilled all inclusion criteria. Rectal bleed (27%) and screening (22%) were the most common indications. 499 polyps and 161 adenocarcinomas were identified in 535 colonoscopies. Fifty percent of patients were female and mean (SD) age was 65 (13) years. Most (37%) polyps were large (>10 mm), 35% were diminutive (≤ 5 mm) and the remainder (28%) small (6 – 10 mm). Eighty five percent of the polyps were neoplastic. Most polyps were tubular (32%), mixed hyperplastic-adenoma (27%) and tubulovillous (25%). The majority of the polyps (64%) and adenocarcinoma (64%) were located in the rectum or sigmoid colon with 71% of adenocarcinomas being moderately differentiated. Carcinoma in situ was seen in 8.4% of the polyps in patients with a mean (SD) age of 70 (11) years ($p = 0.0075$). Overall, proximal neoplasms (7%) and advanced proximal neoplasms (5%) were found in patients with distal polyps.

Conclusions/Discussion: The presence and size of distal polyps did not predict the likelihood of advanced proximal lesions. Our study also revealed that most diminutive and small polyps were neoplastic, recommending removal of all polyps regardless of size.

AGE VERSUS ASA - EXAMINING 30-DAY MORTALITY IN PATIENTS UNDERGOING COLECTOMY FROM THE ACS NSQIP DATABASE.

P467

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Purpose/Background: Colon cancer is a disease of the elderly, estimated to account for 8% of all new cancer diagnoses in the United States for 2017. As the US population of adults over the age of 80 continues to expand (doubling by 2050) and life expectancy lengthens, colorectal surgeons can expect to have an increasingly elderly population seeking elective surgical management of their disease. We evaluated whether age or American Society of Anesthesiologists physical status classification (ASA class) was a better predictor of 30 day mortality in the most elderly populations.

Methods/Interventions: All open and laparoscopic colectomies, coloproctectomies, and proctectomies were identified in the 2005–2016 American College of Surgeons National Surgical Quality Improvement Program database. Stepwise multiple logistic regression analysis was performed to evaluate the predictive role of age and ASA classification on 30-day mortality in this cohort.

Results/Outcome(s): Preliminary analysis evaluated 12,875 patients who underwent open or laparoscopic colectomy, proctocolectomy, and proctectomy, including elective and non-elective cases. ASA classification was

highly correlated with 30-day mortality when all ASA classes and case types (elective & non-elective) were considered, and age accounted for (OR = 3.17, 95% confidence interval (CI): 2.75-3.63). ASA classification was noted to no longer be correlated to 30-day mortality when ASA class 4 was removed from the cohort and accounted for age (OR 0.85, 95% CI: 0.69-1.07). However, at age greater than or equal to 82, age was a better predictor of 30-day mortality than ASA class (1, 2, or 3) (OR = 1.4, 95% CI: .96-2.03). When all non-elective cases were removed, for age greater than or equal to 87, age was a better predictor of 30-day mortality than ASA class (1, 2, or 3) (OR = 1.49, 95% CI: 0.76-2.90).

Conclusions/Discussion: ASA classification is a better predictor of 30 day mortality than age for patients 86 years of age and younger. In the most elderly patients, however, age may be a better predictor of 30 day mortality than ASA classification.

WHEN DOES DELAY IN TREATMENT IMPACT SURVIVAL IN NON-METASTATIC COLON CANCER?

P468

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Purpose/Background: While the optimal time to initiate treatment in colon cancer has been investigated, little is known about how far one can safely deviate from this ideal. It is not uncommon for patients to experience complications or encounter other obstacles that delay their care. This study sought to evaluate how long treatment could be delayed without impacting survival in non-metastatic colon cancer.

Methods/Interventions: The National Cancer Data Base (2003-2011) was retrospectively reviewed for patients with clinical stages 1-3 colon cancer. Patients treated within 7 days were excluded. ANOVA and chi-square tests were used to compare demographic data. Kaplan Meier and Weibull models were used to compare survival. Linear regression was performed to analyze time to treatment.

Results/Outcome(s): This study included 35,136 patients (stage I: 16,192, II: 10,974, III: 7,970). In stage I and II disease (5YS: 76%, 68%, respectively), surgery performed >6 weeks after diagnosis was associated with significantly worse survival ($p < 0.001$, both). On multivariate analysis, >6 weeks was associated with a 17% increase in mortality (HR 1.17, $p < 0.001$). Older age, Black race, coverage by Medicaid, lack of insurance, greater comorbidities, and treatment at an academic center were associated with longer time to surgery ($p < 0.05$, all). For patients with stage III disease (5YS 73%), surgery within 4-5 weeks was associated with worse survival ($p < 0.001$). However, on multivariate analysis, time to surgery did not significantly

impact survival (HR 1.1, $p = 0.225$). Older age, Black race, coverage by Medicaid, lack of insurance, greater comorbidities, and treatment at an academic center, were associated with a longer time to surgery ($p < 0.05$, all). In stage III disease, chemotherapy delayed >12 weeks after surgery was associated with worse prognosis on both univariate ($p < 0.001$) and multivariate (HR 1.31, $p = 0.012$) analyses. Older age, Black or Hispanic race, non-private insurance, greater comorbidities, and treatment at an academic center were associated with greater time from surgery to chemotherapy ($p < 0.05$, all). In stage III disease, time from diagnosis to chemotherapy ≥ 6 months was associated with worse survival ($p < 0.001$) on univariate analysis, and multivariate analysis (HR 1.61, $p = 0.021$).

Conclusions/Discussion: In stage I-II colon cancer surgical treatment can be delayed up to 6 weeks without impacting survival. In stage III disease, while delay of surgery did not significantly impact survival, delay of adjuvant chemotherapy beyond 12 weeks of surgery was associated with a worse prognosis. Time from diagnosis to initiation of chemotherapy does not significantly impact survival until 6 months.

EVALUATING THE RESPONSE TO CHEMORADIOTHERAPY IN CLINICAL T4 RECTAL CANCERS.

P469

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Purpose/Background: The standard of care for T4 rectal cancers includes neoadjuvant chemoradiotherapy (nCRT) followed by radical surgery with *en bloc* resection of involved adjacent organs. Response to therapy in T4 tumors is an underreported subset in the literature. The aim of this study is to investigate the correlation between pre-nCRT clinical staging, post-nCRT re-staging with MRI, and subsequent pathological staging for T4 rectal cancers and evaluate whether downstaging might permit a change in surgical planning.

Methods/Interventions: A total of 62 patients with clinical T4 (cT4) stage rectal cancers who underwent surgery between 2012 and 2016 were identified from a prospectively maintained single-institution database. Thirty-four patients were staged by MRI and treated with nCRT followed by curative-intent surgery and were included in the study. Twenty-eight patients with non-curative intent surgery, incomplete chemoradiation, previous pelvic radiotherapy, upfront chemotherapy, or insufficient data were excluded. Seventeen of 34 patients had restaging MRIs after nCRT per surgeon discretion. All post-nCRT MRIs were reviewed by a single experienced radiologist blinded to pathologic stage. An established MR tumor regression score (mrTRG) was used to grade responses.

Pathological staging after neoadjuvant treatment (yp) and histologic response to nCRT were then categorized based on American Joint Committee on Cancer response score (AJCC TRG) and compared to pretreatment clinical staging.

Results/Outcome(s): The cohort of T4 patients (n=34) had an average age of 63. Fifty nine percent were male (n=20). Eleven patients had cT4a disease based on pre-treatment MRI, while 23 patients had cT4b disease. cT4a patients had tumors located an average distance from the anal verge of 4.9cm (0-10cm) and 27% had N0, 36% had N1 and 36% had N2 disease. cT4b patients had tumors located an average distance from the anal verge of 2.9cm (0-14cm) and 48% had N0, 13% had N1 and 39% had N2 disease. On pathological examination, of the cT4a tumors, 9% were found to be ypT4a, 55% ypT3, 27% ypT2, and 9% had a pathological complete response. Of cT4b tumors, 52% had a pathological stage of ypT4b after resection, 30% were ypT3, 13% were ypT2, and 4% had a complete pathological response. Four cT4a patients and 13 cT4b patients had post-nCRT MRIs (table). MRI was accurate in predicting the pathologic stage in 11 of 17 (65%) patients. However, among downstaged patients, post-nCRT MRI was only accurate in 1 of 7 (14%) patients with 5 being overstaged and 1 being understaged.

Conclusions/Discussion: Many T4 tumors are downstaged after nCRT, however less than 10% of cT4 patients have a complete pathologic response. With current modalities, we are not able to accurately predict responses and surgical management should be based on pretreatment clinical staging.

Table 1-

Patients	Pre-MRI Stage	Post-MRI Stage	mTRG	Pathological Stage	AJCC TRG
1	T4a	T2	2	T3	2
2	T4a	T4a	5	T4	2
3	T4a	T3	3	T3	1
4	T4a	T4a	3	T3	2
5	T4b	T4b	2	T3	1
6	T4b	T4b	2	T4	1
7	T4b	T4b	4	T4	3
8	T4b	T4b	4	T3	2
9	T4b	T4b	3	T4	2
10	T4b	T4a	3	T4	2
11	T4b	T4b	3	T4	1
12	T4b	T4b	4	T4	1
13	T4b	T3	3	T2	1
14	T4b	T4b	4	T4	2
15	T4b	T4b	3	T4	2
16	T4b	T4b	3	T4	2
17	T4b	T4b	4	T3	2

Patients who underwent post-nCRT staging MRIs, with pre- and post- nCRT T stage, regression grades and pathologic T stage results.

TIMING OF RECTAL CANCER RESECTION AFTER PREOPERATIVE CHEMORADIOTHERAPY (T4RC): A PROTOCOL FOR A RANDOMIZED CONTROLLED TRIAL.

P470

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Purpose/Background: The current standard of care for T3/T4 rectal cancers is neoadjuvant chemoradiation (CRT) followed by surgical resection 6 to 8 weeks after neoadjuvant therapy. Although there is literature to suggest that a longer interval between CRT and surgery is beneficial, there is a paucity of prospectively collected data to correlate a longer wait interval with oncologic benefit. The purpose of this study will be to determine whether delaying surgery after preoperative CRT increases disease-free survival.

Methods/Interventions: The standard 6-7 week interval between CRT and surgery will be compared to an experimental interval of 10-11 weeks. The experimental interval was selected based on the data from the Dutch Colorectal Audit which indicates that a 10-11 week waiting period may be associated with an increased likelihood of pathologic complete response (pCR). Patients will be allocated to standard or experimental arm using electronic block randomization. The allocation process will be blinded and the assessors and data analysts will be blinded. Patients and surgeons will not be blinded. This will be a double-arm, single-blinded superiority randomized controlled trial to assess the primary outcome of 3-year disease free survival comparing standard 6-7 week surgical interval versus 10-11 weeks. Secondary outcome measures include local recurrence, rate of pCR, overall survival, sphincter preservation, and perioperative morbidity. Clinical data will be collected by a blinded assessor and analyzed by a blinded biostatistician. The primary outcome will be analyzed using Kaplan Meier survival analysis. For categorical outcomes chi-square statistic will be used. Logistic regression will be used to adjust for covariates. Statistical analysis will be performed using Statistical Analysis System 9.4 (SAS). This study has been registered with clinicaltrials.gov (identifier NCT02441153) and has research ethics board approval from the health institute. A data safety monitoring board consisting of a surgeon, research administrator, and a member of the research services office will evaluate the outcomes as the study evolves to ensure patient safety.

Results/Outcome(s): Pending

Conclusions/Discussion: Our results will add to developing literature used to inform oncologists regarding the potential benefit of increasing the wait interval between completion of neoadjuvant CRT and definitive surgery. Our dissemination plan includes publications, presentations, website postings, and a stakeholder meeting.

TRENDS AND OUTCOMES OF PATIENTS WHO REFUSE SURGERY FOR THE TREATMENT OF RECTAL ADENOCARCINOMA: A NATIONAL CANCER DATA BASE STUDY.

P471

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Purpose/Background: It is not uncommon in a busy surgery practice to have patients refuse surgical treatment for rectal cancer. The goal of this study was to identify the general trend in surgical refusal, survival associated with surgical refusal and risk factors associated with refusal of recommended surgery.

Methods/Interventions: Through an analysis of data in the National Cancer Data Base, patients with AJCC clinical stage II and III rectal adenocarcinoma receiving chemoradiation were identified from 2004 to 2014. Patients who refused surgery were identified and compared with those who underwent surgery. Kaplan-Meier survival analysis was utilized to calculate overall survival (OS). Multivariable analyses were performed using binary logistic regression, log-rank test, and Cox proportional hazards regression models to evaluate factors associated with surgery refusal, and with OS.

Results/Outcome(s): From a cohort of 54,494 eligible patients, 1,154 (2.1%) were reported to have refused surgery. The proportion of patients refusing surgery increased over time from 1.6% to 2.9% during the study period. In an adjusted analysis, older age, African-American ethnicity, male gender, increased comorbidities, and treatment at comprehensive cancer center were risk factors associated with surgery refusal. Mean OS of patients who refused surgery was significantly shorter than that of those who underwent resection (39 months vs 52 months; $P < 0.05$). Upon adjustment for relevant clinical factors, this survival difference persisted in multivariate regression analysis (HR=2.34, 95% CI: 2.13-2.57, $P < 0.01$). In multivariate survival regression analysis of the full cohort, female gender was significantly associated with improved OS (AHR, 0.83; 95% CI: 0.78-0.89; $P < 0.05$), whereas African-American ethnicity (AHR: 1.34; 95% CI: 1.20-1.50; $P < 0.05$) and increased medical comorbidities (AHR: 1.31; 95% CI: 1.24-1.39; $P < 0.05$) were associated with independent increased risk of death.

Conclusions/Discussion: The proportion of patients who refuse surgery for rectal cancer has increased over time and is associated with a significantly increased risk of death from rectal adenocarcinoma. The observed difference in OS for surgery vs. refusal was independent of other relevant clinical factors such as age, gender, race/ethnicity.

MINIMALLY INVASIVE SURGERY IN PATIENTS WITH CT4 RECTAL CANCER TREATED WITH NEOADJUVANT CHEMORADIATION: THE EFFECTS OF DOWNSTAGING.

P472

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Purpose/Background: It is unknown if chemoradiation impacts outcomes differently in patients with cT4 rectal cancer who undergo open surgery (OS) or minimally invasive surgery (MIS). We compared the outcomes between MIS and OS in cT4 rectal cancer patients who experienced downstaging following preoperative chemoradiation and those who did not.

Methods/Interventions: Patient data from the National Cancer Database who underwent neoadjuvant chemoradiation and surgical treatment for cT4 rectal adenocarcinoma between 2010 and 2014 were selected for analysis. These patients were divided into 2 groups: those whose primary tumor downstaged (pT0-pT3) and those who did not (pT4). We analyzed the 2 groups based on the surgical approach: OS by intent or MIS by intent (including laparoscopic, robotic, and MIS converted to OS). A Cox proportional hazard model was used to assess the influence of surgical approach on margin status, number of removed lymph nodes, incidence of multi-organ resection and overall survival were assessed.

Results/Outcome(s): A total of 1,960 patients with cT4 rectal cancer who received neoadjuvant chemoradiation were included. Of these, 1,260 (64.3%) downstaged and 700 (35.7%) did not. In the downstaged group, 444 (35.2%) underwent MIS and 816 (64.8%) underwent OS; among those whose tumors did not downstage, 145 (20.7%) patients underwent MIS and 555 (79.3%) OS. Positive margins were found in 45 (10.2%) and 91 (11.2%) patients in the downstaged group with MIS and OS, respectively ($p = 0.65$); and 47 (32.6%) for MIS and 167 (30.8%) for OS in the non down-staged group ($p = 0.75$). Number of patients with more than 12 lymph nodes removed was not significantly different after MIS (66.5%), compared to OS (64.8%) in the downstaged group ($p = 0.58$). Similarly, in the non-downstaged group, there was no significant difference in the number of patients having at least 12 lymph nodes removed between MIS (70.3%) and OS (67.2%), $p < 0.53$. In the downstaged group, multi-organ resection was performed more often in OS (12.5%) compared to MIS (5.6%), $p < 0.001$. In the non-downstaged group, the incidence of multi-organ resection was similar between MIS (25.7%) and OS (31.8%), $p = 0.20$. The overall survival hazard ratio for MIS and OS was 0.84 (95% CI: 0.41-1.7) in the downstaged group ($p = 0.62$) and 0.81 (95% CI: 0.51-1.29) in the non-downstaged group.

Conclusions/Discussion: MIS demonstrated similar effects on margin status, number of lymph nodes removed and survival compared to open surgery in patients treated with neoadjuvant chemoradiation irrespective of whether or not down-staging was achieved. However, MIS approach was less frequently utilized in patients who did not experience downstaging. MIS may allow a lower incidence of multi organ resection without a negative impact on margin status in patients who experience downstaging.

MANAGEMENT OF PRIMARY ANAL ADENOCARCINOMA ARISING FROM CHRONIC ANAL FISTULA.

P473

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Purpose/Background: Adenocarcinomas of the anus represent <1% of all tumors of the GI tract and 3-9% of all anal carcinomas. It is thought chronic inflammatory conditions like untreated fistula-in-ano may, in some cases, be a predisposing factor. Treatment typically consists of abdominoperineal resection with or without perioperative chemoradiation. We aim to review current literature to determine the optimal treatment for this rare malignancy.

Methods/Interventions: A comprehensive literature search was conducted using PubMed and Google Scholar identifying cases of primary anal adenocarcinoma. Clinical and pathologic variables from each case were tabulated and backward stepwise Cox-regression analysis as well as Kaplan-Meier estimation was performed to determine the effects of each variable on survival.

Results/Outcome(s): We identified 66 patients with anal adenocarcinoma. 42 patients (64%) had a history of long-standing anorectal fistula. 53 patients had TNM staging available. Of those, 33 patients had locally invasive disease at the time of diagnosis while 15 patients exhibited nodal involvement. 56 patients (67%) underwent radical surgery including APR or pelvic exenteration. 12 patients (18%) underwent wide local excision. 25 patients (39%) received neoadjuvant therapy and 21 patients (33%) received adjuvant therapy. Mean follow up for patients was 35.6 months (\pm 36.1). Average mortality during the study period was 33%. Kaplan-Meier estimates survival at 1-, 3- and 5-year were 97.8%, 71.3% and 58.3% respectively. Five-year survival of stage I, III and III were 100%, 74.5%, and 0% respectively. Lymph node (LN) involvement (HR 29.5, CI 6.0 - 145.9) and non-surgical management (HR 7.6, CI 1.5 - 38.5) adversely influenced survival. Other clinical variables did not demonstrate statistical importance.

Conclusions/Discussion: Primary anal adenocarcinoma is a rare disease entity that has been shown to be associated with chronic anal fistulas. Its treatment should center around radical surgical resection as this offers the best survival benefit. Lymph node involvement was also found to be predictive of poor prognosis.

CAN OUTCOMES OF MERCURY II STUDY BE REPRODUCED ON POST NACTRT RESPONSE ASSESSMENT MRI SCAN?

P474

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Purpose/Background: MRI staging of the entire low rectal cancer plane (mrLRP) and pathological circumferential resection margin (pCRM) risk stratification model has been reported recently in MERCURY II study. We intended to see the feasibility of this model in Indian patients.

Methods/Interventions: 148 consecutive patients who have received NACTRT for low rectal cancer were included. Patients were stratified based on site of tumor, extramural venous invasion (EMVI) status, distance from anal verge and CRM prediction based on post NACTRT response evaluation MRI.

Results/Outcome(s): Possibility of pCRM positivity was greatest in patients with anteriorly located, EMVI negative patients irrespective of tumor distance from anal verge (17% and 18%). EMVI positive status based on post NACTRT MRI, did not confer high pCRM positive rates.

Conclusions/Discussion: In post NACTRT, response evaluation MRI scans, EMVI does not appear to predict pCRM status irrespective of the distance of the tumor from anal verge and risk stratification model based on MERCURY II study needs to be evaluated in further studies.

mrEMVI Status	Tumour Site	MRI predicted CRM			
		SAFE Distance from anal verge		UNSAFE	
		>4cm	<4cm	>4cm	<4cm
Negative	Not Anterior	0	0	0	11
Negative	Anterior	4	5	17	18
Positive	Not Anterior	-	-	0	0
Positive	Anterior	0	-	10	0

ABDOMINOTRANSACRAL RESECTION: SINGLE-STAGE, TWO-PHASE TECHNIQUE FOR EN BLOC COMPOSITE RESECTION OF LOCALLY ADVANCED OR RECURRENT RECTAL CANCER.

P475

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Purpose/Background: Objectives/Background: In cases of locally advanced or recurrent anorectal cancer, nonoperative interventions such as external beam radiation therapy and systemic chemotherapy have not been shown to improve long-term survival and only serve as a palliative treatment. Aggressive resection via abdominotransacral approach is a viable surgical option to improve quality of life and offer an attempt for cure. The goal of this study is to review preoperative and intraoperative data of patients with locally advanced or recurrent anorectal squamous or adenocarcinoma undergoing abdominotransacral resection employing a single-stage approach and utilizing several operative techniques previously undescribed. In our experience, utilizing this approach has resulted in a significant reduction in blood loss and operative time.

Methods/Interventions: Methods: Retrospective chart review was performed for patients who underwent abdominotransacral resection between 2010 and 2013 at a single institution. Patient demographics and intraoperative data were analyzed.

Results/Outcome(s): Results: Seven patients underwent abdominotransacral resection with curative intent. Three patients presented with locally advanced primary tumors, while four patients presented with recurrent cancer lesions. All patients underwent chemoradiotherapy, and composite resection of the tumor and sacrum via a single-stage, two-phase abdominotransacral procedure as described. Median total operative time for abdominotransacral resection, including reconstruction of the perineal defect with myocutaneous flap, was 576 minutes (range: 480 to 900 minutes). Median total blood loss was 800mL (range: 500mL to 2000mL), requiring a median intraoperative transfusion of 2 units of blood product (range: 0 to 8 units). Median total length of stay was 14 days (range: 10 to 23 days) for inpatient postoperative recovery.

Conclusions/Discussion: Conclusions: Surgical management of locally advanced or recurrent anorectal cancer via an abdominotransacral approach, utilizing previously unreported modifications of operative technique, achieves similar surgical specimen outcomes, and is associated with less estimated blood loss and decreased operative times compared to prior series. Important aspects to our technique include completing the procedure during one operation, turning the patient from supine (abdominal phase) to knee-chest prone position on the Andrews frame (perineal phase), determining the level of sacral resection during the abdominal phase, devascularizing the presacral plexus,

completing the anterior and lateral pelvic wall dissections during the abdominal phase, and performing a subperios-teal resection from S1 to the level of the bony resection.

TRENDS IN THE CHARACTERISTICS OF PROXIMAL AND DISTAL COLON CANCERS: A POPULATION-BASED STUDY.

P476

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Purpose/Background: Increasing focus is being placed on population-based colon cancer screening with the goal of improving early detection of disease. However, available screening methods have differential impact on the ability to detect proximal versus distal colon cancers. This study sought to determine how the features of resected proximal and distal cancers, including size and stage, have changed over a 25-year period.

Methods/Interventions: We used the Surveillance Epidemiology and End Results database to analyze trends in the characteristics of surgically resected colon adenocarcinoma diagnosed from 1988-2013. We classified cecal, right colon, and transverse tumors as proximal cancers and splenic flexure, left colon, sigmoid, and rectosigmoid tumors as distal cancers. We evaluated changes in tumor size and T, N, and summary stages. Temporal trends were analysed using the Cochran-Armitage test for trends.

Results/Outcome(s): We identified 211,095 cases of surgically resected invasive colon cancer during this period (Table). From 1988 to 2013, there were increasing proportions of proximal tumors diagnosed. Both proximal and distal cancers demonstrated decreasing age at diagnosis over time; however, this decline was more precipitous for distal cases where there was a 5-year difference in the mean age at diagnosis from the beginning to the end of the study period. Although both proximal and distal cancer groups demonstrated decreases in the proportion of T3 tumors over time, concomitant increases in T1 and T2 tumors were only found in the proximal group; both groups demonstrated increased proportions of T4 tumors over the study period. Additionally, we found increasing proportions of N2 tumors in both groups. Greater numbers of lymph nodes were retrieved over time but decreases in the ratio of positive lymph nodes to total lymph nodes retrieved were found, suggesting retrieval of more negative nodes. There was a moderate correlation between the mean number of lymph nodes examined and the proportion of patients with N2 disease for distal cancers ($r^2 = 0.74$); however, this correlation was weaker for proximal cancers ($r^2 = 0.49$). Overall, we found decreases in stage II and stage IV disease in both groups and an increase in stage I disease within the proximal group; however, both groups demonstrated increases in the proportion of stage III cancers.

Conclusions/Discussion: The features of surgically resected proximal and distal colon cancers have changed significantly over the last 25 years. There are promising trends in the increasing proportions of early disease for proximal cancers; however, this trend is less apparent for distal cancers, which are occurring in increasingly younger patients. Importantly, Stage III, particularly N2, cancers have not demonstrated a downtrend over time. The increase in N2 disease cannot be explained solely by greater lymph node sampling.

Table. Study Results

	Proximal			Distal		
	1988	2000	2013	1988	2000	2013
Proportion of all tumors, n (%)	47.0	55.0	59.2 ^a	53.0	45.0	40.1 ^a
Age (mean, SD)	72.1 (11.7)	72.1 (12.5)	70.9 (12.9) ^a	69.2 (11.5)	68.2 (12.9)	64.6 (13.7) ^a
Sex, % male	44.5	43.8	46.1	53.8	54.1	54.7
T stage (%)						
T1	9.1	10.4	13.1 ^a	17.8	18.5	16.7
T2	11.8	16.9	15.7 ^a	13.5	16.3	14.4
T3	60.7	59.7	52.1 ^a	54.1	55.2	50.9 ^b
T4	18.4	13.0	19.0 ^b	14.6	10.0	18.0 ^b
Tumor size, median (IQR), mm	50 (35-60)	45 (33-60)	45 (30-61) ^a	40 (30-55)	40 (30-55)	40 (28-55)
N stage (%)						
N0	60.8	59.0	61.2	64.5	59.5	58.9 ^a
N1	24.7	23.7	21.4 ^a	24.3	26.3	25.2
N2	14.5	17.3	17.3 ^a	11.2	14.1	15.9 ^a
Number of lymph nodes examined (mean, SD)	12.2 (8.8)	13.9 (9.8)	21.4 (10.6) ^a	9.5 (7.9)	10.9 (8.8)	18.4 (10.1) ^a
Number of positive lymph nodes (mean, SD)	1.6 (3.2)	1.8 (3.5)	1.8 (3.7) ^a	1.3 (2.9)	1.5 (3.2)	1.7 (3.7) ^a
TNM Stage (%)						
I	16.9	21.3	24.6 ^a	25.4	26.2	25.4
II	38.8	34.9	32.9 ^a	35.5	31.1	28.1 ^a
III	28.1	29.0	30.4 ^a	24.2	29.1	33.0 ^b
IV	16.1	14.8	12.0 ^b	14.9	13.6	13.5 ^b

SD: standard deviation; IQR: interquartile range
Significant trends denoted by superscripts in 2013 column: ^ap<0.0001; ^bp<0.001; ^cp<0.01; ^dp<0.05

Study Results

IMPLEMENTATION OF A STANDARDIZED PROTOCOL FOR THE CLOSURE AND CARE OF PERINEAL WOUNDS LEADS TO A DECREASE IN THE INCIDENCE OF PERINEAL WOUND COMPLICATIONS.

P477

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Purpose/Background: Impaired perineal wound healing is a major source of morbidity after abdominoperineal resection (APR). Rates of perineal wound complications after primary closure have been reported to be as high as 37.6% and no standardized approach to the closure and care of these incisions has been published to our knowledge. Our aim was to develop a standardized approach to the intra- and post-operative management of these wounds and to assess the impact of implementation of a standardized wound protocol on perineal surgical site infection (SSI) rates at The Ottawa Hospital (TOH).

Methods/Interventions: Using the framework of the Comprehensive Unit-based Safety Program (CUSP), an inter-professional team of stakeholders was identified to develop and implement a standardized perineal wound protocol at TOH. Literature was explored to extrapolate best practices for these incisions and consensus reached using nominal group technique. The resultant protocol included standards for pre- and intra-operative interventions, dressings, activity, elimination and post-discharge

care instructions. An initial pilot was undertaken and modifications made to the protocol through a multiple iterative process. The protocol was then implemented in October 2016. Perineal wound occurrences (including perineal SSI and/or wound disruption) were compared pre- and post-implementation utilizing data from ACS NSQIP (procedure targeted data available from April 2014 -July 2017), supplemented by retrospective chart review.

Results/Outcome(s): A total of 28 patients underwent APR with primary closure of the incision prior to the implementation of the standardized protocol (April 1, 2014 - September 30, 2016) compared with 13 patients post-implementation (October 1, 2016 - July 31, 2017). Patients who underwent flap reconstruction of any type were excluded. The two groups were similar with respect to age, sex, indication for surgery (cancer, inflammatory bowel disease etc), history of radiation, and extent of dissection (intersphincteric, extrasphincteric, extralevator). The incidence of perineal wound occurrences in the pre-implementation study period was 9/28 (32.1%) compared with 1/13 (7.7%) following introduction of the protocol (p<0.05).

Conclusions/Discussion: A standardized approach to the care of the perineal incision was successfully developed and implemented at The Ottawa Hospital and demonstrated a significant decrease in the incidence of perineal wound occurrences in patients undergoing APR with primary closure of the perineal incision. Given the significant morbidity and cost associated with the management of perineal wound complications, our initial results are quite promising. Future directions include wider implementation of this protocol in multiple centres across our health care region with ongoing audit of its effect on the incidence and sequelae of perineal wound complications.

SURGICAL AND ENDOSCOPIC INTERVENTIONS AFTER EMERGENT PRESENTATIONS OF COLORECTAL CANCER.

P478

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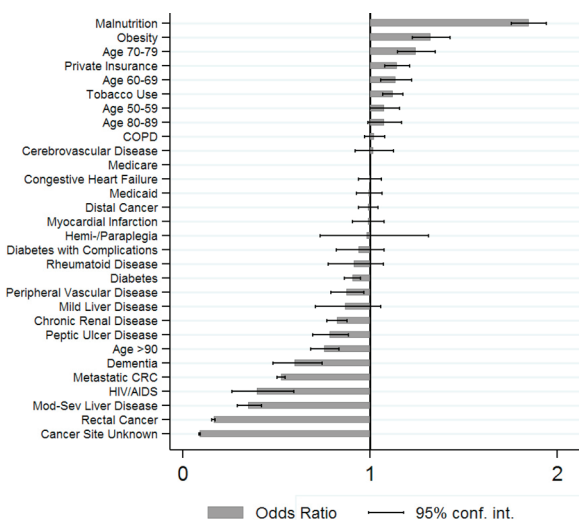
Purpose/Background: Patients who undergo emergent interventions for colorectal cancer (CRC) have worse outcomes. The burden of interventions in these populations is unknown. We examined the surgical and endoscopic interventions done for CRC patients presenting to the emergency department (ED) and the factors associated with receiving a procedure.

Methods/Interventions: We queried the 2008–2014 Nationwide Emergency Department Sample, a 20% stratified sample of United States (US) ED visits, and identified all visits with a primary ICD-9-CM diagnosis of CRC. Patients who underwent a colon resection, ostomy creation, dilation, or stenting were identified.

Descriptive analyses were weighted to the level of the US population. Multivariable logistic regression was done to evaluate factors associated with receiving a procedure. Variables included in the model were Insurance status (Medicare=referent), age (Age<50=referent), comorbidities, and cancer site (proximal disease=referent).

Results/Outcome(s): Of the estimated 312,105 ED visits for a primary diagnosis of CRC, most required a surgical or endoscopic intervention (50.5%). They were more likely to be male (51.4% vs. 49.8%, $p<0.001$) and younger (mean age in years 67.4 vs. 68.4, $p<0.001$). Among those who had an intervention, 51.2% had a proximal resection, 26.1% had a distal resection, 7.2% had a rectal resection, 1.5% had total colectomy, 3.8% had a partial resection, 8.2% had an ostomy created, 1.5% had a stent placed, and 0.4% underwent dilation. Patients who underwent an intervention were more likely to be discharged to additional care (skilled nursing facility, home health care) (54.5% vs 42.0%, $p<0.001$) but less likely to die during the hospitalization (5.0% vs. 7.4%, $p<0.001$). Total hospital charges were higher for the intervention group (\$114,185 vs. \$44,241, $p<0.001$) and length of stay was longer (13.2 days vs. 6.2 days, $p<0.001$) compared to patients who did not have an intervention. Factors significantly associated with getting an intervention include private insurance coverage, age 50-79, tobacco use, malnutrition, and obesity.

Conclusions/Discussion: More than half of the CRC patients who presented for ED care required a surgical or endoscopic intervention. It cannot be determined from this dataset if this emergency presentation is also when CRC was diagnosed. Patients aged 50-79, those with malnutrition, history of tobacco use, and obesity were more likely to get a procedure. Private insurance patients were significantly more likely to get a surgical or endoscopic intervention suggesting a bias by payor status. Investigations to evaluate ways to decrease the emergent need for surgery should be done given the poor outcomes.



Factors associated with receiving a surgical or endoscopic intervention during an emergent presentation of colorectal cancer.

INFERIOR MESENTERIC VEIN FIRST APPROACH TO INFERIOR MESENTERIC ARTERY DISSECTION IN LAPAROSCOPIC ANTERIOR RESECTION.

P479

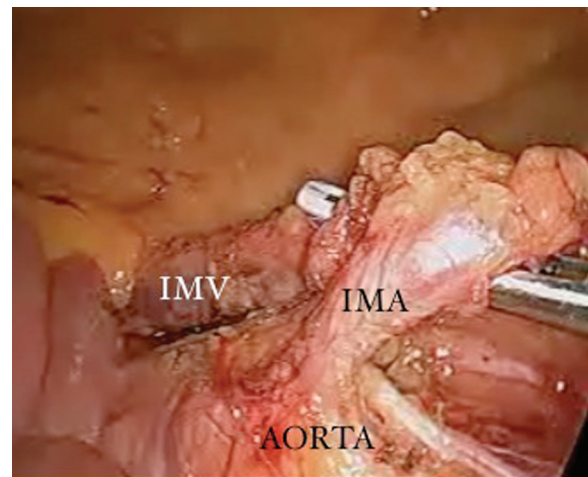
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Purpose/Background: The dissection of the inferior mesenteric artery [IMA] to its root and performance of a radical lymphadenectomy is a critical step in the performance of a high anterior resection for sigmoid cancer or a low anterior resection for rectal cancer. In routine practice, the IMA is dissected first and divided, followed by Inferior mesenteric vein [IMV]. This increases the risk of damage to the nerves to the left of the IMA, as it is incompletely dissected. We propose dissection of the IMV which allows circumferential dissection of the IMA, prior to its division as a better technique

Methods/Interventions: We document the technique of the IMV first approach and illustrate it with videos during laparoscopic anterior resection

Results/Outcome(s): Identification and Dissection of the root of the IMA and transection is facilitated by the IMV first approach

Conclusions/Discussion: Dissection of the IMV as a first step is easy, allows high ligation of the IMV and enables circumferential clearance of the root of the IMA, allowing a radical lymphadenectomy and better visualisation and preservation of the hypogastric nerves.



Inferior mesenteric vein and artery completely dissected prior to transection

PILOT STUDY OF NEOADJUVANT CHEMOTHERAPY WITH THREE CYCLES OF CAPOX FOR TREATMENT OF LOCALLY ADVANCED COLON CANCER.

P480

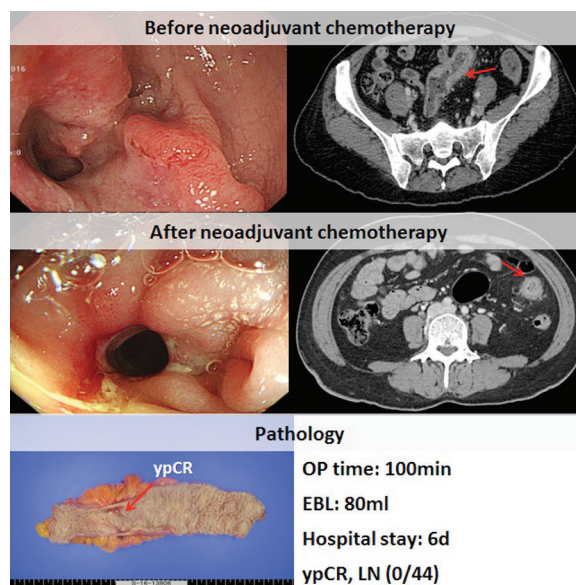
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Purpose/Background: There are potential advantages of neoadjuvant chemotherapy, such as early eradication of circulating micrometastasis, reduction of tumor cell spillage during surgery, and better tolerability. Hence, this may allow the downstaging of the tumor, and increase in radical resection. Neoadjuvant treatment has been used in several solid malignancies, such as breast cancer, bladder cancer, gastric cancer, and esophageal cancer. However, there has been no strong evidence in colon cancer. We evaluated the feasibility and efficacy of neoadjuvant 3 cycles of CAPOX (capecitabine plus oxaliplatin) for patients with locally advanced colon cancer.

Methods/Interventions: Between May 2015 and March 2017, thirty-five patients with locally advanced colon cancer, defined clinically as T3/4 with longitudinal length ≥ 4 cm, were enrolled in our center. Each patient provided informed consent for receiving preoperative 3 cycles of CAPOX chemotherapy. Patients underwent surgical resection at three or four weeks after completing the last cycle of chemotherapy. After surgery, patients received 5 cycles of CAPOX. The primary endpoint was to determine the safety of neoadjuvant chemotherapy.

Results/Outcome(s): Thirty one (89%) of all patients completed their planned preoperative 3 cycles of CAPOX and 4 patients received 1 or 2 cycles of CAPOX. There were 2 patients (6%) who had grade 3 or 4 chemotherapy-related toxicity during neoadjuvant chemotherapy. Thirty four (97%) patients received laparoscopic resection and the mean hospital stay was 7.7 days. There was no intraoperative morbidity. Postoperative morbidity occurred in 3 patients (8.6%) without any mortality. Thirty two patients (91%) completed adjuvant chemotherapy for a total of eight cycles of CAPOX. Among those who received adjuvant chemotherapy, 3 patients had grade 3 or 4 toxicity. The tumor length on the CT scan was significantly decreased after neoadjuvant CAPOX (5.3 vs 3.2, $p < 0.001$). In the pathologic outcomes, 2 patients (5.7%) showed complete remission (ypCR) (Figure 1). The tumor stages were 0 in 1 patient (2.8%), I in 3 patients (8.6%), II in 14 patients (70%), III in 14 patients (40%), IV in 1 patient (2.8%), respectively.

Conclusions/Discussion: In this pilot trial, neoadjuvant CAPOX was safe and feasible for patients with locally advanced colon cancer. This treatment protocol could achieve tumor down staging, in terms of clinical stage or pathological outcomes in most of patients. These results warrant further prospective randomized trials to



THE RELATIONSHIP BETWEEN RACE AND ESTABLISHED RISK FACTORS FOR THE DELAY OF ADJUVANT THERAPY IN RECTAL CANCER.

P481

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Purpose/Background: According to the American Cancer Society, the incidence and mortality from cancers of the colon and rectum in the US are highest in Non-Hispanic Blacks. This disparity likely reflects socioeconomic inequalities that result in disparate access to appropriate screening tests and receipt of timely and appropriate treatment. Several studies have identified factors resulting in the delay of the initiation of adjuvant therapy following surgical resection for rectal cancer. These factors include stoma formation, development of intra-abdominal sepsis, advanced age, prolonged hospital stay, and the use of open surgical technique. In this study, we examine the relationship between race and these factors-- which have been shown elsewhere to delay the timely initiation of adjuvant therapy in colorectal cancer.

Methods/Interventions: A retrospective analysis of 11,838 admissions for rectal cancer was performed using data from the 2009-13 National Inpatient Sample (NIS). Treating race as an independent variable, the outcomes of interest were the formation of a stoma, employment of minimally invasive surgical technique, development of intra-abdominal sepsis, and length of stay during the index hospitalization.

Results/Outcome(s): Blacks were 26% more likely than Whites to undergo the formation of a stoma following surgical resection while Asian/Pacific Islanders were 19% less likely than Whites to undergo the formation of a stoma ($P < 0.01$). Blacks were 47% and Hispanics 39%

more likely than Whites to develop intra-abdominal sepsis following surgical resection for rectal cancer ($P < 0.001$). Asians/Pacific Islanders were 27% more likely than Whites to undergo a minimally invasive procedure ($P < 0.05$) while there was no such disparity for other racial groups. Following surgery, the average length of stay (LOS) for Blacks receiving open and laparoscopic surgery was 10.3 and 9.3 days respectively which was significantly longer than the LOS for Whites ($P < 0.001$). No other racial group demonstrated significant differences with respect to LOS.

Conclusions/Discussion: Blacks were significantly more likely than Whites to have procedure resulting in stoma formation, intra-abdominal sepsis, and longer length of stay. While Asians/Pacific Islanders were more likely to undergo minimally invasive surgery, there was no clinically significant disparity with respect to race in the use of minimally invasive surgical techniques in the treatment of rectal cancer. These results suggest that Blacks with rectal cancer are at a higher risk of delayed initiation of adjuvant therapy and potentially worse outcomes than other races as a result.

Table 1. Odds of stoma formation by race

Race	OR	95% CI	P
White	Ref		
Black	1.26	1.09 - 1.45	0.001
Hispanic	1.04	0.91 - 1.20	0.6
Asian/PI	0.81	0.67 - 0.99	0.05
Native American	1.21	0.77 - 1.89	0.48

ROBOTIC CONVERSION RATES- ONE CENTER'S EXPERIENCE.

P482

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Purpose/Background: Robotic surgery is becoming an integral part of colorectal surgery, allowing surgeons to execute more precise movements in smaller spaces. Currently conversion rates in the literature range from 0-15%. Additionally, a recent study by Bhama et al determined that the risk factors for conversion from robotic versus laparoscopic to open colorectal surgery were not the same, and predictors for conversion for the robotic approach being fewer. At our institution, we sought to review our data to elucidate risk factors and guide future practice as we continue to improve the robotic experience for the surgeon and patient.

Methods/Interventions: Rutgers University Institutional Review Board approval was obtained for this study. The Rutgers Robert Wood Johnson University Hospital database was queried to identify all robotic colorectal surgeries performed from January 2011 to June 2017. Exclusion criteria: age under 18. The primary outcome of interest was reason for conversion.

Results/Outcome(s): Of the 415 robotic surgeries performed, we reviewed 350 complete charts and identified 29 conversions (8.3%). The average BMI was 31.1 and the surgeries were performed for a variety of indications including ulcerative colitis (UC, 13.8%), cancer (41.3%), diverticular disease (20.7%) and polyps (20.7%). The reasons for conversion from robotic surgery were; difficult dissection (21.4%), uncontrollable bleeding (17.2%), poor visualization (17.2%) and a combination of reasons (CoR, 20.7%).

Conclusions/Discussion: In all 29 cases, there were clear indications for conversion including bleeding, poor visualization, a difficult dissection, or a CoR. When the cases were sub-categorized, there did not appear to be any factors which correlated with a need to convert for a specific reason. Interestingly, in the category of conversion for CoR, the surgeons indicated a good deal of inflammation or very 'friable' or 'oozy' tissue leading to a difficult dissection. Three out of 6 of these patients underwent surgery due to complicated diverticulitis, 1 patient received prior pelvic radiation for rectal cancer, 1 patient had a long-standing history of UC not controlled on mesalamine and 1 patient with a descending colon cancer was noted intra-operatively to have had a severe inflammatory reaction to his cancer. All of these patients had inflammation as a part of their disease process resulting in multiple reasons contributing to a need to convert from robotic surgery. Our robotic colorectal data is in-line with current literature and indicates that our conversion rate is relatively low with inflammation leading to a difficult dissection as a potential risk factor for conversion. This suggests that once the surgeon has started the case, if there are reasons in the history for or findings of severe inflammation, the surgeon may consider converting to an open or laparoscopic procedure sooner rather than later, benefiting the patient in less time under general anesthesia and potentially avoiding complications.

READMISSION FOLLOWING ELECTIVE COLORECTAL SURGERY: WHAT HAPPENS IN THE HOSPITAL MATTERS.

P483

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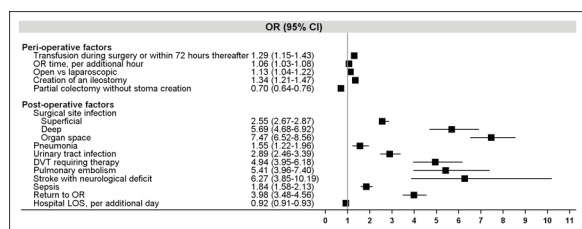
Purpose/Background: Readmission is becoming increasingly scrutinized, and the Centers for Medicare and Medicaid Services are penalizing hospitals with excess readmissions using risk adjustment methodology. Pre-hospital predictors of readmission following colorectal surgery have been fairly well characterized and often surgery cannot be delayed until modifiable pre-hospital factors are optimized. Our aim was to identify significant predictors of

readmission following elective colon and rectal surgery in the peri-operative and post-operative setting.

Methods/Interventions: We used the American College of Surgeons National Surgical Quality Improvement Program database from 2012-2014 and included all adult patients who underwent an elective abdominal colon or rectal resection based on Current Procedural Terminology codes. Patients who underwent emergency surgery or perineal only approaches were excluded. The primary outcome was readmission within 30 days. Covariates included peri-operative factors and post-operative occurrences during the index admission. This analysis was conducted on a 60% sample in order to allow cross-validation at a later stage. Continuous variables were tested for differences between these readmission groups using the Mann-Whitney U test; categorical variables were tested using the chi-square test. A multivariable logistic regression model that controlled for demographic and clinical factors was fit by backwards selection using all covariates that were significant ($p < 0.20$) on a univariate level. The final model included pre-hospital and post-operative variables that remained significant at $p < 0.05$.

Results/Outcome(s): A total of 51,058 patients were analyzed and the overall readmission rate was 11.1%. Peri-operative factors found to predict readmission upon multivariate analysis included operative time, red blood cell transfusion during surgery or within 72 hours thereafter, an open approach, and creation of an ileostomy. Independent post-operative risk factors included surgical site infection, pneumonia, stroke, urinary tract infection, venous thromboembolism requiring therapy, sepsis, return to surgery, and shorter length of hospital stay. Patients who underwent a partial colectomy without an ostomy were at lower risk for readmission compared to all other abdominal colon and rectal resections. **Figure 1.**

Conclusions/Discussion: Peri-operative factors and post-operative complications significantly affect risk of readmission following elective colorectal surgery. Optimizing length of stay and avoiding premature discharge is critical, as shorter hospital stay was associated with risk of readmission. These findings can be used to identify high-risk patients that may benefit from targeted inpatient intervention or intensive post-discharge follow-up, and can better inform prediction models used to determine hospital reimbursement. Future creation of a validated risk prediction model is actively in process.



Independent Predictive Factors of Readmission following Elective Colorectal Surgery

A NOVEL, EVIDENCE-BASED SMOKING CESSATION PROGRAM IN AN OUTPATIENT COLORECTAL SURGERY CLINIC: 1 YEAR OUTCOMES.

P484

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Purpose/Background: Smoking cessation programs initiated as late as 4 weeks prior to surgery reduce perioperative morbidity and mortality, yet outpatient clinic smoking cessation interventions are rarely provided. Our aim was to develop a functional, evidence based, outpatient smoking cessation program.

Methods/Interventions: From October 2015-October 2016, a multidisciplinary team met regularly to develop a program to address smoking cessation in our outpatient colorectal surgery clinic, including development of a novel protocol, consult form, and prescription. We performed a needs assessment to identify the percentage of colorectal patients who were smokers, and another to find out what was currently being done in other surgical clinics to assess smoking. The program took effect October 2016 to present, with patients receiving an intervention in clinic involving brief counselling, nicotine replacement therapy, and a referral to a local smoking cessation program through a novel "opt out" technique. A post-implementation survey was done of the staff who used the program. A post-implementation audit of every patient chart was done, up to October 9, 2017. Long term cessation data was collected through the local smoking program.

Results/Outcome(s): 70 (19%) of 369 colorectal patients were current smokers. 10 (9%) of 116 surgical patients were asked about smoking, and none of the smokers were offered any intervention. Of the 10 nurses, residents, and surgeons surveyed, 100% felt the protocol was easy to use, would use it again, would recommend it to other clinicians, and felt patients responded positively. The average required time was 3-6 minutes. Furthermore, 80% are now more likely to address smoking cessation in other settings. Post-implementation, of 953 patients seen on 1547 visits, 736 (77.2%) were asked smoking status on their first visit and 804 (84.4%) were asked on at least one visit. In total, 125 smokers were identified and 91 (72.8%) consults were sent. Of those, 75 patients agreed to long term follow up, with 78.8% and 74.2% reached on 1 and 3 month follow up calls. The intention-to-treat quit rates at 1 month and 3 months were 18% (12/66) and 23% (14/62), respectively.

Conclusions/Discussion: Our team has developed a fast, easy to use smoking cessation protocol for outpatient surgical clinics. We have had a successful early implementation in our colorectal surgery clinics, leading to significantly increased identification and treatment of smokers, with quit rates of 18% and 23% at 1 and 3 months.

These numbers may even be higher given the quarter of patients not reached on follow up calls. The novel “opt out” technique led to a 60% retention rate, compared to a previous baseline of 35%, and we believe should be standard practice. We have shown that smoking, the number one modifiable risk factor in surgical patients, can be successfully addressed in outpatient surgical clinics.

MALE GENDER IS THE SINGLE MOST IMPORTANT RISK FACTOR FOR ANASTOMOTIC LEAK AFTER RECTAL RESECTION.

P485

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Purpose/Background: This study aimed to evaluate predictors and consequences of anastomotic leak (AL) after rectal resection using the ACS-NSQIP targeted-proctectomy dataset.

Methods/Interventions: Patients who underwent rectal resection with primary anastomosis from the ACS NSQIP (2016) were included. Individuals who developed AL were compared to others for demographics, co-morbidities, procedure, diverting ostomy, surgical approach, conversion, prolonged surgery (duration > 75 percentile) and complications. Preoperative colon evaluation and ostomy marking; tumor stage, location from anal verge, margins, lymph node harvest and stage were also compared. Univariable and multivariable analyses were conducted to identify risk factors for AL after proctectomy.

Results/Outcome(s): Of 2,768 rectal resections, 96 (3.5%) developed AL. Male gender (66.7% vs. 44.8%, $p < 0.0001$), preoperative sepsis (7.3% vs. 2.3%, $p = 0.002$), higher American Society of Anesthesiologists scores (IV-V: 9.3% vs. 3.7%, $p = 0.04$); emergency (6.3% vs. 2.2%, $p = 0.01$) and prolonged (30.2% vs. 21.3%, $p = 0.04$) surgery were more common in AL group, while elective surgery (90% vs. 79.2%, $p = 0.001$) in the no-AL group. Postoperative ileus, surgical site infection, wound disruption, bleeding transfusion, sepsis or septic shock, urinary tract infection, deep vein thrombosis or pulmonary embolism, reoperation, length of stay and readmission were significantly greater for AL. For rectal cancer, neoadjuvant therapy, tumor location, distance to radial and distal margins, pathological stage and lymph node harvest were similar for the AL and no-AL groups. On multivariable analysis, male gender (OR= 2.4, CI= [1.6 – 3.8]) increased the odds, while elective surgery (OR= 0.52, CI= [0.28 – 0.97]) was protective against AL. For rectal cancer, male gender (OR= 2.12, CI= [1.02 – 4.38]) and prolonged surgery (OR= 2.0, CI= [1.1 – 3.7]) were associated with AL, however, colonic pouch creation

(OR= 0.46, CI= [0.21 – 0.96]) reduced the odds in these patients. Diverting ostomy reduced surgical site infection (81.5.5% vs. 95.2%, $p = 0.04$) but not other outcomes when AL occurred.

Conclusions/Discussion: Anastomotic leak after rectal resection predisposes to significant morbidity and resource utilization. Male gender is a common factor that doubles the risk of anastomotic leak regardless of the diagnosis. This association supports a lower threshold for the judicious use of diverting ostomy, since it reduces the risk of SSI, particularly in male patients.

PROLONGED OPIOID USE AFTER ANORECTAL VS. ABDOMINAL COLORECTAL OPERATIONS: WHO IS AT RISK?

P486

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Purpose/Background: Given the significant pain experienced by patients who undergo anorectal procedures, we hypothesized that they would have the same rates of prolonged postoperative opioid use as patients who undergo abdominal colorectal operations. The aim of this study was to compare patterns of post-operative opioid use among patients who underwent anorectal and abdominal colorectal surgery.

Methods/Interventions: The data source was a nationally representative commercial insurance claims database (Optum), 2012-14. We identified a cohort of adult patients who underwent colorectal abdominal or anorectal operations during the study period. Inclusion criteria were continuous enrollment on a single insurance plan for ≥ 6 months prior to and ≥ 3 months after surgery. Patients who had any additional operation during the 9-month enrollment window, concurrent colorectal and anorectal operations, or non-invasive anorectal procedures were excluded. We measured prolonged post-operative opioid use, defined as pharmaceutical claims for ≥ 3 opioid refills occurring over a period of ≥ 60 days after surgery. We fit a hierarchical multivariable logistic regression model with operation type, Charlson Comorbidity Index, race, age group, and educational attainment as fixed effects covariates for prolonged post-operative opioid use.

Results/Outcome(s): The proportion of anorectal ($n = 51,454$) vs. abdominal ($n = 11,623$) surgery patients who filled post-operative opioid prescriptions at 30-60 days was 7.1% vs. 13% ($p < 0.0001$) and at 61-90 days was 6.6% vs. 11% ($p < 0.0001$). Compared to those who underwent abdominal operations, patients who underwent anorectal operations were half as likely to demonstrate prolonged post-operative opioid use (Odds Ratio

P485 Pre-, intra- and post-operative factors stratified by the development of anastomotic leak (AL) after proctectomy

Variable	No AL N= 2,672	AL N= 96	p-value
Age	1757 (67.6%)	63 (67%)	0.9
< 65 years	842 (32.4%)	31 (33%)	
≥ 65 years			
Gender (male)	1196 (44.8%)	64 (66.7%)	<0.0001
ASA classification			0.04
I	48 (1.8%)	2 (2.1%)	
II	1185 (44.5%)	40 (41.7%)	
III	1334 (50.1%)	45 (46.9%)	
IV	94 (3.5%)	8 (8.3%)	
V	4 (0.2%)	1 (1%)	
Primary diagnosis	925 (34.6%)	42 (43.8%)	0.1
Malignant disease	1747 (65.4%)	54 (56.3%)	
Benign disease			
Preoperative sepsis	61 (2.3%)	7 (7.3%)	0.002
Emergency surgery	59 (2.2%)	6 (6.3%)	0.01
Elective surgery	2403 (90%)	76 (79.2%)	0.001
Preoperative colon evaluation	1509 (64.5%)	57 (67.1%)	0.6
Preoperative ostomy marking	1417 (53%)	59 (61.5%)	0.1
Resection type	1761 (65.9%)	60 (62.5%)	0.5
Partial resection	911 (34.1%)	36 (37.5%)	
Total resection			
Ileal pouch creation	541 (20.2%)	21 (21.9%)	0.7
Colonic pouch creation	561 (21%)	17 (17.7%)	0.4
Diverting ostomy creation	1472 (55.7%)	53 (56.23%)	0.9
Operative approach	1307 (48.9%)	53 (55.2%)	0.6
Open	935 (35%)	31 (32.3%)	
Laparoscopy	283 (10.6%)	10 (10.4%)	
Robot-assisted	8 (0.3%)	0 (0)	
Other (MIS)	139 (5.2%)	2 (2.1)	
Hybrid / Endoscopic / NOTES			
Conversion to open	141 (5.3%)	7 (7.3%)	0.4
Operative duration (> 75th percentile)	566 (21.3%)	29 (30.2%)	0.04
Postoperative ileus	440 (16.5%)	47 (49%)	<0.0001
Surgical site infection (superficial, deep and organ space)	254 (9.5%)	84 (87.5%)	<0.0001
Wound disruption	20 (0.7%)	5 (5.2%)	<0.0001
Pulmonary complication	69 (2.6%)	7 (7.3%)	0.01
Deep vein thrombosis or pulmonary embolism	49 (1.8%)	6 (6.3%)	0.002
Renal complication	36 (1.3%)	6 (6.3%)	<0.0001
Urinary tract infection	71 (2.7%)	7 (7.3%)	0.01
Cardiovascular or cerebrovascular complication	24 (0.9%)	3 (3.1%)	0.03
Bleeding transfusion	279 (10.4%)	21 (21.9%)	<0.0001
Sepsis or septic shock	110 (4.1%)	33 (34.4%)	<0.0001
Reoperation	108 (4%)	41 (42.7%)	<0.0001
Readmission	369 (13.8%)	47 (49%)	<0.0001
Length of stay, day, Mean (SD)	7.1 (7.6)	14.9 (14.8)	<0.0001

Descriptive statistics shown as n (%) unless mentioned otherwise.

ASA: American Society of Anesthesiologists score, MIS: Minimally invasive surgery, NOTES: Natural orifice transluminal endoscopic surgery, SD: Standard Deviation.

[OR]=0.51, 95% Confidence Interval [CI]=(0.47, 0.56). Female sex, high Charlson Comorbidity Index, and not having a college degree were associated with a higher odds of prolonged post-operative opioid use among both operation types. Among patients who underwent anorectal surgery, prolonged post-operative opioid use was associated with older age and non-Hispanic white or black race. Among those who underwent abdominal surgery, age > 65 years was associated with a lower odds of prolonged post-operative opioid use.

Conclusions/Discussion: Patients who underwent abdominal colorectal operations were more likely than those who underwent anorectal operations to have prolonged postoperative opioid use. This may be explained by the more extensive surgical trauma or higher rates of preoperative opioid use in this population. To prevent long-term dependence or inappropriate opioid use beyond the post-operative period, future research should focus on the identification of modifiable risk factors and development of potential interventions.

EARLY VERSUS LATE UNPLANNED REOPERATION AFTER ELECTIVE COLORECTAL RESECTION.

P487

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Purpose/Background: Unplanned reoperation is a feared and often devastating complication after colorectal resection. We aimed to assess the risk factors, indications and interventions related to early reoperation (ER, within 48 hours) versus late reoperation (LR, after 48 hours) after elective colorectal resection in a population based sample.

Methods/Interventions: The 2012-2016 American College of Surgeons-National Surgical Quality Improvement Project (ACS-NSQIP) databases were used to identify patients who underwent elective colorectal resection. Patients requiring an unplanned reoperation within 30 days were identified and multivariate regression analysis was used to identify risk factors and outcomes associated with reoperation.

Results/Outcome(s): Of 251,331 patients who underwent elective colorectal resection, 14,124 (5.6%) patients required unplanned reoperation after the index procedure. Amongst those, the minority of patients 2,009 (14.2%) required ER while the majority 12,115 (85.8%) required LR. The mean time to unplanned reoperation was 1.2±0.8

P486 Multivariable logistic regression estimating the likelihood of prolonged postoperative opioid use after anorectal and abdominal colorectal surgery

	Abdominal Operations		Anorectal Operations	
	OR*	95% CI**	OR	95% CI
SEX				
Female (referent)				
Male	0.75	0.65, 0.86	0.89	0.81, 0.98
AGE GROUP				
18-29 (referent)				
30-49	1.16	0.74, 1.83	2.53	1.87, 3.41
50-64	1.10	0.71, 1.70	3.05	2.26, 4.11
65+	0.54	0.35, 0.85	1.75	1.29, 2.38
CHARLSON COMORBIDITY INDEX				
0 (referent)				
1	1.60	1.32, 1.94	2.32	2.05, 2.63
2	1.69	1.45, 1.97	2.60	2.30, 2.94
EDUCATION				
No College Degree (referent)				
College Degree	0.74	0.60, 0.91	0.51	0.45, 0.59
RACE				
White (referent)				
Black	1.07	0.85, 1.35	0.94	0.80, 1.10
Other	0.80	0.63, 1.03	0.51	0.43, 0.61

*OR=Odds Ratio; **CI=Confidence Interval.

days in ER compared to 11.4±7 days in LR. Patients in ER more likely were ventilator dependent, had acute renal failure or a bleeding disorder, or were admitted as a hospital transfer ($P<0.05$ for all). Conversely, patients who required LR were more likely current smokers, had disseminated cancer or preoperative sepsis or were admitted from home ($P<0.05$ for all). When comparing ER to LR, multivariate regression analysis revealed that patients requiring ER had greater bleeding requiring transfusion (AOR=4.44, 95%CI: 4.0-5.0, $p<0.05$) but decreased surgical site infection (AOR=0.15, 95%CI: 0.13-0.17, $p<0.05$), pulmonary complications (AOR=0.49, 95%CI: 0.42-0.58, $p<0.05$), venous thromboembolism (AOR=0.30, 95%CI: 0.20-0.45, $p<0.05$) and lower rate of sepsis (AOR=0.42, 95%CI: 0.32-0.56, $p<0.05$). The most common indication for ER was postoperative hemorrhage (38%), compared to obstruction (34%) and sepsis (22%) in LR. The majority of the patients in both ER and LR required an open intervention as part of their reoperation.

Conclusions/Discussion: Early and late reoperations after colorectal resection have varying etiologies. Although fewer reoperations occur within 48 hours after index surgery, these primarily relate to hemorrhage in patients with predetermined risk factors for bleeding suggesting that careful preoperative planning and intraoperative technique could reduce this risk. Later reoperations may be less predictable or preventable but may still be influenced by surgical decision-making and technique.

EFFECTS OF THE TOPIC APPLICATION OF SUCRALFATE IN PROTEINS OF ADHERENS JUNCTIONS IN AN EXPERIMENTAL MODEL OF DIERSION COLITIS.

P488

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Purpose/Background: Asses the anti-inflammatory effects and the content of the proteins E-cadherin and β -catenin in the colon mucosa without fecal stream after intervention with sucralfate (SCF).

Methods/Interventions: Thirty-six rats have been submitted to transit derivation by proximal colostomy and distal mucous fistula. The animals were divided into three groups according to the daily enemas received: physiologic solution 0.9%, SCF 1.0 g/kg/day or 2.0 g/kg/day. Each group has been subdivided into two subgroups according to the euthanasia to be performed after 2 or 4 weeks. The inflammatory intensity has been assessed based on a scale previously validated, and the neutrophilic infiltrate has been assessed by researching the tissue for myeloperoxidase (MPO). The proteins E-cadherin, β -catenin, and MPO have been identified by immunohistochemistry with specific monoclonal antibodies for each of them and the tissue content of all proteins has been quantified by computer-assisted image analysis. The final value attributed to tissue contents has been expressed as percentage/field (%/field). The Mann-Whitney and the

P487 Most Common Indications And Procedures In Patients Requiring Unplanned Reoperation After Colorectal Resection

Early Reoperation (≤ 48 hours)			Late Reoperation (> 48 hours)		
Rank	Indication	Procedure	Rank	Indication	Procedure
1	Hemorrhage 38%	Open Exploration / Lysis of Adhesions 56%	1	Obstruction / Perforation 34.3%	Open Exploration / Lysis of Adhesions 34%
2	Obstruction / Perforation 9.2%	Resection and Anastomosis 15.5%	2	Infection / Sepsis 22.2%	Resection and Anastomosis 25.3%
3	Ischemia 8.5%	Ostomy Diversion 8.7%	3	Hemorrhage 2.8%	Incision & Drainage 15.2%
4	Infection / Sepsis 2.8%	Laparoscopic Exploration / Lysis of Adhesions 8.2%	4	Ostomy Complication 2.3%	Ostomy Diversion 13.7%
5	Ostomy Complication 1.8%	Incision & Drainage 2.7%	5	Ischemia 1.5%	Laparoscopic Exploration / Lysis of Adhesions 1.2%

Kruskal-Wallis test has been used, adopting the significance level of 5% ($p < 0.05$).

Results/Outcome(s): The intervention in the colon excluded of intestinal transit with SCF in the concentration of 2.0 g/kg/day for 4 weeks has decreased the inflammatory score and it shows to be related to the concentration used and the intervention time. The content of E-cadherin, in the excluded colon irrigated with saline, SCF 1.0 g/kg/day and 2.0 g/kg/day, for 2 weeks has been of $2.8\% \pm 0.43\%$, $5.68\% \pm 1.2\%$ and $7.62\% \pm 1.16\%$, respectively ($p < 0.01$), while in the colon irrigated for 4 weeks, it has been $3.5\% \pm 0.20\%$, $6.38\% \pm 0.64\%$ and $6.22\% \pm 0.80\%$, respectively ($p < 0.01$). The content of β -catenin, in the excluded colon irrigated with saline, SCF 1.0 g/kg/day and 2.0 g/kg/day, for 2 weeks has been of $2.9\% \pm 0.38\%$, $5.28\% \pm 0.5\%$ and $6.41\% \pm 0.44\%$, respectively ($p < 0.01$), while in the colon irrigated for 4 weeks, it has been $3.51\% \pm 0.22\%$, $5.34\% \pm 0.64\%$ and $7.49\% \pm 0.70\%$, respectively ($p < 0.05$). The reduction of inflammatory score has varied over the intervention time and according to the SCF concentration used.

Conclusions/Discussion: The intercellular junctions represent one of the main constituents of the colic epithelial barrier. The adherent's junctions are constituted by the proteins E-cadherin and β -catenin. Studies show that there is a reduction in the content of both proteins in the experimental model of the diversion colitis (DC). Sucralfate (SCF) has a protecting action against the epithelial lesions in the epithelial barrier of the gastrointestinal tract. The results obtained in this study showed that the application of enemas with SCF reduces the inflammatory score and the neutrophilic infiltrate and increases the tissue content of the proteins E-cadherin and β -catenin in experimental DC.

PREVALENCE AND BURDEN OF OPIOID-INDUCED RESPIRATORY DEPRESSION AND POSTOPERATIVE NAUSEA/VOMITING ASSOCIATED WITH THE TREATMENT OF ACUTE POSTOPERATIVE PAIN FOLLOWING GENERAL/COLORECTAL SURGERY.

P489

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Purpose/Background: Intravenous opioids are highly effective in managing moderate-to-severe postoperative pain in general/colorectal (GC) surgical procedures. However, the therapeutic use of opioids can be limited by opioid-related adverse events (ORAEs), especially opioid-induced respiratory depression (OIRD)

and postoperative nausea/vomiting (PONV), which can adversely impact patients' recovery after surgery. This analysis was designed to examine the prevalence and burden of OIRD and PONV in patients who received opioids following GC surgery.

Methods/Interventions: In a retrospective, inception cohort study, patients aged >18 years remaining in hospital following ≥ 1 GC surgical procedure and in receipt of ≥ 1 dose of parenteral morphine, hydromorphone, or fentanyl, were identified from the Premier Perspective[®] database (July 2015–June 2016). Characteristics and treatment patterns of patients with and without OIRD and PONV were compared using *t*, Mann-Whitney U, and chi-square tests; length of stay (LOS) and costs were compared using adjusted Poisson and generalized linear regression models. As a case representation, these factors were also examined in a subgroup of open colectomy (OC) patients.

Results/Outcome(s): During 158,348 stays for GC procedures, treatment with ≥ 2 parenteral opioids was common (Table). Rates of OIRD and PONV were 11.8% and 72.1%, respectively. OIRD and PONV were associated with greater LOS and total hospital costs (all $P < 0.0001$). Increased odds of OIRD were associated with obesity (odds ratio [OR]=1.29), existing respiratory (OR=1.83) or renal (OR=1.21) condition, sleep apnea (OR=1.40), increasing age (OR=5.40 in patients aged ≥ 85 years), average daily morphine milligram equivalence (MME) >45 mg (OR=1.29 in patients receiving >45 to ≤ 90 mg MME daily) and sedative use (OR=1.09 in patients receiving sedative on Day 1) (all $P < 0.05$). Increased odds of PONV were associated with female gender (OR=1.65), age <55 years (OR=1.09 for patients aged 45–54 years) and average daily MME >10 mg (OR=1.35 in patients receiving >10 to ≤ 20 mg MME daily) (all $P < 0.05$). In 11,079 patients who underwent OC, rates of OIRD and PONV were 22.4% and 80.4%, respectively. Compared with the GC group, the OC patient subgroup was relatively older with a higher comorbidity burden (Table). OC was associated with greater mean LOS and total cost than that observed for the GC group (Table).

Conclusions/Discussion: Among patients who underwent GC procedures and received opioid analgesia, OIRD and PONV were associated with substantial clinical and economic burden. This may be of particular significance in procedures such as OC, which are typically associated with an extended LOS and increased hospital costs. Preoperative evaluation of patient and clinical characteristics, and the availability of better-tolerated analgesics may reduce the burden of these ORAEs.

Table: Summary of patient characteristics, treatment patterns, opioid-related adverse events, and utilization/cost burden during inpatient stays for general/colorectal and open colectomy procedures.

	General/colorectal procedures (N=158,348)	Open colectomy (n=11,079)
Patient demographic characteristics		
Age, y (SD)	57.1 (17.9)	64.8 (15.0)
Female, % (no.)	55.2 (87,393)	52.6 (5,823)
Patient clinical characteristics		
Obesity, % (no.)	14.8 (23,353)	9.7 (1,071)
Respiratory condition, % (no.)	11.0 (17,480)	16.7 (1,853)
Renal condition, % (no.)	12.4 (19,689)	13.4 (1,488)
Sleep apnea, % (no.)	5.9 (9,326)	4.8 (529)
CCI, mean (SD)	1.5 (2.0)	2.3 (2.5)
Treatment pattern		
Total daily MME, mean (SD)	50.0 (269.3)	48.3 (167.0)
Combination therapy ^a , % (no.)	86.5 (137,026)	92.2 (10,210)
Parenteral opioid, % days ^b (SD)		
Morphine	38.0 (0.5)	25.0 (0.3)
Hydromorphone	46.0 (0.5)	34.0 (0.3)
Fentanyl	34.0 (0.3)	20.0 (0.2)
Non-opioid prescription analgesic, % (no.)	95.8 (151,638)	95.4 (10,569)
NSAIDs	38.0 (60,178)	36.1 (3,994)
Acetaminophen	52.3 (82,787)	62.7 (6,948)
Calcium channel blocker	11.3 (17,909)	9.6 (1,063)
Local anesthetic	86.0 (136,248)	81.9 (9,072)
NMDA receptor antagonist	4.5 (7,060)	6.7 (743)
α ₂ adrenergic receptor agonist	7.4 (11,762)	11.0 (1,214)
Sedative, % (no.)	52.8 (83,595)	60.6 (6,715)
Naloxone, % (no.)	2.1 (3,259)	3.0 (331)
Prophylactic antiemetic ^c , % (no.)	75.1 (111,267)	73.4 (7,764)
ORAEs		
OIRD ^d , % (no.)	11.8 (18,735)	22.4 (2,485)
PONV ^e , % (no.)	72.1 (114,116)	80.4 (8,903)
Utilization/cost burden		
LOS, no. of days (SD)	7.0 (9.1)	11.6 (11.3)
Readmission, ≤30 days, % (no.)	9.1 (13,924)	11.8 (1,289)
Total costs, US\$ (SD)	18,412.01 (27,054.60)	30,327.86 (35,443.28)

Mean values are presented, unless otherwise specified.

^a≥2 parenteral opioids, ^bdays of inpatient therapy, ^cdefined by antiemetic use on Day 1 of inpatient stay, ^ddefined by diagnosis code for respiratory depression or ≥1 naloxone dose received during inpatient stay in general/colorectal group, defined by diagnosis code for respiratory depression during inpatient stay in open colectomy subgroup, ^edefined by diagnosis code for nausea or vomiting or antiemetic use after Day 1 of inpatient stay in general/colorectal group, defined by antiemetic use after Day 1 of inpatient stay in open colectomy subgroup.
CCI, Charlson comorbidity index; LOS, length of stay; MME, morphine milligram equivalence (for all parenteral opioids); NSAIDs, nonsteroidal anti-inflammatory drugs; NMDA, N-methyl-D-aspartate; OIRD, opioid-induced respiratory depression; ORAE, opioid-related adverse event; PONV, postoperative nausea and vomiting; SD, standard deviation.

LAPAROSCOPIC SPLENIC FLEXURE MOBILIZATION FOR SIGMOID OR RECTAL RESECTIONS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF OBSERVATIONAL STUDIES.

P490

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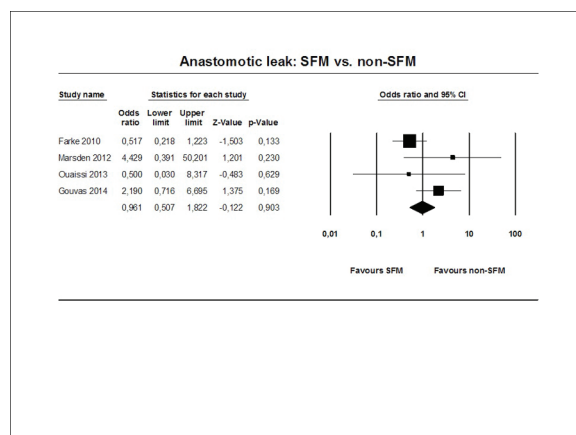
Purpose/Background: There is no consensus in the literature whether splenic flexure mobilization (SFM) should be performed selectively or routinely for sigmoid or rectal resections. The aim of this study was to evaluate the impact of splenic flexure mobilization on anastomotic leak and surgical site infection rates in sigmoid and rectal resections.

Methods/Interventions: The Scopus, MEDLINE and Pubmed databases were systematically searched. Inclusion criteria were clinical studies comparing laparoscopic SFM to non-SFM during sigmoid or rectal resections. Non-comparative studies and studies comparing open or robotic SFM, and non-clinical studies were not included. Anastomotic leak and surgical site infection (SSI) were the primary endpoints. Anastomotic leak was defined either clinically or radiologically. SSIs were defined by the Center for Disease Control National Nosocomial Infections Surveillance System. Superficial incisional SSI

was defined as an infection that occurs within 30 days after the operation and the infection involves only skin or subcutaneous tissue of the incision; deep incisional SSI was defined as an infection that occurs within 30 days after the operation and the infection appears to be related to the operation and the infection involves deep soft tissues (e.g., fascial and muscle layers) of the incision; organ/space SSI was defined as an infection that occurs within 30 days after the operation and the infection appears to be related to the operation and the infection involves any part of the anatomy (e.g., organs or spaces), other than the incision, which was opened or manipulated during an operation. Statistical heterogeneity and between-study variance were assessed using I^2 and Tau^2 statistics, respectively. A random-effects model was used for variables with heterogeneity exceeding 50%.

Results/Outcome(s): Six studies with 12,790 patients were analyzed including 5,089 SFM and 7,701 non SFM. The overall bias risk was found to be high. No significant difference was found in anastomotic leak rates (Figure 1) when SFM patients were compared to their non-SFM counterparts [OR(95%CI) = 0.96 (0.50-1.82); $p=0.903$; number needed to treat (NNT)=98]. SFM patients had longer operating time [OR(95%CI) = 4.84 (1.39-16.80); $p=0.013$] and increased SSI rates when compared to their non-SFM counterparts [OR(95%CI) = 1.21 (1.09-1.35); $p<0.001$; NNT=29]. Superficial incisional SSI rates were significantly higher in SFM patients [OR (95%CI) = 1.29 (1.14-1.47); $p<0.001$; NNT=53], whereas there was no significant difference found in organ/space SSI rates.

Conclusions/Discussion: Laparoscopic SFM was not associated with significantly decreased anastomotic leak rates. Superficial incisional SSI rates were significantly increased in patients undergoing laparoscopic SFM. These data support individualized decisions rather than routine implementation.



INFLUENCE OF OBESITY ON SURGERY FOR DIVERTICULITIS.

P491

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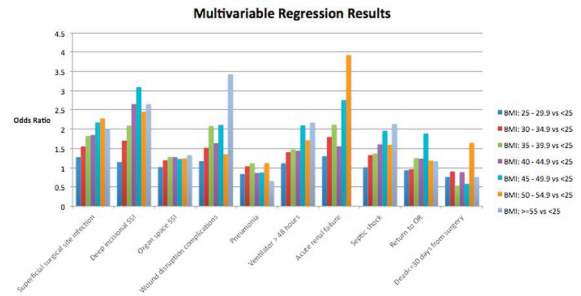
Purpose/Background: This analysis was conducted to assess the relationship of BMI and surgical complications following surgery for diverticulitis. We hypothesized that increasing BMI is a risk factor for surgical complications in surgery for diverticulitis.

Methods/Interventions: We used the National Surgical Quality Improvement Program (NSQIP) database from 2005 to 2015. A total of 52196 patients who underwent surgery for diverticulitis were included. Outcomes of interest were complications of superficial surgical site infection (SSI), deep incisional SSI, organ space SSI, wound disruption complications, pneumonia, being on ventilator >48 hours, acute renal failure, MI, septic shock, return to OR, and mortality within 30 days of surgery. Univariate analyses were conducted to obtain summary measures (e.g., proportions, means, medians, standard deviations) of all variables. As appropriate, bivariate analysis were conducted to test the association of the characteristics with BMI using a two-sided Chi-square test of independence, or ANOVA. Furthermore, we obtained odds ratios (OR) and 95% confidence intervals (CI) from separate multivariable logistic regression models to evaluate the association of BMI with each complication adjusting for age, gender, race/ethnicity, diabetes, smoking status, ASA class, procedure type, preoperative serum albumin, and total operation time. A two-sided p-value < 0.05 was considered to be significant.

Results/Outcome(s): Results from bivariate analysis indicate that all variables other than bleeding disorders and having prior MI were associated with BMI. Morbidly obese patients had higher diabetes, hypertension, more steroid use, ASA classification, were emergency cases, higher rates of all infections, mostly open procedures, returned to OR, died within 30 days, longer operation times and hospital stays, and fewer days to death from surgery. Interestingly, increased BMI was inversely associated with mean age [62.2 years in BMI < 25 and 52.7 years in BMI ≥ 55 (p < 0.0001)]. After accounting for confounders, multivariable regression results indicate that the odds of each complication increase with increasing BMI [superficial SSI (p < 0.0001), deep incisional SSI (p < 0.0001), wound disruption complications (p < 0.0001), ventilator dependence > 48 hrs (p = 0.0004), acute renal failure (p = 0.0148), septic shock (p = 0.0006), and return to OR (p < 0.0001)]. Complications such as MI, pneumonia, mortality within 30 days, and organ space SSI either were not statistically significant or did not show correlation with BMI.

Conclusions/Discussion: Obesity is associated with a number of complications following surgery for diverticulitis. Elevated BMI adds significant risk to procedures for

diverticulitis and should be accounted for in risk stratification models. Patients should be counseled on weight reduction before undergoing surgery for diverticular disease.



ACS-NSQIP RISK CALCULATOR PREDICTS COHORT BUT NO INDIVIDUAL RISK OF COMPLICATION FOLLOWING COLORECTAL RESECTION.

P492

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Purpose/Background: The American College of Surgeons National Surgery Quality Improvement Program (ACS-NSQIP) calculator does not include institutional characteristics that may influence outcomes. We evaluate if assigning risk based on sample characteristics performs better than the ACS-NSQIP risk calculator in predicting risk of adverse outcome.

Methods/Interventions: ACS-NSQIP risk scores were calculated for all colorectal resections at an academic medical center from October 2015-September 2016. Brier scores were calculated for the calculator and compared to a null Brier score (assigning sample risk to all patients). Additional analysis was performed for the subset of patients for whom the risk scores and outcomes were divergent.

Results/Outcome(s): 288 patients underwent colorectal resection (median age 60, 51.7% male); 78% were laparoscopic and cancer was the most common indication (52.4%). The ACS-NSQIP calculator accurately predicted cohort rates for seven out of eight outcomes considered: any complication, surgical site infection, venous thromboembolism, readmission, reoperation, length of stay and death; there were more serious complications in the sample than predicted (19.4 vs 14.7%, p = 0.05). The Brier scores for the ACS-NSQIP calculator were not different from the null Brier score for any of the outcomes except death. For death, the null Brier score performed better (0.0076 vs 0.0139, p = < 0.001). Moderate predictive ability of the calculator was confirmed by AUCs of 0.685 and 0.680 for serious and any complication respectively. Patients whose outcomes were better than expected had a history of smoking (OR 4.3 95% CI 1.2-15.4), ASA ≥ 3 (OR 10.4, 95% CI 2.8-39.2), total/subtotal colectomy (OR 3.5, 95% CI 1.1-12.2) and Surgeon5 (OR 2.9, 95% CI 1.4-11.6)

on multivariable analysis controlling for elective versus emergent procedure. The patients with serious complications who had the lowest predicted risk were difficult to predict; on univariate analysis, almost all had low ASA and they were disproportionately operated on by Surgeon 5, the same surgeon with a specialized referral practice who was overrepresented in the other group with mismatched prediction and outcome.

Conclusions/Discussion: The ACS NSQIP calculator predicted outcomes for the entire cohort for most outcomes, suggesting it may be used for benchmarking. However the calculator did not predict outcomes for individual patients better than assigning each patient the background risk of the sample population. For an experienced colorectal unit, the calculator may over predict risk for specialized operations such as total/subtotal colectomy. The calculator appears to perform better for surgeons whose case-mix resembles that of the NSQIP sample. Serious complication remains difficult to predict, particularly for lower risk patients, and patient risk may be better predicted by individual center and surgeon characteristics than by nationwide NSQIP risk.

SINGLE INCISION LAPAROSCOPIC COLECTOMY IS EQUIVALENT TO MULTIPOINT LAPAROSCOPIC RESECTION BUT OFFERS LITTLE BENEFIT TO SWITCHING TECHNIQUE.

P493

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Purpose/Background: Single incision laparoscopic right colectomy (SILRC) has been utilized over the past decade and initial reports suggested at least equal efficacy and outcomes compared to multiport laparoscopic right colectomy (MPLRC). Despite initial enthusiasm for single incision surgery, widespread adoption has not occurred. In our institution, only one of five surgeons performs single incision colectomy. The purpose of this study was

to retrospectively compare SILRC with MPLRC in a large volume of patients to determine if widespread adoption of SILRC could be supported by more favorable outcomes.

Methods/Interventions: All patients that underwent laparoscopic right colectomy at our institution between June 2011 and June 2017 were identified and retrospective data collected. Patient data were compared according to technique of laparoscopic resection: multiport laparoscopic right colectomy versus single incision laparoscopic right colectomy. All five surgeons participating had similar laparoscopic technique with medial to lateral colon dissection, high ligation of ileocolic vessels, and extracorporeal resection and anastomosis. Data were analyzed using student's t-test, Fisher's exact test, or one-way analysis of variance, $p < 0.05$ statistically significant.

Results/Outcome(s): A single surgeon performed all 96 SILRC. Five surgeons, including the single SILRC surgeon, performed 384 MPLRC. Patient demographics, hospital length of stay, complications, and readmission rates were similar between SILRC and MPLRC (Table). There were three conversions to laparotomy in the MPLRC and no conversions in the SILRC group, $p > 0.99$. Operative time was significantly shorter in the SILRC group. Analyzing the SILRC surgeon's subset of MPLRC procedures showed significant differences in surgery length, ASA, and BMI when compared to both SILRC and the cumulative MPLRC group. This suggests a selection bias of more favorable surgical patients towards SILRC.

Conclusions/Discussion: Overall outcomes were similar between SILRC and MPLRC. Although operative time was shorter in SILRC, this did not impact overall outcome. In addition, SILRC are generally performed on more favorable surgical candidates and challenging or high risk surgical patients are offered MPLRC instead of single incision surgery. We conclude that SILRC is equivalent and perhaps faster than MPLRC in experienced hands. However, there are no objective benefits in terms of surgical outcomes to promote widespread adoption of this technique. Surgeon and patient preferences may ultimately determine choice of technique.

P492 Predicted rate, actual incidence, and Brier score by complication

30 day outcomes	Predicted (%)	Actual (%)	P-value*	Brier NSQIP	Brier Null	P-value†
Serious complication	14.7	19.4	0.05	0.144	0.1570	0.93
Any complication	17.4	21.8	0.1	0.1535	0.1675	0.99
SSI	8.5	8.1	0.8	0.0721	0.0719	0.92
VTE	1.5	1.4	0.9	0.0098	0.0105	1.0
Readmission	10.3	10.5	0.9	0.0925	0.0923	0.99
OR	4.3	6.0	0.08	0.0651	0.0659	1.0
Death	1.3	1.7	0.6	0.0139	0.0076	<0.001

*p-value for ACS-NSQIP prediction versus actual complication rate

†p-value for comparison of NSQIP calculator and null brier scores

SSI: surgical site infection; VTE: venous thromboembolism; OR: unplanned reoperation

ANALYSIS OF SPLENIC FLEXURE VASCULAR ANATOMY USING 3-DIMENSIONAL CT ANGIOGRAPHY.

P494

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Purpose/Background: Recent great progresses in a radiological diagnosis has provided accurate preoperative diagnosis, and that has realized optimal preoperative management in colorectal cancer. Of these, 3-dimensional CT angiography (3D-CTA) is useful to identify a vascular anatomy and to perform an appropriate lymphadenectomy. Since there is a vascular communication between superior and inferior mesenteric artery in splenic flexure, blood supply in splenic flexure is complicated and is not well understood. The objective of this study is to clarify the pattern of vascular anatomy around splenic flexure using 3D-CTA.

Methods/Interventions: Between 2014 and 2017, patients who met our inclusion criteria were consecutively included. Our inclusion criteria is as follows: more than 18 years old, colorectal cancer patients, patients who preoperatively undertook dynamic contrast-enhanced CT scanings. In order to construct a 3D-CTA image, ZioStation2 (Ziosoft, Inc, Tokyo, Japan) was utilized as a medical image processing workstation. The presence of left colic artery (LCA), accessory of middle colic artery (AMCA), splenic vein (SpV) and inferior mesenteric vein (IMV) were described as vasculars feeding or discharging splenic flexure.

Results/Outcome(s): A total of 288 patients met our inclusion criteria, composed of 161 males and 127 females.

A median age was 68. LCA was found in 272 (94.4%) and AMCA was found in 68 (25.0%). These two arteries were mainly feeding artery of splenic flexure. Interestingly, three patients (1.0%) had AMCA arising from celiac artery. IMV was discharged into SpV in 156 (54.2%) whereas IMV was discharged into SMV in 132 (45.8%). Most of AMCAs were running parallel to veins discharging from transverse colon to SpV or upstream of IMV.

Conclusions/Discussion: A 3D-CTA was useful to better understand the pattern of vascular anatomy around splenic flexure, where there were lots of anatomical variations. AMCAs were present approximately in 25.0% and were running parallel to veins discharging from transverse colon to SpV or upstream of IMV. These findings suggested that a 3D-CTA is necessary to perform complete mesenteric excision around splenic flexure.

ELECTIVE VERSUS EMERGENCY SURGERY FOR DIVERTICULITIS IN IMMUNOSUPPRESSED PATIENTS: RISKS AREN'T THE SAME FOR EVERYONE.

P495

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Purpose/Background: Data suggest that patients with immunosuppression (IMS) may be at higher risk for complications from recurrent attacks or emergency surgery for diverticulitis, but the actual risk of surgical intervention is not well known. We sought to determine which forms of immunosuppression are at increased risk for morbidity and mortality from surgery and whether outcomes differed between elective or emergent surgery.

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	MPLRC n=384	SILRC n=96	MPLRC with SIL Surgeon n=25	p value
Age (yrs)	64.0 ± 0.5	66.2 ± 1.1	64.8 ± 2.4	NS
BMI	29.8 ± 0.3	29.0 ± 0.6	33.2 ± 2.2 ‡	‡ 0.03 vs. MPLRC and SILRC
ASA Score	2.6 ± 0.0	2.7 ± 0.0	3.1 ± 0.1 ‡	‡ 0.0019 vs. MPLRC and SILRC
Surgery Length (min)	118.3 ± 2.0	103.0 ± 2.9 †	134.6 ± 9.8 ‡	† 0.0005 vs. MPLRC ‡ 0.0001 vs. MPLRC and SILRC
LOS (days)	3.5 ± 0.1	3.0 ± 0.1	3.8 ± 0.3	NS
Lymph Node Harvest	19.0 ± 0.4	19.9 ± 0.8	19.2 ± 1.9	NS
30-day Readmission	8.0%	9.1%	12.0%	NS
Complications	11.7%	12.2%	12.0%	NS

MPLRC, multiport laparoscopic right colectomy; SILRC, single-incision laparoscopic right colectomy; BMI, body-mass index; ASA, American Society of Anesthesiologists; LOS, hospital length of stay

Methods/Interventions: We queried National Inpatient Sample from 2004 through 2014 and identified patients with diverticulitis. Patients who underwent surgery were analyzed and classified as having elective or emergent surgery. Patients were characterized as IMS if they were taking oral steroids, were organ transplant recipients, had a primary immunodeficiency disorder (including HIV), an active diagnosis of cancer, or diabetes. Patients in each IMS subgroup were separately matched to a compatible cohort of immunocompetent (IMC) general population, using propensity scores. Multivariable regression was performed to determine incremental risk of mortality due to emergency surgery.

Results/Outcome(s): Over 3.5 million patients presented with diverticulitis; 716,148 or 20% had surgery. Of these patients 17% were IMS. Diabetes was the most common form of IMS (91,305, 74%) followed by cancer (26,015, 21%), oral steroids (7,857, 6.4%), immunodeficiency disorder (3,476, 2.8%), and organ transplant recipients (1,803, 1.5%). Among IMS patients, colon resection was performed as emergency in 56% and electively in 46%. After propensity matching (Table 1), the highest mortality was noted in patients with immunodeficiency disorders undergoing emergency resection (12.7% vs 5.9%, $p < 0.001$). Likewise, cancer patients had significantly higher mortality after emergency surgical resection (10.6% vs 5.7%), but the risk was low for both groups (<2%) after elective resection. Transplant patients had similar mortality compared to IMC patients (Elective: 2.8% vs 2.4%, $p = 0.76$; Emergency: 9.5% vs 9.2%, $p = 0.89$), but the risk of sepsis was significantly higher after either elective (4.7% vs 0%, $p < 0.001$) or emergency (13% vs 7.9%, $p = 0.04$) surgery. In contrast, the mortality was significantly lower in diabetics (Elective: 0.4% vs 1.9%; Emergency: 6.4% vs 8.7%, $p < 0.001$, both) and patients taking steroids (Elective: 0.6% vs 1.9%, $p = 0.02$; Emergency: 5.8% vs 7.9%, $p < 0.02$) when compared immunocompetent patients.

Conclusions/Discussion: Although rates of mortality are higher in all patients undergoing emergency surgery for diverticulitis, rates vary substantially among immunosuppressed patients. In particular, patients with immunodeficiency disorders and cancer patients are at high risk of mortality from emergency surgery. Consideration of elective surgery prior to recurrence may be appropriate to decrease the risks of mortality in emergency settings.

Matched Patients	Surgical Management					
	Elective			Emergency		
	Steroid n=797	No Steroid n=797	P- Value	Steroid n=1713	No Steroid n=1713	P- Value
Mortality	0.6	1.9	0.02	5.8	7.9	0.02
Wound infection	3.5	3.5	>0.9	3	7.4	<0.001
Sepsis	1.1	0.6	0.28	7.2	7.8	0.5
Wound dehiscence	0.6	1.3	0.13	1.5	1.4	0.78
Matched Patients	Transplant			No Transplant		
	n=211	n=314		n=314	n=314	
			P-Value			P-Value
Mortality	2.8	2.4	0.76	9.5	9.2	0.89
Wound infection	7.1	5.2	0.4	6.3	6.3	>0.9
Sepsis	4.7	0	0.001	13	7.9	0.04
Wound dehiscence	0	0	-	3.1	1.6	0.19
Matched Patients	Immune Disorder			No Immune Disorder		
	n=349	n=349		n=892	n=892	
			P-Value			P-Value
Mortality	1.4	2.9	0.19	12.7	5.9	<0.001
Wound infection	11	5.7	0.007	6.2	10.9	<0.001
Sepsis	0	0	-	9.9	7.7	0.09
Wound dehiscence	2.8	0	0.002	1.1	1.6	0.41
Matched Patients	Cancer			Cancer		
	n=3197	n=3197		n=3197	n=3197	
			P-Value			P-Value
Mortality	1.5	0.6	<0.001	10.6	5.7	<0.001
Wound infection	4	4.9	0.09	6.4	5.6	0.11
Sepsis	1.9	1.2	0.02	8.7	8.7	>0.9
Wound dehiscence	0.3	1	<0.001	1.3	1.9	0.04
Matched Patients	Diabetes			No Diabetes		
	n=8720	n=8720		n=12412	n=12412	
			P-Value			P-Value
Mortality	0.4	1.9	<0.001	6.4	8.7	<0.001
Wound infection	5.2	4	0.0003	6.1	7.1	0.02
Sepsis	1.1	1.2	0.25	7.1	8.6	<0.001
Wound dehiscence	0.5	0.3	0.37	1.6	1.8	0.24

Table 1: Impact of IMS on outcomes of surgical resection for diverticulitis.

DECREASING SURGICAL SITE INFECTIONS: IMPLEMENTATION OF A COLORECTAL BUNDLE.

P496

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Purpose/Background: Colon and rectal surgical (CRS) procedures are consistently associated with high SSI rates, ranging from 2 to 45%. To decrease SSI rates in CRS cases, many groups have implemented 'colorectal bundles.' In 2011, NSQIP benchmarking data indicated that our organization had been a consistent high outlier in CRS SSIs. Among CRS cases, we had SSI rates as high as 24%. A pilot project colorectal bundle was instituted May 1st 2012.

Methods/Interventions: We performed a retrospective review of our American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) institutional data base. All patients undergoing CRS as defined by the primary Current Procedural Terminology (CPT) code used by the ACS NSQIP were captured for inclusion. Cases without included CPT codes, emergency cases, as well as all cases performed by the Emergency General Surgery service after May, 1st 2012 were excluded. Pre-bundle cases were January 1st, 2010 to April 30th 2012, Post-Bundle cases from May 1, 2012 to December 31st, 2015. Our primary outcome was differences in SSIs

between pre-bundle patients and post-bundle patients. Secondary outcomes included rates of other post-op infections, peri-operative transfusions, operative duration, hospital length of stay, readmission rates and 30 day mortality. Our bundle includes a multi-disciplinary team and twenty interventions.

Results/Outcome(s): 1,016 cases met inclusion criteria, 419 in the pre-bundle group, 597 in the post-bundle group. There were no significant differences between the groups for age ($p=0.66$), body mass index ($p=0.9$), smoking status ($p=0.17$), diabetes ($p=0.86$), congestive Heart Failure ($p=0.22$), receiving dialysis preoperatively ($p=0.052$), immunosuppressed status ($p=0.19$) or American Society of Anesthesiologists (ASA) class ($p=0.93$). There were significantly more patients who received blood transfusions in the pre-bundle group compared with the post-bundle group ($p<0.05$). The overall SSI rate was significantly lower in the post-bundle group compared with the pre-bundle group (13.9 vs 24.3, respectively, $p<0.05$) with significant decreases in the superficial SSIs (pre-bundle 14.6 vs. post-bundle 8.4, $p<0.05$) and organ space SSIs (pre-bundle 9.3 vs. post-bundle 5, $p<0.05$). There was no difference in the overall duration of cases pre- and post-bundle ($p=0.93$), postoperative readmissions within 30 days ($p=0.39$), or mortality within 30 days ($p=0.43$). Pre-bundle group had a longer length of stay compared with the post-bundle group 11.2 vs 9.4 days ($p<0.05$). There were no significant differences in Pneumonia ($p=0.23$), Urinary tract infection ($p=0.1$), Myocardial Infraction ($p=0.38$), or development of Sepsis postoperatively ($p=0.22$).

Conclusions/Discussion: We saw a significant decrease in our SSI rates among included colorectal procedures after implementation of our own multifaceted colorectal bundle. Review of our institutional NSQIP data revealed a decrease in total SSI rates from 24.3% to 13.9%.

General Surgery SSI Bundle	Exclusions
Pre-Op	Pre-Op
1 Smoking cessation planning	Emergency cases
2 Education for CHG Bath or Completion of CHG bath (Day Hospital/Inpatient)	Emergency cases
3 Prescribe mechanical bowel prep & p.o. antibiotics (per MD discretion)	All cases other than Elective Colorectal
4 MRSA Screening	Emergency cases
5 HgbA1c (within 6 months)	NONE
6 PAC visit	Emergency cases
Anesthesia	Anesthesia
7 Completed CHG bath or wipes (Verify in Holding Room)	NONE
8 Appropriate dose of IV antibiotics	NONE
9 Appropriate redosing (if applicable)	NONE
10 Minimum of FIO2 60% in OR	NONE
OR Checklist	OR Checklist
11 Skin Prep: Appropriate agent	NONE
12 Correct wound class assigned	NONE
13 OR traffic \leq 10 counts per hour on average	NONE
14 Wound Protector	Laparoscopic cases
15 Change gown/gloves (Exclude laparoscopic)	Laparoscopic cases
16 Closing Pan (Exclude laparoscopic cases)	Laparoscopic cases
17 No flashed instruments	NONE
18 Silver coated/impregnated dressing used (includes hand ports and laparotomies)	Laparoscopic cases
Post-Op	Post-Op
19 Glucose control	NONE
20 Appropriate wound care & teaching for discharge	NONE

POST-DISCHARGE PATIENT PHONE CALLS: PREVENTING READMISSION FOLLOWING ELECTIVE COLON AND RECTAL SURGERY.

P497

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Purpose/Background: Half of 30-day readmissions after colorectal surgery occur within 7 days of discharge. It is unclear whether follow-up phone call interventions after hospital discharge can prevent readmission. We aimed to 1) determine the feasibility of reaching patients with follow-up phone calls after discharge home from elective surgery, and 2) assess the impact of phone-call intervention on readmission rate and time-to-readmission.

Methods/Interventions: Between 11/2015-11/2016, patients were contacted by a dedicated inpatient colorectal physician assistant via telephone 48 hours after discharge as part of a quality initiative aimed at improving post-surgical care. Concerning symptoms or pain issues were assessed and responses were triaged to the primary surgeon as needed. Patients discharged to facility were excluded. Kaplan-Meier analyses and logistic regression were used.

Results/Outcome(s): Of the 184 patients discharged home after elective colorectal surgery, mean age was 58 years and 46% were male. Half had malignant disease and three-quarters underwent a minimally invasive approach. 67% of patients were reached by phone call; 33% did not receive a phone call because of early readmission (5%), early post-op appointment (7%), missed call window (14%), or patients were unreachable after two attempts (7%). Non-elective 30-day readmission in the phone-call group was 9% (11/124) compared to 32% (19/60) in the no-call group ($p<0.001$). After excluding those readmitted within 48 hours (before the phone call window) from the no-call group, those who received a phone call still had a 61% lower risk of readmission than those who did not receive a phone call (OR 0.39; 95% CI (0.15-0.91)). Phone call status did not affect median time-to-readmission (8 days in the phone-call group vs 7 days in the no-call group, $p=0.21$).

Conclusions/Discussion: Phone calls to patients 48 hours after hospital discharge home are feasible; more than two-thirds were reached. Since those who were not reached had a higher readmission risk, an alternative approach may be needed for this at-risk subset. Nevertheless, phone-based evaluations by a dedicated inpatient colorectal physician assistant appear to impact post-operative readmission rates. This straightforward intervention is a high-value, low-cost intervention that can improve quality of care following colorectal surgery.

Table 1. Demographics and Index Hospitalization Clinical Characteristics (A) and Readmission Risk (B)

Characteristic	Cohort, %		P-value
	Reached	Not Reached	
Patients, No. (%)	124 (67%)	60 (33%)	
Male sex	47	45	NS
Age, mean, years	59	57	NS
Procedure			
Partial Colectomy	50	33	0.03
Low Anterior Resection	13	17	NS
Ileostomy takedown	10	15	NS
Colostomy takedown	5	5	NS
Rectopexy	7	7	NS
Total Abdominal Colectomy	2	3	NS
Subtotal Colectomy	0	3	NS
Completion Proctectomy	2	2	NS
Proctocolectomy	2	3	NS
Abdominal Perineal Resection	1	3	NS
Transanal Endoscopic Excision	1	2	NS
Other Procedures	7	7	NS
Primary Diagnosis			
Malignancy	54	42	NS
Diverticulitis	19	23	NS
Inflammatory Bowel Disease	13	13	NS
Rectal Prolapse	7	7	NS
Other Benign Diseases	7	15	NS
Approach			
Laparoscopic	68	50	0.02
Robotic	11	13	NS

Total: N=184; NS = Non-significant, $p > 0.05$. With the exception of age, all other numbers are expressed as a %.

Variable	Readmission No. (%)	Odds Ratio (95%CI)
Not Reached	12 (20%)	ref
Reached	11 (9%)	0.39 (0.15 - 0.91)

We excluded 7 in the not reached group who were readmitted early within 2 days; original readmission in that group was 32%. Although the two variables partial colectomy and laparoscopic approach were significant on univariate analysis, their effect on readmission risk was <10%, and therefore not considered a confounder and did not require adjustment in regression model.

CAN PERIOPERATIVE KETAMINE MITIGATE THE NEGATIVE EFFECTS OF CHRONIC NARCOTICS IN ELECTIVE COLORECTAL SURGERY PATIENTS?

P498

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Purpose/Background: Narcotic use and overuse have become an epidemic in the United States. At our institution a significant proportion (29%) of elective colorectal surgery patients utilize chronic narcotic medications at baseline. We have previously shown that preoperative chronic narcotic use increased length of stay by 1.7 days after elective surgery. In this pilot study, we utilized a low-dose infusion of intravenous ketamine postoperatively to mitigate pain response and thereby lower the overall morphine equivalents use postoperatively. The secondary endpoint was length of stay.

Methods/Interventions: A single-institution, multi-surgeon, retrospective review of adult patients with daily narcotic use, undergoing elective colorectal surgery was performed (2011-2017). Demographic and clinical data was obtained, including the use of chronic narcotics prior to surgery. In 2017, intra- and post-operative intravenous ketamine was utilized as a pain control adjunct for several patients undergoing elective colorectal surgery. Univariate

analyses were performed, with significance assessed at $p < 0.05$ (Stat 15.1, StataCorp, College Station, Tx).

Results/Outcome(s): We identified 38 patients with chronic narcotic use treated with standard postoperative care and 4 patients that had intravenous ketamine added to their postoperative regimen. Both cohorts were taking similar amounts of narcotics preoperatively (47.2 ± 8.4 (baseline) vs. 58.8 ± 21.7 (ketamine drip) morphine milligram equivalents (MME) ($p=0.37$). The two groups did not differ in sex of patient ($p>0.99$), age at procedure ($p=0.1$), American Society of Anesthesiology Classification ($p=0.49$), or surgical approach (i.e. open, laparoscopic, robotic) ($p=0.16$). There was no difference in Transversus Abdominis Plane block use ($p=0.64$). Due to low accrual we did not compare other pain adjunct use postoperatively (i.e. IV Tylenol, ketorolac, ibuprofen). MME per 24 hours postoperatively were not different between the two groups (baseline – 52 (range 17 – 190) vs ketamine group – 146 (25 – 351) ($p=0.4$). Length of stay also was not different amongst the baseline narcotic use group and the ketamine drip group (5 days [range 2 – 36] vs 7 days [4 – 13]).

Conclusions/Discussion: In this pilot study we have yet to demonstrate a decrease in MME use postoperatively or decrease in length of stay with use of postoperative intravenous low-dose ketamine. Continued efforts to reduce the negative effects of chronic preoperative narcotic use on postoperative outcomes should be sought. Efforts to reduce narcotic use in the perioperative period may or may not mitigate the negative outcomes chronic narcotic use is associated with.

SAFETY OF OLICERIDINE, A G PROTEIN-BIASED LIGAND AT THE μ -OPIOID RECEPTOR, IN PATIENTS WITH MODERATE-TO-SEVERE ACUTE PAIN AFTER COLORECTAL SURGERY: RESULTS FROM A PHASE-3, OPEN-LABEL STUDY.

P499

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Purpose/Background: Conventional opioids are very effective analgesics, widely used to manage moderate-to-severe acute pain, but opioid-related adverse events (ORAEs), such as respiratory depression, nausea, and vomiting, may limit dose titration and hence may compromise patient analgesia. Oliceridine is a G protein-biased ligand at the μ -opioid receptor shown to provide rapid analgesia with improved safety/tolerability compared with morphine in pivotal Phase III clinical studies. The objective of this Phase III, open-label safety study (ATHENA) was to evaluate the safety and tolerability of oliceridine in patients with moderate-to-severe acute pain for which parenteral opioid therapy was warranted. The ATHENA

population included patients who underwent a representative array of surgical procedures, had a wide range of medical conditions, or were seen in the emergency department (ED).

Methods/Interventions: The study was conducted in inpatient hospitals, hospital-based EDs, outpatient hospital departments, and ambulatory surgical care centers. It included four phases: 1) screening/baseline; 2) treatment (predose and dosing periods, lasting ≤ 14 d); 3) end of treatment; and 4) follow-up. Patients with a score ≥ 4 on an 11-point numeric pain rating scale (NPRS) received intravenous oliceridine as needed. Treatment was administered via clinician-administered intravenous bolus dosing (1 to 3 mg) and/or patient-controlled analgesia (loading dose: 1.5 mg; demand dose: 0.5 mg; 6-min lockout interval). For this subset analysis, respiratory and gastrointestinal AEs were analyzed in a subgroup of colorectal surgery patients based on cumulative oliceridine dose.

Results/Outcome(s): Of 768 patients treated in the ATHENA study, 3% and 2% of patients experienced serious AEs and AEs resulting in oliceridine discontinuation, respectively, and no deaths occurred. A subset of 115 patients (15%) underwent colorectal procedures; the most commonly performed procedures were colectomy (52/115 [45%]) and sigmoidectomy (26/115 [23%]). In the colorectal surgery subset, patients were predominantly white (75%), female (53%), and overweight/obese (70%); mean (SD) age was 59.7 (12.8) years and NPRS, 6.1 (2.4). Respiratory AEs occurred in 9/115 patients (8%; Table). Nausea and vomiting were reported in 66/115 patients (57%) and 12/115 (10%), respectively; most of these gastrointestinal AEs were of mild severity. A relationship between oliceridine cumulative dose and AE prevalence was not evident for respiratory AEs or vomiting; the prevalence of nausea was higher in patients receiving cumulative doses >16 mg vs. those receiving ≤ 16 mg.

Conclusions/Discussion: In the ATHENA study, oliceridine was generally well tolerated in colorectal surgery patients with moderate-to-severe acute pain with regard to clinically relevant respiratory and gastrointestinal AEs.

Treatment-emergent respiratory and gastrointestinal adverse events (AEs) in colorectal surgery patients by cumulative oliceridine dose.

	Cumulative Oliceridine Dose (mg)					All Doses 115
	≤ 4	>4 to 8	>8 to 16	>16 to 36	>36	
Patients (all), n	8	4	15	24	64	
Respiratory AEs						
Patients with respiratory AEs (all), n (%)	0	1 (25)	1 (7)	3* (13)	4 (6)	9* (8)
Abnormal breath sounds	0	0	0	1 (4)	0	1 (1)
Dyspnea	0	1 (25)	0	2 (8)	2 (3)	5 (4)
Hypoxia	0	0	0	1 (4)	0	1 (1)
Decreased O ₂ saturation	0	0	1 (7)	0	2 (3)	3 (3)
Respiratory failure	0	0	0	1 (4)	0	1 (1)
Gastrointestinal AEs						
Patients with nausea (all), n (%)	1 (13)	1 (25)	5 (33)	16 (67)	43 (67)	66 (57)
Mild	0	1 (25)	4 (27)	14 (58)	31 (48)	50 (43)
Moderate	1 (13)	0	1 (7)	2 (8)	12 (19)	16 (14)
Severe	0	0	0	0	0	0
Patients with vomiting (all), n (%)	1 (13)	0	2 (13)	1 (4)	8 (13)	12 (10)
Mild	0	0	0	1 (4)	7 (11)	8 (7)
Moderate	0	0	2 (13)	0	1 (2)	3 (3)
Severe	1 (13)	0	0	0	0	1 (1)

*Some patients had multiple respiratory AEs.

PREOPERATIVE ORAL IMMUNONUTRITIONAL SUPPLEMENTATION IMPROVES OUTCOMES IN PATIENTS UNDERGOING MAJOR COLORECTAL PROCEDURES.

P500

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Purpose/Background: While malnutrition and sarcopenia are known risk factors for postoperative morbidity, they can be difficult to recognize, assess, and quantify, unless there is significant preoperative weight loss. Some studies have demonstrated improved outcomes with preoperative oral nutritional supplementation in patients with colorectal cancer. The aim of this study was to assess the impact of preoperative oral immunonutritional supplementation on immediate postoperative outcomes among patients undergoing major colorectal procedures.

Methods/Interventions: This was a single institution retrospective cohort study including all patients who underwent a major colorectal procedure over a 15-month period. During this time, a proportion of patients received preoperative oral nutrition supplementation (Impact®, Nestle Health Science) for 5 days, at physician discretion. This subgroup was compared to those who did not receive oral nutritional supplementation during the same time period. Data were collected from a prospectively maintained database and electronic medical records and were analyzed using SPSS. A p value of ≤ 0.05 was taken as significant.

Results/Outcome(s): Between June 2015 and Aug 2016, 235 patients were included, 112 receiving oral nutritional supplementation and 123 without. Baseline characteristics including age, sex, BMI, ASA, albumin and operative approach were similar in both groups. There was no difference in surgical site infections (8% vs. 6.5%, $p=0.667$) but a non-significant decrease in overall complications (17.7% vs. 23.6%, $p=0.281$) in patients receiving immunonutritional supplementation. There was one anastomotic leak in the supplementation group and 2 in the control group. The length of hospital stay was significantly shorter in the supplementation group (5.3 vs. 7 days, $p=0.049$).

Conclusions/Discussion: Preoperative nutritional supplementation decreases length of stay in patients undergoing major colorectal procedures. We demonstrated a non-significant decrease in complications with nutritional supplementation, and further large-scale studies are required to assess this relationship.

ALVIMOPAN SIGNIFICANTLY REDUCES LENGTH OF STAY AND COSTS FOLLOWING COLORECTAL RESECTION AND OSTOMY REVERSAL EVEN WITHIN AN ENHANCED RECOVERY PROTOCOL.

P501

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Purpose/Background: Alvimopan (Entereg®) is a peripherally acting mu-opioid antagonist that has been shown to accelerate gastrointestinal recovery after colorectal surgery and is approved for prevention of postoperative ileus. Data on real world cost-effectiveness have been mixed, particularly in the context of enhanced recovery after surgery (ERAS) protocols.

Methods/Interventions: Data for all patients undergoing elective colorectal resection or ostomy reversal under a standardized perioperative ERAS protocol at an academic medical center from June 2015-July 2017 were obtained from a prospectively maintained database. Baseline characteristics and outcomes of the groups before and after the addition of alvimopan to the treatment protocol in June 2016 were compared using chi-squared tests and t-tests as appropriate. Multivariable logistic analysis was used to assess risk of prolonged length of stay, which was defined as >75th percentile for each procedural category.

Results/Outcome(s): Five hundred seventeen patients (median age 60, 50% male, 13% black, 26% Latino) underwent colorectal resection, while 119 underwent ostomy takedown; a total of 286 patients (45%) received alvimopan. Alvimopan and no-alvimopan groups had similar demographics, comorbidities, indication for operation, and case-mix. In the alvimopan group, more of the colorectal resections were laparoscopic (87% vs. 79%, $p=0.015$). LOS was reduced with alvimopan (6.2 vs 4.9 days, $p=0.003$). Prolonged LOS was more frequent with no-alvimopan (23.1 vs 14.7%, $p=0.007$), as was ileus (16.2 vs 10.8%, $p=0.05$). On multivariable analysis controlling for procedure type and laparoscopic versus open approach, no alvimopan use (OR 1.9, 95% CI 1.2-2.9), ASA ≥ 3 (OR 2.2, 95% CI 1.4-3.3) and history of cardiac surgery (OR 2.6, 95% CI 1.1-6.2) were significant predictors of prolonged length of stay. There was no increase in adverse outcomes with alvimopan use. Alvimopan was associated with a lower risk of infectious complications other than surgical site infection (2.8 vs 6.7%, $p = 0.025$). Combining estimated alvimopan and hospital costs, the addition of alvimopan to the protocol resulted in cost savings of \$1211.74 per patient.

Conclusions/Discussion: The introduction of alvimopan to a postoperative protocol following elective colorectal resection or ostomy reversal significantly reduces length of stay and is associated with cost savings even within an ERAS protocol.

ROBOTIC COLORECTAL SURGERY IN THE ELDERLY: A PROMISING OPTION.

P502

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Purpose/Background: The use of a robotic platform continues to increase in the field of colon and rectal surgery. The adoption of this technique has exceeded solely the ideal surgical candidate and has now been implemented in higher risk cohorts. As the American population ages, we aim to evaluate the current trends and outcomes of a robotic operative approach in the elderly.

Methods/Interventions: This a retrospective review of the Nationwide Inpatient Sample (NIS) from 2006-2013. All cases were restricted to age ≥ 70 -year-old. ICD-9-CM procedural coding was utilized to identify all cases of colectomy (to include partial, subtotal, and total) and proctectomy provided by the database (48.62, 48.63, 48.64, 48.69, 45.72, 45.75, 45.71, 45.73, 45.76, 45.72, 45.8, 45.74, 48.50, 48.51, 48.52, and 48.59). Patients were categorized based on designation codes for a robotic (17.41, 17.42, or 17.49) and laparoscopic (54.21) procedure when applicable (i.e. if not already specified by the above ICD-9-CM coding). Demographics, comorbidities, and postoperative outcomes were analyzed, and a comparative analysis between groups was performed.

Results/Outcome(s): We identified 58,831 cases to include: 51,368 open, 6,955 laparoscopic, and 508 robotic colorectal procedures. The volume of open operations performed has decreased over time from 9,334 cases in 2006 to 4,021 in 2013. Robotic procedures, on the other hand, have increased from zero recorded operations in 2006 to 218 cases collected in 2013. The median age was 77-years-old (Interquartile Range 73-81). The majority of patients in all groups were Caucasian (70%) and female (56%). Significantly more robotic cases were performed at urban teaching hospitals (65%) (versus urban non-teaching and rural hospitals) when compared with laparoscopic (51%; $p<0.01$) and open (43%; $p<0.01$) groups. Patients undergoing a robotic procedure had a lower mean Elixhauser Index (4.4) when compared to the open group (6.1; $p<0.01$); however, there was no significant difference when compared to the laparoscopic group (5; $p=0.08$). Robotic cases were associated with an overall reduced risk of postoperative complications when compared to an open and laparoscopic approach ($p<0.01$). This was specifically evident when evaluating both pulmonary and gastrointestinal outcomes ($p<0.05$) (FIGURE 1).

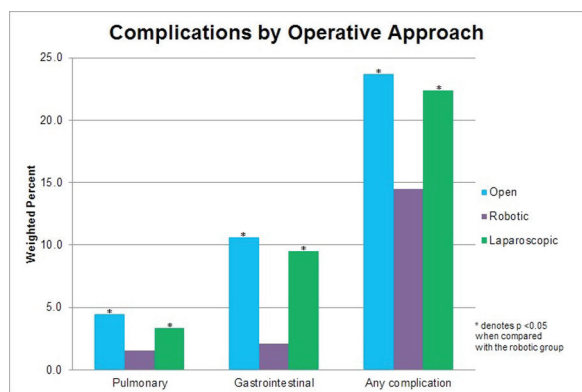
Conclusions/Discussion: These results represent the largest analysis to date of robotic colon and/or rectal resections in the elderly. Robotic colorectal surgery is gaining popularity with the majority of cases still performed in urban teaching centers. Patients receiving a robotic operation were associated with a reduced risk of postoperative

P501 Patient characteristics and outcomes by treatment group

	No alvimopan (N=350) N(%) / median(IQR)	Alvimopan (N=286) N(%) / median(IQR)	P-value
Baseline characteristics			
Age median (IQR)	60 (51-69)	60 (49-71)	NS
Sex (male)	167 (47.7)	148 (51.7)	NS
Race	-	-	NS
Black	30 (11.9)	25 (15.0)	
White	217 (85.8)	133 (79.6)	
Other	6 (2.4)	9 (5.4)	
Ethnicity (Latino)	71 (24.2)	53 (28.0)	NS
Primary diagnosis	-	-	NS
Cancer	152 (43.4)	115 (40.2)	
IBD	43 (12.3)	27 (9.4)	
Diverticular	69 (19.7)	73 (25.5)	
other	86 (24.6)	71 (24.8)	
Procedure	-	-	NS
Right colectomy	86 (24.6)	59 (20.6)	
Left colectomy	82 (23.4)	94 (32.9)	
Partial colectomy, other	9 (2.6)	7 (2.4)	
LAR	66 (18.9)	42 (14.7)	
APR	13 (3.7)	8 (2.8)	
Total/subtotal	28 (8.0)	23 (8.0)	
Ostomy takedown	66 (18.9)	53 (18.5)	
Laparoscopic colectomy	224 (78.9)	202 (86.7)	0.015
Current smoker	22 (6.4)	18 (6.3)	NS
COPD	15 (4.3)	10 (3.5)	NS
Hypertension	135 (38.7)	122 (43.0)	
Diabetes	66 (18.9)	52 (18.2)	
Hypercoaguability	15 (4.3)	10 (3.5)	
Chronic steroid use	18 (5.2)	11 (3.9)	NS
H/o abdominal procedure	212 (61.1)	181 (63.5)	NS
H/o transplant	7 (2.1)	11 (3.9)	
Preop WBC >11 (X10 ³ /μL)	11 (5)	7 (7.1)	NS
Preop hemoglobin <9 (g/dL)	8 (3.6)	4 (4.0)	
Outcomes			
LOS median (IQR)	5 (3-7)	4 (3-5)	<0.001
Prolonged length of stay	81 (23.1)	42 (14.7)	0.007
Ileus	56 (16.2)	31 (10.8)	0.05
Surgical site infection	25 (7.3)	19 (6.6)	NS
Anastomotic leak	8 (2.3)	8 (2.8)	NS
Renal failure	2 (0.6)	1 (0.3)	NS
Arrhythmia	11 (3.2)	9 (3.1)	NS
Venous thromboembolism	1 (0.3)	1 (0.3)	NS
Urinary retention	17 (4.9)	11 (3.8)	NS
Myocardial infarction	1 (0.3)	0	NS
Infection other than SSI	23 (6.7)	8 (2.8)	0.025
Readmission	43 (12.3)	39 (13.9)	NS
Reintubation	10 (2.9)	6 (2.1)	NS
Reoperation	20 (5.8)	14 (4.9)	NS

IQR: interquartile range; IBD: inflammatory bowel disease; LAR: low anterior resection; APR: abdominoperineal resection; COPD: chronic obstructive pulmonary disease; h/o: history of; preop: preoperative; WBC: white blood cell count; LOS: length of stay; SSI: surgical site infection.

complications. These findings support the safety and efficacy of this approach in the elderly population.



Procedures include colectomy (partial, subtotal, and total) and proctectomy

SALVAGE SURGERY FOR FAILED COLORECTAL OR COLOANAL ANASTOMOSIS AFTER TOTAL MESORECTAL EXCISION FOR RECTAL CANCER: A RETROSPECTIVE ANALYSIS OF 51 PATIENTS.

P503

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Purpose/Background: Colorectal and coloanal anastomoses are associated with 10%-15% of anastomotic failures. Salvage surgery may entail redo anastomosis and/or stoma. This study aimed to report our experience with salvage surgery for failed colorectal or coloanal anastomosis, with focus on operative findings and postoperative outcomes.

Methods/Interventions: A prospectively maintained IRB-approved institutional database was queried for all consecutive patients who underwent salvage surgery for failed colorectal or coloanal anastomosis between 2010-2017. Salvage surgery was defined as one of three options: 1) trans-anal/trans-abdominal attempts at rescuing the anastomosis; 2) resection and redo anastomosis; 3) abdominoperineal resection.

Results/Outcome(s): Fifty-one patients were included in the study [31 males; median age at redo surgery: 58 (36-80) years]. Thirty-two patients were referred and 19 had their index proctectomy at our institution; 15 patients were not diverted during index operation. Indications for surgery were abscess (n=18), sinus (n=25, and stricture (n=17). Forty patients (78%) had history of neo-adjuvant pelvic radiation. At the time of index operation, high ligation of the inferior mesenteric vein (IMV) and inferior mesenteric artery (IMA) was performed in 12 patients (23%) and 11 (21%), respectively, and splenic flexure mobilization in 14 (27%). Salvage surgery was approached via laparoscopy (n=9), hand assisted surgery (n=3)

open surgery (n=37), or trans-anally (n=2). Procedures performed were abdominoperineal resection (n=18), resection and redo anastomosis (n=26), laparoscopic diversion (n=4), laparoscopic repair/resection of efferent limb of colonic J pouch (n=2), trans-anal repair (n=1). The 26 patients in whom a redo anastomosis was performed were all diverted with loop ileostomy and 23 underwent hand-sewn anastomosis. Five synchronous resections [seminal vesicle (n=2), prostate (n=1), and bladder (n=1)] were required in 3 patients. Estimated blood loss was 415±365 ml and mean operative time was 357±129 minutes. Final pathology revealed malignancy in two patients. Four of 26 patients (15%) who underwent redo anastomosis suffered anastomotic leak. Other complications included urinary tract infection in 5, ileus in 11, deep vein thrombosis in 2, superficial surgical site infection in 7, and pulmonary embolism in 1. After a 35-month mean follow up, 30 patients (58%) had ileostomy or colostomy.

Conclusions/Discussion: Most patients referred for salvage surgery for a failed colorectal/coloanal anastomosis did not undergo splenic flexure mobilization or high ligation of the IMA or IMV at the time of index operation. Salvage surgery results in high rates of abdominoperineal resection and considerable complication rates. These data support the importance of splenic flexure mobilization and high IMA and IMV ligation in an effort to avoid permanent stoma.

THE UTILITY OF THE DELPHI PROCESS IN DEFINING ANASTOMOTIC LEAK FOLLOWING COLORECTAL SURGERY.

P504

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Purpose/Background: Anastomotic leaks are often used as an indicator of the quality of colorectal surgical care provided. However, almost a decade after guidelines defining anastomotic leak were published (Rahbari NN, et al. Surgery 2010), little is known about how surgeons follow these standards. The aim of this study was to assess the degree of consensus of the definition of anastomotic leaks following colorectal surgery among a national expert panel.

Methods/Interventions: A 3-round modified Delphi study was conducted among a national panel of 8 colorectal surgeon experts representing 8 academic health centers from all US regions. The national panel was selected based on their academic interest and expertise. In round 1, clinical and radiological scenarios were generated by systematic literature review and the expert panel. In rounds 2 and 3, experts rated their agreement with the use of a 5-point scale. Consensus was defined when a scenario was rated as very important or absolutely essential by at least 85% of the experts in round 3.

Results/Outcome(s): Seven clinical and radiological scenarios of anastomotic leaks following colorectal surgery achieved consensus by the expert panel (Table 1). Clinical scenarios reaching consensus included patients with “fecal matter from the wound” and “an intense inflammatory reaction and free fluid at the time of re-exploration.” Radiological scenarios reaching consensus included CT with PO/IV/PR contrast demonstrating “extravasation of contrast outside the intestine lumen near the anastomosis” and “air bubbles around the anastomosis.” No consensus was achieved on 7 of 10 radiological scenarios including a patient with a “CT with PO/IV/PR contrast that demonstrated a fluid collection near the anastomosis but without contrast outside the intestinal lumen” who was treated with antibiotics solely or antibiotics with percutaneous drainage.

Conclusions/Discussion: Consensus on the definition of anastomotic leak is difficult to reach, in relation to international guidelines, as well as in relation to following the Delphi process. Challenges span both clinical and radiological parameters. These findings suggest further refinement of the definition of anastomotic leak is needed to track and compare patient outcomes following colorectal surgery.

P504 Expert Panel Agreement on Clinical and Radiological Scenarios of Anastomotic Leak following Colorectal Surgery

SCENARIOS	% AGREEMENT
CONSENSUS	
CLINICAL	
Fecal matter from wound on postoperative day 12 following laparoscopic sigmoidectomy	88%
Fecal matter from wound on postoperative day 35 following laparoscopic low anterior resection	88%
Intense inflammatory reaction and free fluid at re-exploration on postoperative day 12 following laparoscopic sigmoidectomy	88%
Intense inflammatory reaction and free fluid at re-exploration on postoperative day 35 following laparoscopic low anterior resection	88%
RADIOLOGICAL	
CT A/P with PO/IV/PR contrast: Extravasation of contrast outside intestinal lumen near anastomosis on postoperative day 12 following laparoscopic sigmoidectomy	88%
CT A/P with PO/IV/PR contrast: Extravasation of contrast outside intestinal lumen near anastomosis on postoperative day 35 following laparoscopic low anterior resection	88%
CT A/P with PO/IV/PR contrast: Air bubbles around the anastomosis on postoperative day 35 following laparoscopic low anterior resection	88%
NO CONSENSUS	
CLINICAL	
Endoscopy is necessary to demonstrate an anastomotic leak	0%
RADIOLOGICAL	
CT A/P with PO/IV/Rectal contrast: Fluid collection near the anastomosis but without contrast outside the intestinal lumen and treated with antibiotics on postoperative day 12 following laparoscopic sigmoidectomy	38%
CT A/P with PO/IV/Rectal contrast: Fluid collection near the anastomosis but without contrast outside the intestinal lumen and treated with antibiotics and percutaneous drainage on postoperative day 12 following laparoscopic sigmoidectomy	25%
CT A/P with PO/IV/Rectal contrast: Fluid collection near the anastomosis but without contrast outside the intestinal lumen and treated with antibiotics on postoperative day 35 following laparoscopic low anterior resection	13%
CT A/P with PO/IV/Rectal contrast: Fluid collection near the anastomosis but without contrast outside the intestinal lumen and treated with antibiotics and percutaneous drainage on postoperative day 35 following laparoscopic low anterior resection	25%
Contrast enema is necessary to demonstrate an anastomotic leak	63%
CT A/P with rectal contrast is necessary to demonstrate an anastomotic leak	75%
CT A/P without rectal contrast is necessary to demonstrate an anastomotic leak	25%

COLORECTAL INFECTIONS AND BUNDLE BLOCK: WHEN BUNDLES ARE NOT THE ANSWER.

P505

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Purpose/Background: University of New Mexico Hospital is a 500 bed tertiary hospital and Level I trauma center. We have participated in the essentials module of NSQIP from August 2015 and were identified as an outlier for surgical site infections (SSI). Colorectal cases were found to contribute largely to our rate of SSI. A gap analysis was performed and a colorectal bundle instituted. Compliance was monitored for each element of the bundle.

Methods/Interventions: We performed a retrospective chart review of 100 colon resection cases from April to October 2017. Both emergent and elective, malignant and non-malignant cases were included in the review. Only index cases were evaluated; additional operations on the same patient were not reviewed. Each element of the colorectal bundle at UNM was tracked for each case, as well as ostomy creation, surgical wound contamination class, and infection in the first 30 days post-operatively.

Results/Outcome(s): Frequencies and percentages were used to summarize data for individual elements of the colorectal bundle. Means and standard deviations were computed for continuous scales. The superficial surgical infection rate was 4% (n=4). 79% of cases did not develop a post-operative surgical infection. The total number of infections was 21% (n=21). The number of organ space infections was 15% (n=15). 73% of these infections were elective cases.

Conclusions/Discussion: It is well described that colorectal bundles are effective at reducing superficial infections. The unexpected pattern of organ space infection coupled with compliance with bundle elements has led us to examine other factors at our institution. Along with an external review of our Sterile Processing Department and updating operating room cleaning procedures, we have created a templated approach to review the following surgeon factors: Indication for surgery, adequate pre-operative patient optimization, intraoperative judgment and technique, and optimal post-operative management. These factors will be evaluated using binary answers to each question along with a narrative, housed on a secure drive as part of our institution's patient safety product, and the subject of an ongoing trend analysis to inform future investigations.

PRIMARY ANASTOMOSIS VERSUS NONRESTORATIVE COLONIC RESECTION FOR PERFORATED DIVERTICULITIS WITH PERITONITIS: A PATIENT-LEVEL POOLED ANALYSIS OF RANDOMIZED TRIALS.

P506

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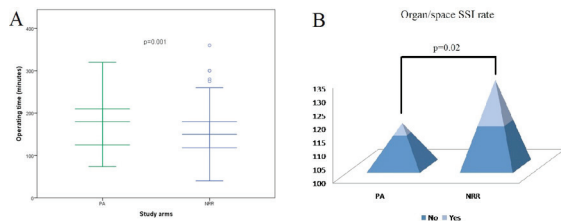
Purpose/Background: The aim of this pooled analysis was to overcome power limitations of previously published underpowered randomized control trials (RCTs) allowing definitive conclusions regarding adverse event rates following primary anastomosis (PA) and nonrestorative resection (NRR).

Methods/Interventions: A pooled analysis of 254 individual patient-level data from three RCTs (NCT01239927; NCT01233713; NCT00692393) was carried out. Perforated diverticulitis with peritonitis was classified as Hinchey III if purulent and Hinchey IV if fecal. Mannheim peritonitis index (MPI) was used for severity scoring of the peritonitis. PA was defined as left colonic resection, anastomosis with loop ileostomy, whereas NRR was left colonic resection with end colostomy. Primary endpoints were 30-day complication and mortality rates after emergency resection and stoma reversal. Secondary endpoints were operating time, length of hospital stay, and non-reversed ostomy rates. Surgical site infection (SSI) was defined by the Centers for Disease Control National Nosocomial Infections Surveillance. Independent continuous variables were compared using t-test, whereas categorical variables using Chi-square test.

Results/Outcome(s): There were 116 PA patients and 138 NRR patients. The study arms were comparable for age (65.2±14.3 vs. 66.3±14.1 years; p=0.55), body mass index (27.5±5.3 vs. 28.0±5.4 kg/m²; p=0.65), pre-existing co-morbidities (p=0.55), American Society of Anesthesiologists score (p=0.78), pre-hospital duration of symptoms (37 vs. 44 hrs, p=0.42), and MPI (12.6±5.3 vs. 13.4±5.3; p=0.92) except for gender (62:54 vs. 59:79; p<0.001). 14.4% of PA and 17.4% NRR patients had Hinchey IV diverticulitis (p=0.24). Operating time was significantly longer in PA patients (174.5±53.4 vs. 150.3±55.6 min; p=0.001) (Figure 1A). ICU stay (2.8±5.8 vs. 2.3±8.4 days; p=0.69) and length of hospital stay (15.8±11.1 vs. 15.7±11.8 days; p=0.92) did not differ. Complication rates (50.8% vs. 48.5%; p=0.76) and mortality rates (4.3% vs. 7.9%; p=0.23) after emergency resection did not differ. Incisional SSI rates (24.1% vs. 25.4%; p=0.82) and wound disruption rates (3.4% vs. 4.3%; p=0.71) were similar. Organ-space SSI rate was significantly lower in PA patients (3.4% vs. 11.6%; p=0.02) (Figure 1B). Complications at 30 days after stoma reversal were significantly fewer in PA patients (13.7% vs.

25.6%; $p=0.05$), whereas mortality did not differ (0% vs. 1.2%; $p=0.51$). Non-reversed stoma rates were significantly lower in PA patients (14.6% vs. 36.2%; $p<0.001$).

Conclusions/Discussion: This patient-level pooled analysis showed that, despite longer operating time, PA for Hinchey III or IV diverticulitis was associated with decreased organ-space SSI rates after emergency resection, reduced non-reversed stoma rates, and lower complication rates at 30 days after stoma reversal.



EARLY REMOVAL OF URINARY CATHETERS IN PATIENTS UNDERGOING AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL WITH INTRATHECAL SPINAL INJECTION DOES NOT AFFECT POST-OPERATIVE URINARY COMPLICATIONS.

P507

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Purpose/Background: Current American Society of Colon and Rectal Surgeons (ASCRS) ERAS clinical practice guidelines for post-operative urinary catheter use are primarily based on patients with epidural catheters. Our aim was to investigate the effect of early removal of urinary catheters on post-operative urinary retention (POUR) and urinary tract infection (UTI) rates in patients undergoing an ERAS pathway with a single pre-operative intrathecal spinal injection.

Methods/Interventions: Using a single-institution colorectal database, we identified all patients who underwent ERAS protocol in 2015 and 2016 and non-ERAS patients from 2012-2014. Patient/procedure-specific characteristics were obtained. Patients that underwent ERAS protocol but did not undergo an intrathecal spinal injection were excluded. The primary outcome was the 30-day POUR rate and secondary outcome was 30-day post-operative UTI rate. Non-ERAS and ERAS patients were each stratified by 30-day POUR and UTI rates and univariate and bivariate comparison were made. Multivariate regression was used to identify independent predictors of POUR and UTI for each cohort.

Results/Outcome(s): Of 860 patients, 40.8% underwent the ERAS protocol. 85.7% of the ERAS patients had the urinary catheter removed on post-operative day 1 (POD1). Mean time to foley removal in ERAS vs.

non-ERAS patients was significantly different (1.36 vs. 2.2 days, $p<0.01$). ERAS patients underwent more laparoscopic or robotic procedures (41.3 vs. 38.5%, 26.5 vs. 7.1%). The overall POUR rate of ERAS patients compared to non-ERAS patients was significantly less: (8.2% vs. 12.9%, $p<0.05$). UTI rates were not significantly different between pre-ERAS and ERAS patients (1.2 vs. 2.3%, $p=0.19$). On multivariate analysis, overall predictors for POUR included age (OR 1.03 CI 1.01-1.04, $p<0.05$) and male gender (OR 1.8 CI 1.1-2.9, $p<0.05$). On a subgroup analysis of patients undergoing pelvic operations, urinary catheters were removed on POD 1 for 75.0 vs. 37.8% ($p<0.01$) of ERAS vs. non-ERAS patients respectively. In these patients with pelvic operations, there was no significant difference between ERAS vs. non-ERAS patients in POUR (11.32 vs. 12.5%, $p=0.71$) or UTI rates (1.9 vs. 1.7%, $p=0.88$).

Conclusions/Discussion: For patients undergoing ERAS with a pre-operative intrathecal injection, early post-operative removal of a urinary catheter decreased urinary retention and did not significantly affect UTI rates. Furthermore, POUR and UTI rates did not appear to be significantly different in patients undergoing low pelvic operations. These findings support safe removal of urinary catheters on POD1 after an intrathecal injection with an ERAS protocol after colorectal surgery.

LAPAROSCOPIC APPROACH IS ASSOCIATED WITH IMPROVED 30-DAY OUTCOMES FOR COLONIC J-POUCH.

P508

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New Orleans, LA

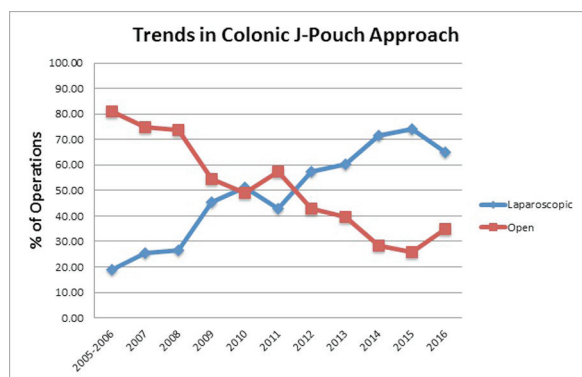
Purpose/Background: Establishment of bowel continuity and normal bowel function following low rectal surgery is a challenge in colorectal surgery. Straight end-to-end coloanal anastomosis, which replaces the removed rectum with less compliant colon, has been shown to often result in abnormal function. One proposed solution is the creation of a colonic J-pouch reservoir. Laparoscopic and other minimally invasive approaches have become a mainstay of colorectal surgery. Laparoscopic approaches have been shown to reduce length of stay, blood loss, and infectious complications in various colorectal operations, including restorative proctocolectomy. Here we aim to show that the laparoscopic approach to proctectomy with colonic-J pouch anastomosis results in fewer infectious complications than open surgery.

Methods/Interventions: Patients undergoing non-emergent open or laparoscopic proctectomy with colonic J-pouch creation (CPT codes 45119, 45397) included in the 2005-2016 databases from the American College of Surgeons National Surgical Quality Improvement Program

(ACS-NSQIP) were analyzed. Patients were excluded if they were not functionally independent or for bleeding disorders, ventilator dependence at the time of surgery, or known infection at the time of surgery. Statistical analysis was performed to determine the association between operative approach and 30-day post procedural outcomes.

Results/Outcome(s): 1930 women mean age (51.82 ± 15) and 2515 men age (52.84 ± 15) ($p = 0.03$) were included. 2580 underwent laparoscopic surgery and 1893 underwent open surgery. Laparoscopic surgery took longer (296.26 vs 258.61 minutes, $p < 0.0001$) but resulted in shorter length of stay (6.36 vs 7.82 days, $p < 0.0001$). Compared to open cases, laparoscopic proctectomy with colonic J-pouch were more likely to be discharged home (77.02% vs 51.29%). Laparoscopic surgery was also associated with less superficial surgical site infection (SSI) (2.60% vs 9.40% , $p = 0.0001$), deep SSI (1.01% vs 1.74% , $p = 0.0332$), wound dehiscence (0.58% vs 1.27% , $p = 0.0147$), pneumonia (0.78% vs 1.43% , $p = 0.0349$), urinary tract infection (2.91% vs 4.28% , $p = 0.0135$) post-operative renal insufficiency (1.32 vs 2.11 , $p = 0.0394$), myocardial infarction (0.12% vs 0.48% , $p = 0.0218$), and bleeding requiring transfusion (4.30% vs 7.66% , $p < 0.0001$). Patients undergoing laparoscopic surgery were also less likely to have unplanned returns to the operating room (6.24% vs 4.86% , $p = 0.0484$). Analysis by year shows an overall decrease in open colonic J-pouch surgery with an associated increase in laparoscopic surgery (Figure 1).

Conclusions/Discussion: As expected laparoscopic colonic J-pouch surgery takes longer to perform but is associated with shorter hospital stay, lower rates of many infectious complications, fewer myocardial infarctions, less major postoperative bleeding, and fewer unplanned reoperations. NSQIP data shows an increase in laparoscopic approach to this procedure over the past 10 years.



ROBOTIC TOTAL MESORECTAL EXCISION OPTIMIZES THE PATHOLOGIC OUTCOME IN OVERWEIGHT MALES WITH LOW RECTAL CANCER. A ANALYSIS OF 836 CASES.

P509

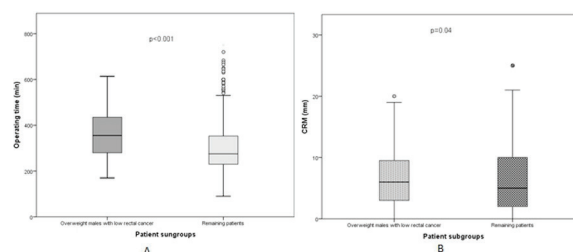
A. Chudner, M. Gachabayov, A. Dyatlov, H. Lee, R. Bergamaschi
Valhalla, NY

Purpose/Background: It is known that the fulcrum effect of non-articulating laparoscopic instruments may lead to coning in android pelvis, whereas articulating robotic instruments may have a beneficial impact on the circumferential resection margin (CRM). There is a concern that the robot's lack of tactile feedback may decrease the quality of total mesorectal excision (TME). The aim of this study was to determine whether robotic TME optimizes CRM and the quality of TME in overweight males with low rectal cancer.

Methods/Interventions: Individual data of robotic TME for rectal cancer performed by 6 surgeons were pooled. Males with BMI over 25 kg/m^2 with rectal cancer within 6 cm from anal verge were compared to their counterparts. CRM involvement was defined by pathologists as $< 1 \text{ mm}$, whereas TME quality was assessed macroscopically and categorized as complete, nearly-complete and incomplete. Student's t and Chi-squared tests were used to compare continuous and categorical variables. Multivariate logistic regression was performed to determine independent predictors of CRM involvement.

Results/Outcome(s): 106 overweight males with low rectal cancer were comparable to 730 remaining patients for age ($p=0.14$), ASA score ($p=0.07$), co-morbidities ($p=0.09$). Operating time was significantly longer (362 vs. 301 min; $p<0.001$). CRM was significantly narrower ($6.6 \pm 4.8 \text{ mm}$ vs. $7.7 \pm 8.9 \text{ mm}$; $p=0.04$), whereas TME quality did not differ ($86.25\%:8.75\%:3.7\%$ vs. $88.5\%:9.2\%:2.8\%$; $p=0.67$). CRM involvement in overweight males with low rectal cancer did not differ (7.5% vs. 5.5% ; $p=0.39$). Being overweight male with low rectal cancer was not an independent predictor of CRM involvement at multivariate logistic regression ($p=0.064$).

Conclusions/Discussion: This study suggests that robotic TME may optimize the oncological outcome in overweight males with low rectal cancer.



**PERINEAL WOUND COMPLICATIONS
AFTER INITIATION OF CLOSED INCISION
NEGATIVE PRESSURE THERAPY IN PATIENTS
UNDERGOING APR: A COMPARATIVE STUDY.**

P510

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Purpose/Background: Perineal wound complications following APR is a common occurrence and continues to be a significant challenge after surgery. Studies cite perineal wound complication rates anywhere from 14% up to 60% of cases. International multidisciplinary consensus recommendations published in the International Wound Journal

in May 2016 recommended that surgeons should consider CiNPT for high risk patients and procedures. Colorectal procedures especially APR are among the surgical interventions with the highest wound complication rates. These are associated with prolonged length of stay, increased re-admission and re-operation rates with reduced quality of life. Since its introduction in 1997 a growing body of literature has reported the benefits of CiNPT over closed surgical incisions to reduce complications, however to our knowledge there is very limited data which investigates the effect of CiNPT on perineal wound complications. The aim of our study is to compare the incidence of perineal wound complications in patients managed with CiNPT and patients managed with conventional care following APR.

P510

Patient characteristics	Control (n14)	CiNPWT (n16)	P- VALUE
Mean age in years	67.64	58.93	.287
Gender			.4005
Male	9	6	
Female	5	10	
Mean BMI Kg/m2	27.9	26.58	.2347
Mean albumin g/dl	3.07	3.11	.0578
Smokers			.0376
No	4	7	
Yes	4	4	
Former	6	5	
Diabetes			.0525
No	10	15	
Yes	4	1	
ASA			.7476
1	0	0	
2	2	4	
3	12	8	
4	0	4	
Steroid use			.5783
Yes	2	4	
No	12	12	
Indication			.4015
Adenocarcinoma of rectum	9	9	
Inflammatory bowel disease	2	4	
Others	3	3	
Perineal wound complications(n)	9	8	.0437
Males	5	2	
Females	4	6	
Minimally invasive surgery (n)	4	7	.2564
Laparoscopic assisted	2	2	
Laparoscopic	1	3	
Robotic	1	2	
Drain	6	7	.9960

Methods/Interventions: Institutional review board approval was obtained. A prospectively maintained database from November 2012 was queried. We performed a retrospective chart review of patients who have undergone APR. All surgeries were performed by one surgeon. Thirty patients were identified and divided into two groups, those managed with CiNPT and those managed with conventional care.

Results/Outcome(s): Incidence of wound complications in our study was 56.6%. Patients with CiNPT had a 50% (8/16) wound complication rate while the control group had 64.2% (9/14) respectively. This was not statistically significant however wound complications in CiNPT were less severe. None of these patients required readmission or reoperation and only three required management with conventional wound VAC. All wounds had closed at 3 month follow up. This was in contrast to control group; in this group one patient required flap reconstruction after infection was controlled and seven required management with conventional wound VAC. Three patients continued to have open wound at 3 months and one patient required wound care for 6 months.

Conclusions/Discussion: Although our study failed to show a statistically significant reduction in perineal wound complications with use of CiNPT it did confirm that CiNPT decreases the severity of wound complications following APR. With the inclusion of multiple variables it is not surprising that our statistical data was conflicting. The ease of application and the overall reduction in severity of perineal wound complications may offer an option for perineal wound management following APR and possibly obviate the need for more expensive therapies. Further prospective controlled trials are required to effectively study the efficacy of CiNPT.

COLECTOMY AND URINARY RETENTION: WHAT'S THE HOLD UP?

P511

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Purpose/Background: Urinary catheterization for bladder decompression is standard practice in colorectal operations. There are no current guidelines for the exact timing of post-operative catheter removal. Premature catheter removal can result in urinary retention (UR), and establishing a balance between the risks and benefits of early catheter removal remains a challenge. Our objective was to study the risk factors leading to urinary retention in patients undergoing colectomy, and its impact on length of stay (LOS) and cost.

Methods/Interventions: Utilizing the 2008-2014 National Inpatient Sample (NIS) database, we identified patients who underwent removal of the rectum ("rectum", 48.0, 48.4X-48.6X), partial colectomy ("partial", 45.7X and 17.3X), and total colectomy ("total", 45.8X) using ICD-9-CM codes. Patients were first stratified based on procedure, then stratified into 2 groups based on UR (788.20). Univariate analysis was performed for 8 different factors: age, sex, laparoscopic, race, benign prostate hyper trophy (BPH), chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), and neurological disease (ND), and 2 outcomes: LOS and cost. Logistic regression was used to identify factors that changed the odds of UR occurrence. Linear regression was performed on the 2 outcomes to determine the impact of UR while adjusting for age, sex, laparoscopic, and race.

Results/Outcome(s): Urinary retention was present in 3,448 out of 73,965 (4.7%) patients for the rectum group, 10,164 of 362,999 (2.8%) patients for the partial group, and 463 of 14,640 (3.2%) patients for the total group. Annual trends for UR rates (Figure 1a), LOS (Figure 1b), and cost (Figure 1c) were plotted. Patients with UR were older males that underwent a laparoscopic procedure. Race was only a significant factor for the partial colectomy patients, where Black and Hispanic had lower odds of UR compared to Caucasian. A summary of the logistic regression on UR can be found in Figure 1d: in the rectum group, COPD (aOR=1.15, p=0.006) and CKD (aOR=1.20, p=0.024) were significant, the partial group, COPD (aOR=1.11, p<0.001), CKD (aOR=1.15, p<0.001), and ND (aOR=1.16, p=0.012) were significant, and the total group, only ND (aOR=1.99, p=0.002) was significant after adjusting for age, sex, laparoscopic, and race. UR significantly increased LOS by 1.2 days (p<0.001) for the rectum group, 1.0 days (p<0.001) for the partial group, and 1.3 days (p=0.003) for the total group. UR significantly increased cost by \$2,129 (p<0.001) for the rectum group and \$1,277 (p<0.001) for the partial group, but did not significantly increase cost for the total group.

Conclusions/Discussion: Based on the review of the NIS database, UR has been increasing in prevalence. Pre-existing conditions of COPD, CKD, and ND may have a significant impact on UR rates depending on the type of procedure performed. UR significantly increased LOS for all 3 groups, and had associated increase in cost for rectum and partial groups.

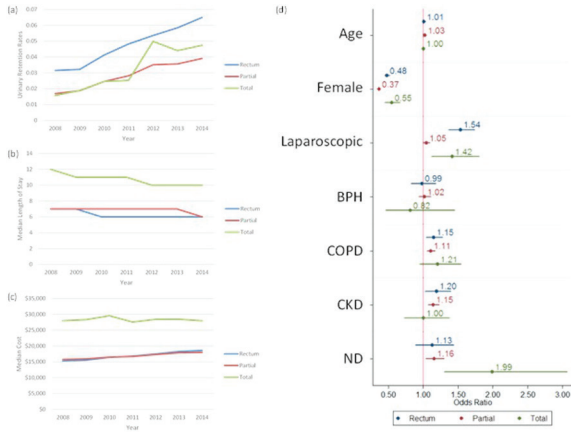


Figure 1. Trends and factors for urinary retention (UR). (a) Annual UR rates, (b) median length of stay for all patients in study, (c) median cost for all patients in study, and (d) odds ratio from logistic regression on UR (Race was omitted for brevity). Blue = rectum group, red = partial colectomy group, and green = total colectomy group. BPH = Benign Prostate Hypertrophy, COPD = Chronic Obstructive Pulmonary Disease, CKD = Chronic Kidney Disease, and ND = Neurological Disease.

IMPACT OF OBESITY ON POST-OPERATIVE WOUND INFECTIONS IN DIABETIC PATIENTS AFTER COLORECTAL SURGERY.

P512

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Purpose/Background: It is well known that diabetic patients have an increased rate of wound infections. Obesity is a common comorbidity with diabetes and in itself is a major risk factor for wound related complications. In this study, we sought to determine the relative effect of obesity and diabetes to determine which one of these factors plays a greater role in wound infections for colorectal patients.

Methods/Interventions: After IRB approval, NSQIP database query was performed from 2008-2015 examining surgical site infections (SSI) including superficial SSI, deep SSI, and organ space infection after colectomy. Patient demographics and post op wound related outcomes were recorded. Emergent cases were excluded. SAS 9.4 was used for all analyses. Statistical analysis including x2 test, Fischer’s exact test, and t-test were used with p-value < 0.05. The data was controlled for Age, Gender, Race, COPD, Hypertension, CHF, Renal Failure, Steroid use, >10% weight loss, Smoking, ASA Class, Serum Albumin, Transfusion, Bleeding Disorders.

Results/Outcome(s): A total of 248,747 patient records were reviewed. After controlling for a variety of demographic risk factors, DM was noted to have significant association with Superficial SSI (p=0.002). This association lost its significance when the results were controlled for BMI in addition to other covariates (p=0.186). There

was no significant association between DM and deep incisional SSI and organ space SSI with or without controlling for BMI. On the other hand, BMI > 30 was associated with increased odds for superficial incisional SSI and deep incisional SSI and decreased odds for organ space SSI (p=<0.0001, <0.001, 0.046 respectively). These associations remained significant when the results were controlled for DM in addition to other covariates (p=<0.002, <0.001, 0.049). Compared to a non-obese, non-DM patients (reference) the odd ratios for superficial SSI were 1.17 for patients with BMI <30 and DM, 1.62 for patients with BMI >30, non-DM and 1.87 for BMI > 30 and DM (p<0.001)..

Conclusions/Discussion: Based on our data, it appears that DM in itself does not increase the risk for wound infections after colon and rectal resections once the data is controlled for BMI along with a variety of covariates. On the other hand BMI > 30 remains a significant risk factor for wound infections despite controlling for diabetes along with other demographic risk factors. These findings suggest that the reported incidence of DM related wound complications may in fact be due to higher BMI that most diabetics possess. Another interesting finding of our study is the protective effect of obesity on anastomotic leaks (organ space SSI), the so called “obesity paradox”.

Table 1:

Infection Type	Patient Characteristics	Without Controlling for BMI	p value	After Controlling for BMI	p value
Superficial SSI	Non Diabetic	Reference	0.002	Reference	0.186
	Oral Agents Insulin	1.12 (1.04, 1.20) 1.09 (1.00, 1.19)		1.06 (0.99, 1.14) 1.04 (0.95, 1.13)	
Deep SSI	Non Diabetic	Reference	0.712	Reference	0.983
	Oral Agents Insulin	1.05 (0.91, 1.22) 1.05 (0.89, 0.92)		1.01 (0.88, 1.17) 1.01 (0.85, 1.20)	
Organ Space Infection	Non Diabetic	Reference	0.868	Reference	0.877
	Oral Agents Insulin	0.98 (0.88, 1.08) 1.01 (0.89, 1.14)		0.98 (0.89, 1.08) 1.02 (0.90, 1.15)	
Infection Type	Patient Characteristics	Without Controlling for Diabetes	p value	After Controlling for Diabetes	p value
Superficial SSI	BMI < 30	Reference	<0.0001	Reference	<0.002
	BMI > 30	1.38 (1.32, 1.45)		1.37 (1.31, 1.44)	
Deep SSI	BMI < 30	Reference	<0.001	Reference	<0.001
	BMI > 30	1.34 (1.22, 1.47)		1.34 (1.22, 1.47)	
Organ Space Infection	BMI < 30	Reference	0.046	Reference	0.049
	BMI > 30	0.94 (0.88, 1.00)		0.94 (0.88, 1.00)	

Odds ratios (95% CI) and p values for infections after colorectal surgery in obese patients.

Table 1: Odds ratios (95% CI) and p values for infections after colorectal surgery in obese patients.

FROM LAPAROSCOPIC TO ROBOTIC RIGHT HEMICOLECTOMIES WITH INTRA-CORPOREAL ANASTOMOSIS - SHOULD WE CONVERT?

P513

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Purpose/Background: Laparoscopic right hemicolectomy with extracorporeal anastomosis is a commonly performed operation. Robotic-assisted procedures have made it possible to overcome limitations of laparoscopy. Robotic right hemicolectomies have come in favour for the growing evidence of benefits of performing an intra-corporeal anastomosis. The aim of our study is to evaluate operative and post-operative outcomes comparing laparoscopic right hemicolectomies with extra-corporeal anastomosis to our early experience of performing robotic right hemicolectomies with intra-corporeal anastomosis.

Methods/Interventions: A retrospective chart review of all patients who have undergone a right hemicolectomy from January 2016 to December 2017 was performed. Outcomes measured were tumor-node-metastasis stage at presentation, number of lymph nodes (LN) retrieved, length of operation, time to return of bowel function, length of hospital stay (LOS), and estimated blood loss. We also examined rates of post-operative complications such as blood product transfusion, hernia, anastomotic leak and re-admission.

Results/Outcome(s): A total of 32 patients underwent a right hemicolectomy by a single surgeon of which 19 (59.4%) were laparoscopic (LRH) and 13 (40.6%) were robotic (RRH). The two groups were comparable with respect to age, gender, and indications for surgery. Median operative time (interquartile range [IR]) was longer for RRH compared to LRH (172 min (159-197.5 min) vs. 129 min (111-150 min); $P < 0.00001$). Median time to recovery of bowel function (IR) was 2 days (2-3.5) for RRH and 3 days (2-3) for LRH ($p = 0.35$). Median LOS (IR) for RRH was 3 days (2.5-5.5) compared to 4 days (2-4) for LRH ($p = 0.27$). Median number of LNs harvested (IR) for RRH was 17 LNs (10-23.5) compared with 18 LNs (14-32) in LRH ($p = 0.20$).

Conclusions/Discussion: There is increasing use of robotics in colorectal surgery with the growing evidence of its benefits in terms of surgical outcomes. Our study shows that our early results are quite comparable to laparoscopy when it comes to performing a right hemicolectomy. Although lacking power, our study demonstrates a trend towards better short-term outcomes even during the learning curve period.

DEVELOPMENT OF A LOCAL RECURRENCE PREDICTION TOOL AFTER RECTAL CANCER SURGERY.

P514

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Purpose/Background: Local recurrence after rectal cancer surgery is a devastating outcome with a poor prognosis. Our objective was to develop a prediction tool to identify patients at higher risk for local recurrence. Our secondary aim was to assess if significant predictors of local recurrence were also associated with overall survival.

Methods/Interventions: A retrospective cohort study was conducted using population-based data collected from the Manitoba Cancer Registry and chart reviews. All patients with stage II or III rectal adenocarcinoma who underwent curative resection between 2004-2014 were included. A forward selection algorithm with an entry p -value of 0.05 was used to select significant predictors for a logistic regression model. Discrimination was assessed

using bootstrapping with 200 samples and calibration using Hosmer-Lemeshow goodness-of-fit test. Overall survival was assessed using univariable and multivariable Cox proportional hazards regression.

Results/Outcome(s): A total of 1,105 patients were included in the prediction model of which 107 developed local recurrence (9.7%). A multivariable logistic regression analysis found distance from anal verge (OR 0.8, 95% CI 0.6-0.9, $p = 0.03$), neoadjuvant chemoradiation (0.5, 0.3-0.8, < 0.01), any positive margin (2.5, 1.5-4.1, 0.01), adjuvant chemotherapy (0.5, 0.3-0.7, < 0.01) and ypT stage (2.0, 1.3-3.1, < 0.01) to be significantly associated with local recurrence. The following prediction model was developed: Total points = [9 x margin status] - [7 x adjuvant chemotherapy] + [7 x ypT stage] - [6 x neoadjuvant chemoradiation] - [2 x distance from anal verge] Where margin status is 1 if positive and 0 if negative, neoadjuvant chemoradiation/adjuvant chemotherapy is 1 if received and 0 if not, T stage is defined as 1, 2, 3 or 4, and distance from anal verge is 1 if 0 to 6 cm, 2 if 7 to 11 cm and 3 if > 11 cm (Table 1). The AUROC was 0.73 (95% CI 0.63-0.80) in the bootstrap derivation dataset and 0.70 (0.63-0.73) in the bootstrap validation dataset. The Hosmer-Lemeshow goodness-of-fit test demonstrated good calibration ($p = 0.43$). The model had a sensitivity of 61.7% and a specificity of 73.3% for predicting local recurrence in high risk patients ($> 10\%$). Positive margins and adjuvant chemotherapy were the only predictors significantly associated with overall survival on univariable (HR 2.0, 95% CI 1.6-2.5, $p < 0.01$ and 0.32, 0.3-4, < 0.01 , respectively) and multivariable Cox regression analysis (1.81, 1.4-2.3, < 0.01 and 0.38, 0.3-0.5, < 0.01 , respectively).

Conclusions/Discussion: There exists a lack of prediction tools that can be used to counsel patients on modifiable risk factors for local recurrence, such as the protective effects of neoadjuvant chemoradiation and adjuvant chemotherapy. This novel prediction tool helps fill that void by providing an easy calculation that can have a role in guiding individuals of their risk of local recurrence and potentially, risk-adapted surveillance strategies.

ANORECTAL MELANOMA: RADICAL RESECTION AN APPROPRIATE OPTION.

P515

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Purpose/Background: Significant controversy regarding the role, approach, and outcomes of surgical treatment for anorectal melanoma persists. Historically, investigation of this rare disease has been limited to small case series with mixed conclusions. Our objective was to compare radical resection to local excision for anorectal melanoma and identify factors associated with survival.

Methods/Interventions: We utilized the National Cancer Database to perform a retrospective cohort study of anorectal melanoma cases diagnosed in the United States from 2004 to 2015. Overall survival was the primary endpoint. Univariate and multivariate analyses were performed. Overall survival was analyzed by Kaplan-Meier product-limit method and Cox proportional-hazards model with significance levels of $p=0.05$.

Results/Outcome(s): 589 patients with nonmetastatic, biopsy-proven melanoma of the anus or rectum were included in the study. 35 (5.9%) were managed nonoperatively, 335 (56.9%) underwent local excision and 219 (37.2%) received radical resections. Median overall survival was significantly shorter among nonoperative patients compared to all surgical patients (8.7 vs. 26.9 months, $p=0.003$ respectively), and surgery of any type demonstrated a mortality proportional hazard ratio (HR) of 0.37 (95% confidence interval [CI] 0.20 to 0.68) versus nonoperative management. Among surgical patients, five-year overall survival did not significantly differ between those undergoing local excision or radical resection (26.3% vs 25.6% respectively, $p=0.198$; see Figure 1). However, patients undergoing radical resection were younger (64.2 vs 68.8 years old, $p<0.001$) but had larger tumors (3.7cm vs 2.3cm, $p<0.001$), higher rates of positive nodes (62.8% vs 36.7%, $p<0.001$), and higher rates of surrounding organ involvement (11.0% vs 2.7%, $p<0.001$) compared to local excision recipients. On multivariable regression analysis, factors adversely affecting survival included age over 77 (HR 2.08; 95%CI 1.50 to 2.89), tumor size over 5.0 cm (HR 1.68; 95%CI 1.24 to 2.36), and presence of pathologic positive lymph nodes (HR 1.88; 95%CI 1.35 to 2.61). Type of surgical resection or adjuvant treatment failed to demonstrate significance.

Conclusions/Discussion: Surgery of any type is the most important factor impacting overall survival among patients with anorectal melanoma. Older age, large tumor size, and positive lymph nodes are associated with increased risk of all-cause mortality. Despite including a significantly larger proportion of these high-risk factors, radical resection produced equivalent survival to local excision in this large national cohort. We conclude that radical resection appears to be a reasonable treatment option for anorectal melanoma.

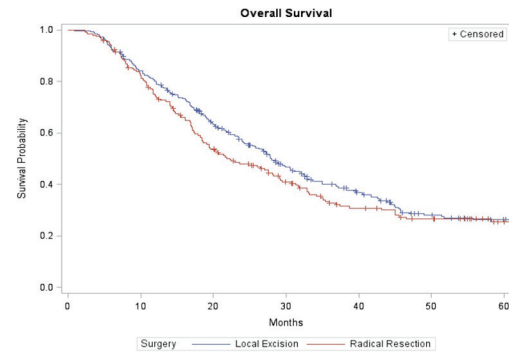


Figure 1: Overall survival probability of patients with anorectal melanoma undergoing local excision vs radical resection.

SURGICAL SITE INFECTION IN ELECTIVE COLON & RECTAL RESECTIONS: EFFECT OF ORAL ANTIBIOTICS.

P516

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Purpose/Background: Surgical site infection (SSI) is a significant complication of colorectal surgery and remains one of the highest amongst all surgeries. Role of mechanical bowel preparation (MBP) with oral antibiotics has been shown to be effective, but is not yet a standardized practice and varies based on surgeon preference. Here, we assess the effect of the addition of oral antibiotics with MBP on SSI rates.

Methods/Interventions: Retrospective cohort study of consecutive, elective colon and rectal resections at a single academic center, before (n=307) and after (n=189) addition of oral antibiotics from September 1 2014 to September 30 2016. All patients followed our ERAS protocol, which includes MBP, oral carbohydrate loading, warming blankets, IV antibiotics, subcutaneous heparin, hair clipping and chlorhexidine skin prep. SSIs were assessed using CDC criteria. SSIs were compared before and after addition of oral antibiotics using chi-squared analysis. A subgroup analysis was performed on colon and rectal resections independently. Univariate analysis was performed on potential SSI risk factors, followed by a multivariate logistic regression analysis with adjusted odds ratio (OR, 95% confidence interval).

P514 Table 1: Risk categories with corresponding points and probability of 3-year local recurrence

Risk	Total Points	Probability Local Recurrence
Low	<6	0-5%
Moderate	7-14	5-10%
High	15-18	10-15%
Very High	>19	>15%

Results/Outcome(s): SSI rates from pre vs. post intervention were: overall 19.9% vs. 9.5%, $p < 0.05$; superficial 9.8% vs. 3.7%, $p < 0.05$; organ space 10.1% vs. 5.8%, $p = 0.06$. Subgroup analysis on colon resections only SSI rates from pre vs. post intervention: overall 17.9% vs. 4.6%, $p < 0.05$; superficial 12.0% vs. 3.8%, $p < 0.05$; organ space 6.0% vs. 0.9%, $p < 0.05$. SSI rates for rectal resections pre vs. post intervention: overall 22.8% vs. 16.3%, $p = 0.26$; superficial 6.5% vs. 3.8%, $p = 0.36$, organ space 16.3% vs. 12.5%, $p = 0.41$. Univariate analysis was performed on the colon resections and yielded significant effects for age (0.97, 0.95-2.00), open vs. MIS (6.35, 2.57-15.67), MIS converted to open vs. MIS (4.57, 1.78-11.75), BMI (1.07, 1.02-1.13), wound protector (0.37, 0.18-0.75), oral antibiotics (0.22, 0.08-0.58) and surgery date (0.94, 0.89-0.98), but not for sex, lesion location, OR duration, stoma, wound class, ASA score, smoking, diabetes, steroid use, negative pressure wound dressings or surgeon. On multivariate analysis, open vs. MIS ($p = 0.01$), MIS converted to open ($p = 0.005$) and oral antibiotics ($p = 0.02$) remained as significant SSI factors.

Conclusions/Discussion: Significant reduction in SSI was found after adding oral antibiotics to MBP. Subgroup analysis revealed significant reduction in superficial and organ space SSIs for colon resections, but not for rectal resections. Operative technique (MIS vs. open and MIS converted open) also had a significant effect on SSI. Small post-intervention number limits assessment of wound protectors and negative pressure wound dressings. Further investigation is needed to understand isolated effects of oral antibiotics.

SSI Results:

COLON & RECTAL RESECTIONS:			
	MBP alone (n=307)	MBP + Oral Abx (n=189)	p value
Overall, n (%)	61 (19.87)	18 (9.52)	0.002
Superficial, n (%)	30 (9.77)	7 (3.70)	0.008
Deep, n (%)	0 (0.00)	0 (0.00)	--
Organ Space, n (%)	31 (10.10)	11 (5.82)	0.06
COLON RESECTIONS:			
	MBP alone (n=184)	MBP + Oral Abx (n=109)	p value
Overall, n (%)	33 (17.93)	5 (4.59)	0.0004
Superficial, n (%)	22 (11.96)	4 (3.76)	0.01
Organ Space, n (%)	11 (5.98)	1 (0.92)	0.01
RECTAL RESECTIONS:			
	MBP alone (n=123)	MBP + Oral Abx (n=80)	p value
Overall, n (%)	28 (22.76)	13 (16.25)	0.26
Superficial, n (%)	8 (6.50)	3 (3.75)	0.36
Organ Space, n (%)	20 (16.26)	10 (12.50)	0.41

MORTALITY AND READMISSION RISK FACTORS FOLLOWING SURGERY FOR ENTERIC FISTULAS.

P517

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Purpose/Background: To determine the demographics and risk factors of mortality and readmission for patients who undergo surgery for enteric fistulas.

Methods/Interventions: We queried the 2006-2015 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) cohort for all patients who underwent surgery for enteric fistulas. Primary outcome was mortality and secondary outcome was readmission. Univariate/bivariate comparisons and backwards stepwise logistic regression analysis were used to identify predictors of selected risk factors.

Results/Outcome(s): Of 5,671 patients who underwent surgery for an enteric fistula, 53% were female and 9% black. Overall, the 30-day mortality rate was 3% and 30-day readmission rate was 9%. Compared to patients who survived, those who died had higher rates of pre-existing co-morbidities including ASA class 4 or higher (38% vs 8%), dependent functional status (45% vs 13%), diabetes (24% vs 17%), severe COPD (18% vs 7%), dyspnea (25% vs 10%), preoperative pneumonia (3% vs 1%), CHF (7% vs 1%), hypertension (60% vs 41%), ESRD on dialysis (6% vs 2%), ascites (3% vs 1%), chronic steroid use (15% vs 10%), and preoperative weight loss (14% vs 8%) ($p < 0.05$). Procedure related factors associated with mortality included emergency surgery, sepsis, septic shock, SIRS, open wound infection, deep incisional SSI, wound disruption and ventilator dependence ($p < 0.05$). On multivariate analysis, totally dependent functional status (Odds Ratio [OR] 3.3, 95%-Confidence Interval [CI] 1.8-5.9), ventilator dependence (OR 3.1, 95%CI 1.2-7.1), SIRS (OR 2.2, 95%CI 1.2-3.8), chronic steroid use (OR 2.1, 95%CI 1.3-3.4), partially dependent functional status (OR 2.1, 95%CI 1.3-3.2), and smoking (OR 1.7, 95%-CI 1.1-2.5) remained independent predictors for mortality (Table 1). Compared to patients with no readmissions, patients who were readmitted had higher preoperative rates of ASA class 3 or higher (74% vs 68%), diabetes (20% vs 17%), and chronic steroid use (14% vs

P517 Predictors of mortality for patients undergoing surgery for enteric fistulas.

Risk Factor	Odds Ratio	95% Confidence Interval
Totally Dependent Functional Status	3.28	1.83-5.90
Ventilator Dependent	3.07	1.34-7.07
Preoperative SIRS	2.16	1.25-3.76
Chronic Steroid Use	2.07	1.27-3.40
Partially Dependent Functional Status	2.07	1.43-3.20
Smoking	1.68	1.13-2.51

10%) ($p < 0.05$). They also had higher postoperative rates of organ space SSI (21% vs 8%), deep incisional SSI (12% vs 4%), superficial SSI (16% vs 9%), and wound disruption (6% vs 4%) ($p < 0.05$). On multivariate analysis, only preoperative weight loss (OR 1.96, 95%CI 1.006-3.8) remained an independent predictor for readmission.

Conclusions/Discussion: Patients undergoing surgery for enteric fistulas have major post-operative risk for 30-day death and readmissions. Pre-operative predictors for increased risk of death include poor functional dependence, smoking history and chronic steroid use. Patients with preoperative weight loss have the highest risk for readmission. Targeting these risk factors through interventions, such as prehabilitation and nutrition programs, may be possible ways to improve outcomes in this select, high-risk patient population.

COMPARISON OF LAPAROSCOPY AND OPEN SURGERY FOR COLORECTAL CANCER IN OCTOGENARIANS.

P518

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Purpose/Background: The aim of this study is to compare the outcomes of laparoscopic and open surgery for colorectal cancer in octogenarians.

Methods/Interventions: Review was conducted using the 2012-2015 colectomy-targeted American College of Surgeons National Surgical Quality Improvement Program database. Patients 80-89 years old and who underwent elective surgery were included in the study. Groups were created based on surgical approach: laparoscopic versus open (planned). Multivariate logistic regression analysis was used for group comparison.

Results/Outcome(s): A total of 6,868 patients met the inclusion criteria [female 3,944 (57.4%)]. Seventy-five percent of the procedures were performed laparoscopically. Seven percent of the cases were converted to open. 2,452 (35.7%) patients had at least one postoperative complication. Patients who underwent open surgery were slightly older (83.7 ± 2.7 vs. 84.0 ± 2.7 , $p = 0.001$), more commonly smokers (5.1% vs 3.3%, $p = 0.0008$) and diagnosed with dyspnea (16.9% vs. 13.3%), dependent functional status (7.8% vs. 6.1%, $p = 0.01$), congestive heart failure (3.9% vs. 2.6%, $p = 0.006$), disseminated cancer (10.4% vs. 5.2%), $p < 0.0001$, weight loss (9.3 vs. 5.1, $p < 0.0001$), preoperative transfusion requirement (7.9% vs. 5.4%, $p = 0.0001$), sepsis (3.8% vs. 1.2%, $p < 0.0001$), hypoalbuminemia (46.1% vs. 34.2%, $p < 0.0001$), leukocytosis (11.8 vs. 6.9%, $p < 0.000$) and anemia (77% vs. 68.5%, $p < 0.0001$) (**Table**). Patients who underwent laparoscopic surgery had an American Society of Anesthesiologists class

of 1-2 (21.6% vs. 7.9%, $p = 0.0006$) and wound class of clean/clean-contaminated (94.2% vs. 89.5%, $p < 0.0001$) more commonly. After adjusting the groups for preoperative factors; organ space surgical site infection, wound disruption, pneumonia, transfusion, septic shock, reoperation, anastomotic leak and ileus were significantly more common in the open group in multivariate analysis. Open surgery was an independent risk factor for 30-day postoperative morbidity [OR: 1.2 (95% CI: 1.02-1.6), $p = 0.001$].

Conclusions/Discussion: Laparoscopic approach may offer better short-term outcomes than open in octogenarians undergoing colorectal cancer surgery when feasible.

NODE POSITIVITY AND WAITING PERIOD MAY PREDICT TUMOR SCATTER IN IRRADIATED RECTAL CANCERS.

P519

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Purpose/Background: The scatter of rectal cancer cells outside the visible ulcer has been shown to occur in more than 50% of locally advanced rectal cancers treated with neoadjuvant chemoradiation. We have yet to define clinical or pathological factors that may predict this behavior.

Methods/Interventions: 20 consecutive rectal cancer specimens were sliced in entirety into 3mm slices. They were mapped: 1) normal tissue proximal to visible ulcer, 2) visible ulcer 3) and normal tissue distal to the visible ulcer. Each slice was then stained for the presence of microscopic tumor cells and then superimposed onto pictures of gross specimens. Demographics, tumor and pathological characteristics were collected and analyzed using SPSS 22 (Chicago, IL).

Results/Outcome(s): For the 20 patients, mean age was 60.1 (32-79) and 40% were female. Caucasians comprised the majority (65%); 6 (30%) patients were diagnosed younger than 50 and had a family history of CRC. Hypertension was the most common co-morbidity (65%); 35 and 80% currently or previously smoked, respectively. All but one had an initial T-stage of T3 and 52.6% had node-positive disease. Mean largest diameter of the pre-treatment tumor was 4.8 cm (2-8) and median distance from anal verge was 6 cm (0-10). Mean time between radiation and surgery was 9.4 weeks (5-14). 4 patients showed complete pathologic response (20%). 8 (42.1%) were down-staged and 25% had positive nodes after radiation. There were no positive margins. Of the 16 specimens with residual cancer, 11 (68.8%) showed tumor scatter with a distance outside the ulcer ranging from 3-15 mm. 7 specimens had proximal scatter up to 12 mm (mean 4.7) and 5 had scatter distally, up to 15 mm (mean 6.6).

Age and race were not associated with scatter but it was more common in diabetics and trended toward significance in males ($p=0.058$) and those with lower tumors (4.67 vs. 9.0cm, $p=0.062$). Proximal scatter was associated with node positive disease ($p=0.01$) and abdominal perineal resection ($p=0.044$). Distal scatter was significantly associated with shorter time between radiation and surgery: 7.5 versus 10.4 weeks ($p=0.023$) and trended toward significance for node+ disease ($p=0.058$). Other factors such as pre- and post-radiation tumor size, down-staging, operative blood loss and duration were not associated with scatter.

Conclusions/Discussion: Tumor scatter was identified in almost 70% of patients with residual cancer after radiation and may be more common in males and those with initial node-positivity. Larger tumors were not more likely to scatter although node-positive disease and APR were associated with proximal scatter. Interestingly, distal scatter was associated with shorter time period between radiation and surgery. Thus, tumor scatter still remains difficult to predict, but it is possible that distal scatter may be amenable by increasing the waiting period between radiation and surgery.

P518 Comparison of demographics, preoperative factors and perioperative outcomes between the groups

Variables	Total N= 6868	Laparoscopic N= 5161		p-value
		(75%)	Open N= 1707 (25%)	
Age, years †	83.8 ±2	83.7± 2.7	84.0± 2.7	0.001
Gender, female	3944 (57.4)	2915 (56.4)	1029 (60.2)	0.005
Race				0.009
White	5290 (88.4)	3961 (87.6)	1329 (90.8)	
African American	437 (7.3)	348 (7.7)	89 (6.0)	
Other	257 (4.3)	212 (4.7)	45 (3.2)	
Location				0.2
Colon	6604 (96.1)	4970 (92.2)	1634 (95.7)	
Rectal	264 (3.9)	191 (7.8)	73 (4.3)	
Procedure				<0.0001
Right colectomy	2441 (35.5)	1750 (33.9)	691 (40.4)	
Left colectomy or Proctectomy	4427 (64.5)	3411 (66.1)	1016 (59.6)	
BMI, kg/m ² †	26.3± 5.2	26.3± 5.2	26.2± 5.3	0.2
Diabetes Mellitus	1355 (19.7)	1008 (19.5)	347 (20.3)	0.4
Smoking	258 (3.7)	171 (3.3)	87 (5.1)	0.0008
Dyspnea	981 (14.2)	691 (13.3)	290 (16.9)	0.0002
Functional status, Dependent	448 (6.5)	315 (6.1)	133 (7.8)	0.01
CHF	205 (2.9)	137 (2.6)	68 (3.9)	0.006
Disseminated cancer	451 (6.5)	273 (5.2)	178 (10.4)	<0.0001
Weight loss	427 (6.2)	268 (5.1)	159 (9.3)	<0.0001
Preoperative transfusion	415 (6.0)	279 (5.4)	136 (7.9)	0.0001
Preoperative sepsis	131 (1.9)	66 (1.2)	65 (3.8)	<0.0001
Hypoalbuminemia	1954 (38.0)	1339 (34.2)	615 (46.1)	<0.0001
Leukocytosis	546 (8.1)	348 (6.9)	198 (11.8)	<0.0001
Anemia	4752 (70.5)	3473 (68.6)	1279 (77)	<0.0001
ASA III-IV	5446 (79.3)	4043 (78.3)	1403 (82.1)	0.0006
Wound class 3-4	470 (6.8)	290 (5.6)	180 (10.5)	<0.0001
Operative time, min †	144± 72.5	149.0± 70.0	132.4± 78	<0.0001
Length of stay, days †	8.2± 7.1	7.3± 6.2	11.0± 8.7	<0.0001

Values are expressed as absolute numbers (percentages) unless indicated otherwise. † Values are expressed as mean ± standard deviation Missing data: hypoalbuminemia:1733, leukocytosis:171, anemia:129

CONQUERING THE MYTH – ROBOTICS IS NOT MORE EXPENSIVE THAN LAPAROSCOPY ALONE IN COLORECTAL SURGERY.

P520

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Purpose/Background: The use of robotics in colorectal surgery has been steadily increasing. However, reported longer operative times and increased higher procedure-associated costs have limited its widespread adoption. To determine the real impact of robotic surgery, we compared costs and clinical outcomes in a detailed in-depth analysis of a single center.

Methods/Interventions: The clinical and cost data were abstracted from University Texas Medical Branch Institution between 2011-2017. Demographics, clinical elements, and cost data were collected. Cases were grouped based on surgical approach (open, laparoscopic, robotic) and stratified by anatomic resection: right colectomy, low anterior resection (LAR) (sigmoid and rectal resections included), and total colectomy. Analyzed outcomes included detailed costs and short-term clinical outcomes.

Results/Outcome(s): We identified 279 cases that met inclusion criteria. Average age was 60±15 years, 54% (150) were males. Cancer was the most common indication for surgery (54%). Robotic, laparoscopic and open approach rates were 35, 34 and 31%, respectively. Overall, total costs were similar in robotic and laparoscopic surgery (\$13,529 vs \$13,309, p=0.78, see Table 1), hospital stay (5.6 vs 5.4 days, p=0.77), return of bowel function (3.0 vs 3.1 days, p=0.79) and estimated blood loss (88 vs 73 mL, p=0.39). Readmission rates were significantly lower with a robotic approach (10.6 vs 4.1%, p=0.04). When comparing robotic to laparoscopic surgery, operative time was similar (293 vs 276 min, p=0.27). Interestingly in the LAR subgroup, operative time was significantly lower (311 vs 366 min, p=0.038). Stratification by anatomic location showed that robotic surgery was more expensive in terms of right colectomy but not significantly so (\$10,993 vs \$12,016, p=0.31), but significantly cheaper in the LAR subgroup (\$14,093 vs \$17,314, p=0.04). (Table 1)

Conclusions/Discussion: Robotic surgery was significantly cheaper in the management of low anterior resection. In terms of all procedures there was no significant difference in cost between robotic and laparoscopic approaches to colorectal surgery. Short-term clinical outcomes were in fact improved with the robotic approach, specifically in terms of decreased readmission rate.

Table 1

Detailed cost and short-term clinical outcomes stratified by approach and anatomical resection

Procedure Type	All			Low Anterior Resection*			Right Colectomy		
	Robotic Surgery	Laparoscopic Surgery	P-Value	Robotic Surgery	Laparoscopic Surgery	P-Value	Robotic Surgery	Laparoscopic Surgery	P-Value
Total Cost (\$)	13,529	13,039	0.78	14,093	17,314	0.048	12,016	10,993	0.31
OR Supply Cost (\$)	26,060	26,027	0.61	2,611	2,930	0.33	2,737	2,613	0.56
Nursing Cost (\$)	31,002	31,054	0.92	3,763	3,670	0.95	2,519	2,747	0.56
Readmission Rate (%)	4.1	10.6	0.04	5.7	20.7	0.04	1.8	7.7	0.07
LOS (days)	5.63	5.41	0.77	5.26	6.27	0.34	5.49	4.46	0.14
Bowel function (days)	3.02	3.10	0.79	2.71	3.40	0.28	3.33	3.02	0.44
OR time (min)	293	276	0.27	311	366	0.04	272	220	0.002

* Low Anterior Resection (Sigmoid Resection, Rectal Resection)

BRINGING GERIATRICS ONTO THE COLORECTAL SURGERY TEAM: DECREASED MEDICAL COMPLICATIONS AND COST.

P521

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Purpose/Background: In elderly surgical patients, multiple comorbidities and diminished reserve lead to prolonged hospitalization, increased post-operative complications and higher cost. We developed a Geriatric Surgery Co-management (GSC) program, as an innovative partnership between geriatrics and colorectal surgery, to improve patient care for elderly colorectal surgery patients in the post-operative setting.

Methods/Interventions: This retrospective study analyzed colorectal patients aged 70 or older admitted to a community hospital under the care of 3 colorectal surgeons before GSC program implementation. The data was collected via National Surgical Quality Improvement Program and chart review. Historical control (HC) from 11/2013 to 10/2014 was compared to patients admitted after implementation of the GSC program from 11/2014 to 1/2016. GSC patients received a post-operative comprehensive geriatric assessment, identification of risk factors for and prevention of geriatric syndromes, management of comorbidities and optimization of pain management in addition to usual surgical care.

Results/Outcome(s): Of 187 patients included in the study, 98 (52.4%) were in HC and 89 (47.6%) in GSC. The mean age was higher in HC (78.1) when compared with 76.1 in the intervention group (p-value=0.03). The average number of major medical comorbidities was approximately 7 in both groups (p-value=0.96). Most surgeries were elective cases in both HC and GSC (82.0% and 78.6%, respectively and p-value=0.56). The type of surgeries included laparoscopic colectomy (56.6%), open colectomy (10%), laparoscopic anterior resection of the rectum (7%), small bowel resection (5.4%), total proctocolectomy and proctectomy (6.3%) and other (14.7%).

The mean length of stay (LOS) was 7.6% shorter (-0.6 days) in GSC (p-value= 0.4); more pronounced in older and sicker patients: 27% shorter (-2.3 days) in patients ≥ 80 years old, 22.5% shorter (-1.8 days) in patients with Charlson comorbidity index ≥ 3 (p-values=0.1 and 0.08, respectively). The incidental delirium was significantly lower in intervention group (2.24%) when compared with the historical group (17.4%, p-value= <0.0001). Postoperative cardiac arrhythmia was markedly diminished from 12.2% in HC compared to 3.4% in GSC (p-value=0.02). The mean total hospital charge was 18% less per patient in GSC (p-value=0.03).

Conclusions/Discussion: Our results suggest that a multidisciplinary approach to postoperative care for geriatric colorectal surgery could improve patient outcomes while decreasing hospital costs. Our analysis supports targeting high-risk patients, those with greater comorbidities.

THE ROLE OF PRE-OPERATIVE BOWEL PREPARATION IN CASES WITH OSTOMY CREATION AFTER COLECTOMY. A RETROSPECTIVE ANALYSIS OF ACS-NSQIP.

P522

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Purpose/Background: The controversy regarding the use of mechanical and/or oral antibiotic bowel preparation continues to be a subject of debate for the pre-operative management of patients undergoing elective colorectal resection. Recent large retrospective studies demonstrated reduced post-operative morbidity using combined mechanical and oral antibiotic bowel preparation before elective colorectal surgery involving an anastomosis. The aim of our study was to assess the impact of bowel preparation on short-term post-operative outcomes in a large cohort of colectomies that have either creation of end colostomy or end ileostomy.

Methods/Interventions: Demographic and clinical data on 14,407 patients who have undergone elective colectomies with creation of an end ostomy was abstracted from the NSQIP database including targeted colectomy variables (2002-2016).

Results/Outcome(s): A total of 14,407 patients were analyzed: 12,625 (87.6%) patients with end colostomy and 1,782 (12.4%) patients with end ileostomy. Of which 9,038 (62.7%), 2,422 (16.8%), 623 (4.3%) and 2,324 (16.2%) were in the no preparation group (NP), mechanical bowel preparation alone group (MP), oral antibiotic preparation alone group (AP) and combined preparation group (MAP), respectively. Superficial surgical site infections were reduced in bowel preparation regimens that included oral antibiotics (3.7% in AP/MAP group vs. 5.7% in MP group vs. 6.8% in NP group; p <0.001). Organ space/Deep

space surgical site infection rates are also lowered by the use of oral antibiotics in bowel preparation (5.6% in MAP group, 5.8% in AP group, 7.1% in MP group and 10.6% in NP group; p <0.001). Regarding post-operative ileus, mechanical bowel preparation combined with oral antibiotics offers the greatest benefit (18.4% in MAP group, 28.4% in AP group, 22.2% in MP group and 32.9% in NP group; p <0.001).

Conclusions/Discussion: The combined use of mechanical bowel preparation and oral antibiotics has become the standard of care for elective colon surgery. Published studies have focused on outcomes of anastomotic leaks after colectomy with anastomosis. This analysis of patients with creation of ostomy demonstrates that a combined regimen offered lower rates of superficial/deep space infections and post-operative ileus. The use of oral antibiotics during bowel preparation appears to be more important to reducing superficial surgical site and deep/organ space infections than the use of mechanical preparation. Furthermore, it appears that mechanical preparation was more integral to the reduction of post-operative ileus over oral antibiotics. This suggests that combined antibiotic and mechanical bowel preparation is beneficial to those undergoing elective colectomy with ostomy creation.

OUTCOMES AFTER COLON SURGERY BASED ON WOUND CLASSIFICATION. A RETROSPECTIVE NATIONWIDE ANALYSIS.

P523

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Purpose/Background: Uniform and accurate documentation of surgical wound classification has been used in risk-adjustment models with a goal to improve outcomes. This provides a benchmark for hospitals to compare their surgical outcomes. More importantly, it provides us an opportunity to assess and evaluate quality of care, practice systems and compare outcomes. We sought to investigate the impact of inconsistent wound classification in patients who underwent colorectal operations on post-operative outcomes.

Methods/Interventions: Demographic and clinical data on 92,063 patients who have undergone colorectal surgery and who were classified as either a clean case or a clean/contaminated case were abstracted from the NSQIP database including targeted colectomy variables (2002-2016).

Results/Outcome(s): A total of 92,063 patients were analyzed. Interestingly, 1,161 (1.3%) patients were classified as clean wound classification (WCI) despite guidelines in colorectal surgery prompting at least clean/contaminated designation. 90,902 (98.7%) patients analyzed were characterized with a clean/contaminated wound classification (WCII). Both groups of patients had similar demographics and co-morbidities. Operative time was longer in

the WCII group compared to WCI group (176.8 min vs. 163.7 min; $p < 0.001$). Complexity of cases based on work RVU were also higher in WCII group (26.4 RVUs vs. 25.9 RVUs; $p < 0.001$). Out of the colorectal procedures, partial colectomies with anastomosis were more commonly mislabelled as WCI (17.7% WCI vs. 13.0% WCII; $p < 0.001$). Diverticulitis, as an indication for colorectal surgery, was more commonly mislabelled as WCI (5.9% WCI vs. 3.2% WCII; $p < 0.001$). There was no difference in the rate of anastomotic leak depending on wound classification ($p = 0.29$). There was no significant difference in readmission rates between the two groups. Analyzing any surgical site infections reveals a lower rate in the WCI group (6.4% WCI vs. 8.0% WCII; $p < 0.05$).

Conclusions/Discussion: Hospital measured quality metrics are affected by the inconsistent reporting of wound classification. This study reveals discrepancies with wound class reporting in colorectal surgery. Outcome improvements are dependent on accurate reporting and we should strive to provide consistent practices.

SURGERY FOR SIGMOID VOLVULUS: IS LAPAROSCOPY BENEFICIAL?

P524

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Purpose/Background: **Background:** Laparoscopic sigmoid colectomy has improved short term outcomes when compared to open surgery for indications such as diverticular disease, malignancy, and inflammatory bowel disease. Without evidence, these benefits are often extrapolated to other disease processes at the potential expense of increased operative time and cost. Because of the dilated and redundant colon, open sigmoid colectomy may be preferred for surgical management of sigmoid volvulus. We therefore compared the outcomes between laparoscopic and open sigmoidectomy for sigmoid volvulus.

Methods/Interventions: **Methods:** We retrospectively reviewed the 2012-2015 participant user files and targeted colectomy data from the ACS-NSQIP database. Patients with the diagnosis of sigmoid volvulus undergoing urgent or non-emergent surgery were included. Initial comparisons between the laparoscopic and open groups revealed that preoperative patient characteristics were significantly different, with the open group having worse comorbidities. Propensity score matching for age, sex, BMI, diabetes and ASA class with the nearest neighbor method was used to create open and laparoscopic groups with similar covariates. Patient characteristics, comorbidities, perioperative variables, and post-operative complications were compared using Fisher's exact test and Student's t-test. Multivariable logistic regression was performed to determine predictors of 30-day mortality and morbidity.

Results/Outcome(s): **Results:** A total of 1050 patients were initially included in the study where 371 (35.3%) had a laparoscopic resection and 679 (64.7%) had an open procedure. Patients with an open resection were older (66.2 vs 60.1, $p < 0.001$), of higher ASA class (2.8 vs 2.5, $p < 0.001$), and more often diabetic (13.8% vs 8.6%, $p = 0.013$). Propensity score matching was then used to create groups with similar preoperative characteristics, each with 265 patients. Operative time was shorter in the open group (106.6 min vs 140.1 min, $p < 0.001$). Length of stay and readmission rates were similar between the groups, but rate of discharge to rehab or a skilled nursing facility was more common in the open group (25.5% vs 16.4%, $p = 0.013$). There was no significant difference for wound and other infectious complications (UTI, pneumonia), anastomotic leak, non-infectious complications (DVT, PE, MI), readmissions, and return to OR. On multivariable analysis, the risk of any 30-day morbidity and mortality was not significantly different between groups.

Conclusions/Discussion: **Conclusions:** Patients who undergo minimally invasive sigmoid resection experience longer operative time with no difference in length of stay or 30-day morbidity and mortality. However, patients undergoing an open approach were more likely to be discharged to a nursing home or rehabilitation facility. Either an open or laparoscopic approach are appropriate for sigmoid volvulus.

INCISIONAL HERNIAS AFTER LAPAROSCOPIC RIGHT HEMICOLECTOMIES: DOES SPECIMEN EXTRACTION SITE ALTER THE RISK?

P525

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Purpose/Background: Incisional hernia (IH) is a morbid, costly, and common complication after gastrointestinal surgery. It is important to identify techniques that reduce IH. Compared to open surgery, laparoscopic techniques have a lower risk of IH. However, because laparoscopic colectomy requires an extraction incision, the risk of IH is higher than other laparoscopic procedures. Many surgeons utilize a midline extraction site for laparoscopic colectomy. Paramedian incisions have demonstrated lower IH rates in laparotomy patients, but there is less data examining the effect of paramedian incisions in laparoscopic colectomy. This studies goal was to determine if a vertical paramedian extraction incision during laparoscopic right colectomy reduces the incidence of IH.

Methods/Interventions: Data from a single surgeon's consecutive case series of laparoscopic and single incision (SILS) from 2009-2016 was retrospectively reviewed. During this period three different extraction sites were used; upper midline, vertical periumbilical, and left upper quadrant paramedian. Incisional hernia was the primary

outcome. Diagnosis was confirmed with CT and/or clinical exam. Patient factors including history of tobacco use, diabetes, BMI, wound infection, patient age, previous hernia, and length of patient follow up were also analyzed. Exclusion criteria included patients who required reoperation during the first 30 days or did not have adequate follow up as defined by less than 6 months. Statistical analysis was achieved using one-way ANOVA, Chi-square test, and multivariate regression.

Results/Outcome(s): 108 patients met criteria for the study. There was a significant reduction in postoperative hernia formation in patients undergoing paramedian extraction (0%) compared to upper midline (23.9%) and periumbilical (16.7%). The decreased incidence in the paramedian group was statistically significant ($p=0.0274$) in comparison to the other two groups. BMI was higher ($p = <0.0001$) in the paramedian group (33.7 ± 7.6) in comparison to the upper midline (27.4 ± 5.2) and periumbilical (27.0 ± 5.2). Length of follow up was shorter ($p = <0.0001$) in the paramedian group (23.3 ± 14.5 months) versus the upper midline (63.3 ± 24.8 months) and periumbilical groups (41.1 ± 19.9 months). There were no significant statistical differences in the two groups in regards to the other factors studied.

Conclusions/Discussion: Our results suggest that a paramedian extraction during laparoscopic right colectomy has a significant protective effect in reducing IH. The benefit of a paramedian incision occurred, despite this group having a higher mean BMI. Although length of follow-up was shorter in the paramedian group, it exceeded the mean time for hernia development in the midline and periumbilical group. Future studies will require larger patient numbers and longer follow up to more accurately validate paramedian extraction sites as being lower risk for hernia formation.

SURGICAL OUTCOMES AFTER THE ADMINISTRATION OF NEO-ADJUVANT CHEMORADIOTHERAPY FOR UPPER RECTAL CANCERS.

P526

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Purpose/Background: Background: Consensus exists for the use of neoadjuvant chemoradiotherapy (CRT) for locally advanced middle and low rectal cancers. However, the delineation of the upper and middle rectum can be subjective, especially in the setting of bulky disease, and some cancers in the upper rectum may actually require CRT for oncologic benefits. Our study aimed to compare surgical outcomes in patients with upper rectal cancers who received neoadjuvant CRT to those who did not.

Methods/Interventions: Methods: We retrospectively reviewed the 2016 Targeted Proctectomy and Participant User Files from the ACS-NSQIP database. Patients were included if they had locally advanced, stage II or III, "upper third (>10cm)" tumors, and were excluded if they had metastatic disease. Patient characteristics and comorbidities, perioperative outcomes, and post-operative complications of those who had neoadjuvant CRT were compared to those who did not using Fisher's exact test and Student's t-test. Multivariable logistic regression was performed to determine if neoadjuvant chemotherapy was a significant predictor of 30-day morbidity and mortality, with age, sex, BMI, ASA, diabetes, and laparoscopic approach used as covariates.

Results/Outcome(s): Results: A total of 130 patients were included in the study; 60 (46%) had neoadjuvant CRT while 70 (54%) did not. Patients who had neoadjuvant CRT were similar in age (60.3 vs 64.0, $p=0.102$), BMI (27.4 vs 29.0, $p=0.176$), ASA class (2.65 vs 2.63, $p=0.843$), and rate of diabetes (16.7% vs 20%, $p=0.657$). There was no difference in operative time (278.9 vs 254.5, $p=0.173$), length of stay (5.8 vs 7.8 days, $p=0.219$), or readmission rate (20% vs 12.9%, $p=0.341$). There was no significant difference for infectious complications (surgical site infections, UTI, pneumonia, or anastomotic leak) or non-infectious complications (DVT, reintubation, PE, MI, renal failure). On multivariate analysis, the risk of any 30-day morbidity and mortality was not significantly different between groups.

Conclusions/Discussion: Conclusions: Patients undergoing neoadjuvant CRT prior to resection of upper rectal cancers have similar perioperative outcomes to those who have surgery alone.

THE IMPACT OF SURGICAL APPROACH ON SEGMENTAL COLECTOMY OUTCOMES AS ANALYZED IN A LARGE POPULATION CONTROLLED DATABASE.

P527

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Purpose/Background: Compared to open procedures, laparoscopic colorectal surgery has consistently demonstrated improved clinical outcomes but is also costly as compared to traditional open surgical techniques. Over the past decade, utilization of minimally invasive technology has increased significantly. However, amongst elective colectomies, there is a dearth of evidence comparing outcomes of colon resection by procedure type and anatomic location. In this study, we sought to investigate whether there were differences in the clinical and

economic outcomes of robotic, laparoscopic, and open colectomy between distinct anatomic subsites.

Methods/Interventions: Utilizing the Healthcare Cost and Utilization Nationwide Inpatient Sample database, we conducted a retrospective review of all patients who underwent colon resection between 2009 and 2013. Adult patients (≥ 18 years) undergoing elective colectomy for reasons other than inflammatory bowel disease were selected based on ICD-9 procedure codes. Patient morbidity, mortality, hospital length of stay (LOS) and inpatient costs were assessed for distinct anatomical subsites, utilizing logistic and linear regression. All analyses were adjusted for patient characteristics, hospital demographics, and socio-economic status.

Results/Outcome(s): 128,922 elective colectomy procedures were identified between 2009 and 2013. The mean age was 63.4 (± 13.7) years. Patients were predominantly Caucasian (80.2%), female (54.4%), and had more than one comorbidity (80.8%). 2,867 colectomies were robotic-assisted while the majority of procedures were performed open (53.0%). 1,668 patients died at the hospital and postoperative complications were reported for 27.4% of subjects with GI complications being the most frequent complication (17.5%). With the exception of cecectomy and total colectomy, inpatient costs were higher for robotic procedures when compared to laparoscopic. Open colectomies were more expensive regardless of the anatomical subsite. LOS was not significantly different for patients undergoing robotic or laparoscopic resection of various subsites; however, patients undergoing open colectomy had a higher LOS. In all procedures as well as stratified by anatomic subtype, use of a robot did not have a significant impact on complications or mortality. All colectomies combined, open surgery was associated with increased mortality as compared to laparoscopic surgery (OR=3.16, 95% CI 2.75-3.63), increased risk of complications (OR=1.73, 95% CI 1.68-1.77), and increased hospital LOS (OR=2.53, 95% 2.45-2.61).

Conclusions/Discussion: In a large population level database, the clinical outcomes in total and segmental colectomies were similar between laparoscopic and robotic surgery. Open surgery was associated with higher costs and adverse outcomes. Studies such as this are helpful in determining at a broader level, the true impact of surgical choice on best-practice patient care.

PROJECT CLOT (CENTRAL LINE, OUT OF BED, AND TRANSFERS): IDENTIFYING HIGH VALUE TARGETS FOR REDUCTION OF POST-OPERATIVE VENOUS THROMBOEMBOLISM.

P528

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Purpose/Background: Venous Thromboembolism (VTE) is a significant cause of post-operative morbidity associated with increased cost, length of stay, and lower hospital quality scores. We sought to create a Quality Improvement project to lower the incidence of VTE at our institution. The initial step for this project was to identify high value targets for improvement.

Methods/Interventions: A single center retrospective review of both the Standard National Surgical Quality Improvement Project (NSQIP) and institution specific data was conducted. All patients who underwent colectomy or proctectomy between January 2011 and March 2017 were included. Potential targets for improvement were selected by staff surgeons and residents in the Section of Colon and Rectal Surgery using the A3 problem solving methodology. Potential targets included presence of an epidural, patient origin (home, outside emergency department, outside hospital, or nursing facility), time from admission to operation, presence of a peripherally inserted central catheter (PICC lines), and post-operative ambulation. Chi-squared and univariate logistic regression were used to determine the association between potential targets and VTE.

Results/Outcome(s): A total of 1963 patients met inclusion criteria, 71 of which had either a deep vein thrombosis (DVT), pulmonary embolism (PE), or both for an overall VTE rate of 3.6%. The odds of VTE were 3.7 times higher in patients transferred from an outside hospital compared to those admitted from home, regardless of time to surgery (95% CI 1.7-8.2). The incidence of VTE progressively increased from 2.5% in those having their operation on the day of admission to 11% in those waiting greater than 5 days (OR 4.9, 95% CI 2.6-9.2). Each additional inpatient day prior to surgery was associated with a 5% increase in the risk of VTE (OR 1.05, 95% CI 1.02-1.07). Of patients with PICC lines, 34 of 71 patients had a post-operative VTE. Presence of an epidural was not associated with an increased risk of VTE (3.9% vs 2.4% $p=0.1$). The absence of ambulation carried the strongest association with VTE. Patients that ambulated twice on POD 1 had a 1.1% (2/282) incidence of VTE compared to 6.9% (23/332) that did not ($p<0.01$). And strikingly, there was a 0% (0/226) incidence of VTE in patients who ambulated at least twice on POD 1 and 2 compared to 6.3% (24/382) in patients that did not ($p<0.01$).

Conclusions/Discussion: In our institution, there was clear relationship between lack of ambulation, prolonged

pre-operative stay, and transfer from an outside hospital and development of VTE. Combining the A3 problem solving methodology, NSQIP, and institution specific data allows for creation of an evidence-based, institution-specific targets for a quality improvement project with the goal of lowering the incidence of post-operative VTE.

Table 1: Risk factors associated with Venous Thromboembolism

Risk Factor	VTE % (n)	Odds Ratio (95% CI)
All Patients	3.6% (71/1962)	-
Epidural		
Epidural Absent	3.9% (61/1550)	Ref.
Epidural Present	2.4% (10/412)	0.61 (0.31-1.2)
Patient Origin		
Home	3.1% (54/1746)	Ref.
Outside ER	6.3% (8/127)	2.1 (0.98-4.5)
Outside Hospital	11% (8/75)	3.7 (1.7-8.3)*
Nursing Facility	7.1 % (1/14)	2.4 (0.3-19)
Inpatient Days Prior to OR		
0	2.5% (38/1528)	Ref.
1-2	5.8% (11/189)	2.4 (1.2-4.8)*
3-5	6.8% (8/118)	2.9 (1.3-6.3)*
>5	11% (14/127)	4.9 (2.6-9.2)*
Ambulation \geq Twice on POD #1		
Yes	1.1% (3/282)	Ref.
No	6.9% (23/332)	6.9 (2.1-23.3)*
Ambulation \geq Twice on POD #1 AND #2		
Yes	0% (0/226)	Ref.
No	6.3% (24/382)	N/A [†]

[†] Unable to calculate odds ratio as reference group has 0 VTEs.

* Statistically significant

Figure 1: Risk factors associated with Venous Thromboembolism

CHANGING THE CULTURE OF THE INSTITUTION THROUGH STANDARDIZED ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL IN COLORECTAL SURGERY PATIENTS.

P529

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Purpose/Background: The ERAS protocol for colorectal surgery is a set of recommendations to guide all phases of the operative management. Our study focuses on the effect that compliance with this protocol has on the patient outcomes.

Methods/Interventions: We review outcomes and quality metrics in all patients undergoing colectomies with primary anastomosis at our institution since the transition to ERAS was implemented (July 2014).

Results/Outcome(s): A total of 135 colectomies were performed, including 87 laparoscopic colectomies and 48 open colectomies. Patients were stratified to three different groups according to their percent of compliance with the ERAS protocol criteria: Group 1: 0-25% (N=15), Group 2: 26-50% (N=83) and Group 3: 51-75% (N=37). There was no significant difference between the groups with respect to age, sex, BMI, or ASA score. The mean postoperative length of stay was: Group 1= 9.1 days, Group 2 = 4.8 days, and Group 3 = 3.3 days ($p < 0.001$). Meanwhile, days to ambulation ($p < 0.001$) and days to bowel function ($p = 0.023$) also reached statistical significance. Overall, anemia requiring transfusion and

uncontrolled glycemia were the most frequent of these post-operative complications.

Conclusions/Discussion: Implementation of the ERAS protocol in our institution, independent of the effect of the type of surgery, has proven to be effective. Adherence to the protocol correlates directly to better outcomes. Adoption of the protocol by the majority of surgeons at our institution has been possible. Length of stay, rate of complication, and return of bowel function were reduced when ERAS was strictly followed.

A COMPARISON OF AGE AND MOLECULAR PROFILING IN COLORECTAL CANCER PATIENTS.

P530

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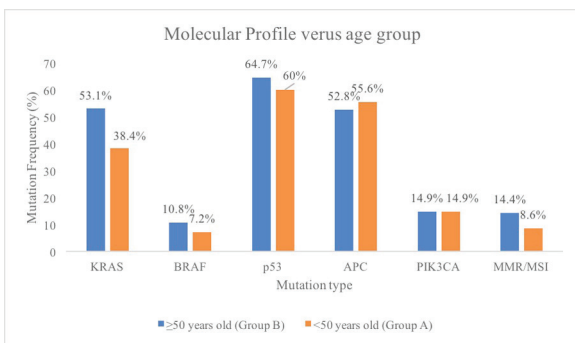
Purpose/Background: Colorectal adenocarcinoma is a disease that predominantly affects the elderly population, but attention has been turned to the growing incidence of colorectal cancer (CRC) in young patients. Currently, screening for colorectal cancer is recommended to begin at the age of 50, or at a younger age if there is strong family history, and the proposition to move screenings to begin at a younger age is now being considered. Since molecular profiling (MP) has become a tool for evaluating primary tumors, the objective of this study is to analyze molecular profiles of patients with CRC and evaluate expression based on age at diagnosis.

Methods/Interventions: A retrospective study was performed using MP data of CRC patients of any stage who were treated at our tertiary cancer center between 2006 and 2017. Those who did not undergo MP, those with incomplete data as well as those with no detection of mutation were excluded. Demographic, clinical, and pathological data were collected and analyzed. Statistical comparison analysis was performed using the Chi-square and Kaplan-Meier tests as appropriate.

Results/Outcome(s): The cohort analyzed consisted of 356 CRC patients who underwent MP, with the median age at diagnosis being 60 years old (range 27-90). Of this group, 82 (23.0%) were <50 years old (Group A), and 274 (77.0%) were \geq 50 years old (Group B). For Group A, the median age at diagnosis was 43 years old (range 27-49), 49 (59.8%) were male, and 48 (58.5%) were Stage IV, and the average number of mutations was 1.48. For Group B, the median age at diagnosis was 64 years old (range 50-90), 148 (54.0%) were male, and 149 (54.4%) were Stage IV, and the average number of mutations was 2.47. Mutation in KRAS was present in 38.4% of Group A vs 53.1% of Group B ($p = 0.03$), p53 mutation in 60.0% vs 64.7% ($p = 0.48$), BRAF mutation in 7.2% vs 10.8% ($p = 0.39$), APC mutation in 55.6% vs 52.8% ($p = 0.69$),

PIK3CA mutation in 14.9% vs 14.9%, and defective mismatch repair/microsatellite instability (dMMR/MSI) in 8.6% vs 14.4% (p=0.18). The average overall survival was for Group A was 89.4 months and 66.7 months in Group B (p=0.01).

Conclusions/Discussion: Utilizing MP data has helped us describe if age at diagnosis and mutation are in any way related. Our cohort was predominantly of the older population, but both age groups as expected demonstrated predominance in p53 and APC mutations. Additionally, mutation frequencies varied for BRAF and dMMR/MSI, and did so significantly for KRAS between both age groups. The overall survival for both age groups were significantly different. To better characterize young patient with CRC and their molecular phenotypes, further investigation with a larger cohort is warranted.



INTRATHECAL (IT) ANALGESIA: A SAFE, RELIABLE, AND EFFECTIVE PAIN MODALITY WITHIN A LAPAROSCOPIC COLORECTAL ENHANCED RECOVERY PROGRAM (ERP).

P531

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Purpose/Background: Opiate abuse is a national health emergency and is frequently iatrogenic in nature. A major effort is afoot to decrease opiate use peri-operatively within ERPs. Traditionally, pain management after colorectal surgery consisted of patient-controlled intravenous opiate analgesia (PCA) or epidural analgesia. Concerns with epidurals include post-operative hypotension and variable efficacy. IT analgesia is a simple, quick, single-injection, non-catheter-based method of opiate administration. ITs have been the primary pain modality at our institution for ten years as part of our colorectal ERP, but their safety and efficacy in colorectal surgery have not been well-described.

Methods/Interventions: Data were collected retrospectively on 118 patients who underwent laparoscopic colorectal resection in 2016. Cases were patients who received IT with routine post-operative oral/IV opiates. Controls were patients who were considered for an IT, but did not receive one, e.g. due to patient refusal. They received standard post-operative opiates alone. We

examined oral morphine equivalent (OME) use and pain scores on a visual analogue scale (VAS) at three post-operative time points: interval 1 (0-8 hours), interval 2 (9-16 hours), and interval 3 (17-24 hours), as well as length of stay. Safety endpoints included need for postoperative antiemetic use, respiratory arrests, neuraxial hematoma, and post-dural puncture headache requiring a blood patch.

Results/Outcome(s): We had 93 cases and 25 controls. As listed in table 1, patients who declined intrathecal were significantly more likely to be older with higher ASA score. Median OME for intrathecal patients was significantly lower for time interval 1 and 2, as compared to controls, and not significantly different at interval 3. Median VAS scores were lower at interval 1, and not significantly different at intervals 2 and 3. Cases had a significantly shorter length of stay. There was no difference in antiemetic use. There was 1 respiratory arrest in the intrathecal group, and no other complications.

Conclusions/Discussion: IT analgesia is a key component of our successful colorectal ERP. It offers several known advantages over epidural, such as no indwelling catheter, no constraints regarding pharmacologic DVT prophylaxis, and significantly easier and more reliable placement. ITs reduced early mean postoperative opiate use and pain scores by half. The majority of patients required no additional opiate during the first 16 hours postoperatively. Mean length of stay was reduced by 34% compared to conventional postoperative opiate use. Although there are legitimate concerns about respiratory depression, with appropriate nursing education for post-operative monitoring and a coordinated multidisciplinary effort, an IT anesthesia program can be safely and efficaciously implemented with fewer barriers to use than epidural anesthesia in colorectal patients.

	Intrathecal (n=93)	Controls (n=25)	p-value
Age (years)	60 (53.5-67.5)	73 (70-85)	<0.0001 **
Female	51 (55%)	15 (60%)	0.64
ASA (median)	2	3	<0.0001 **
BMI (mean)	28	27	0.10
Procedure			0.04 **
R colectomy	33 (35%)	5 (20%)	
TV colectomy	2 (2%)	2 (8%)	
L colectomy	28 (30%)	15 (60%)	
Proctectomy	23 (25%)	2 (8%)	
Other	7 (8%)	1 (4%)	
Antiemetic use			p=0.25
Median # doses	1	0	
% use	51.6%	44%	p=0.50
Adverse events			p=0.60
Respiratory arrests	1	0	
Neuraxial hematoma	0	0	
Blood patch	0	0	
OME (median mg)			
Interval 1 (0-8hrs.)	0	5	0.01 **
Interval 2 (9-16hrs.)	0	10	0.04 **
Interval 3 (17-24hrs.)	10	7.5	0.17
Overall 24 hrs.	15	22.5	0.10
VAS (median)			
Interval 1 (0-8hrs.)	2	4	0.0002 **
Interval 2 (9-16hrs.)	2	0	0.39
Interval 3 (17-24hrs.)	2	2	0.33
Overall mean 24 hrs.	2	3.67	0.10
Length of stay (days)	3	5	P<0.001 **

Table 1: Demographics and principal safety and efficacy outcomes comparing intrathecal patients and controls.

TRANSANAL EXCISION FOR T2 OR GREATER RECTAL CANCER HAS FAVORABLE OUTCOMES: A RETROSPECTIVE ANALYSIS.

P532

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Purpose/Background: Local excision of rectal cancer by transanal excision (TAE) is a topic of contention for clinical T2 or T3 rectal adenocarcinoma. We aim to evaluate our clinical experience of TAE for T2 or greater rectal cancers in select patients.

Methods/Interventions: From an IRB approved database, patients who underwent TAE for rectal cancer were identified. Clinical T2 or greater rectal cancers were included. Patients with metastatic disease or who underwent subsequent early radical excision were excluded. Primary outcome measures included tumor downstaging, local recurrence, and distant recurrence.

Results/Outcome(s): Of 78 patients that underwent TAE for rectal cancer from 2003 to 2017, 48 were included in this study: 27 with T2Nx disease and 21 with T3Nx disease. All patients were deemed unfit to undergo or had refused radical excision. Mean age was 70.48 years (42-97). Mean Charlson Comorbidity Index was 2.9 (2-6). Forty-one patients (85.4%) received neoadjuvant therapy, 11 (23%) received adjuvant therapy. Thirty-eight (92.68%) patients had downstaging of the tumor following neoadjuvant therapy. One patient (2.1%) developed metastatic disease. Three patients (6.25%) developed local recurrence: 1 underwent repeat TAE for palliation, 1 was lost to followup, and 1 underwent chemotherapy. The mean follow-up was 35 months (1-160). Overall survival was 93.8%.

Conclusions/Discussion: We observe a much lower and possibly acceptable recurrence rate for T2 or greater rectal cancers in select patients following TAE in combination with neoadjuvant radiation and chemotherapy. Longer follow-up is necessary to continue to validate the results.

IS THERE A ROLE FOR ROUTINE, OFFICE-BASED FLEXIBLE SIGMOIDOSCOPY TO EVALUATE LEFT-SIDED COLORECTAL ANASTOMOSES?

P533

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Purpose/Background: Left-sided anastomotic stricture rate following colorectal surgery is reportedly between 5-20%. To date, there is no literature exploring the efficacy of endoscopic surveillance for detecting asymptomatic strictures. This study aims to demonstrate the utility of

routine post-operative endoscopy for the identification and treatment of anastomotic strictures.

Methods/Interventions: We performed a retrospective review of 201 surgeries between 2013 and 2017. Procedures included all laparoscopic and open colorectal surgeries with a left-sided anastomosis, excluding colo-anal anastomoses, performed for both benign and malignant disease. Inclusion criteria were as follows: elective surgery, creation of a left-sided anastomosis (colo-colic, colo-rectal or ileo-rectal) and the absence of a peri-operative anastomotic leak or bleed. Each patient was followed for a minimum of 6 months post-operatively. Pre-operative, peri-operative and post-operative data were collected for each patient. A stricture was defined as an anastomosis through which we were unable to pass a 12-mm flexible sigmoidoscope. Student's t-test was used to analyze continuous variables; Fisher's exact test for categorical variables.

Results/Outcome(s): Of the 201 patients, none had clinical signs or symptoms of anastomotic stricture within 90 days of surgery. 121 patients underwent office-based endoscopic surveillance of the anastomosis without complication within that 90-day time period. The average time from surgery to scope was 64.7 days. There was no difference in age, gender, tobacco use, diabetes, pre-operative radiation status or presence of a proximal diverting stoma between the two groups. Of the patients who were surveilled, 7.4% were found to have strictures, at an average of 49.6 days. An additional 1.7% of the surveilled patients developed late symptomatic strictures (post-operative days 146 and 910), despite the lack of findings on surveillance scope. Of the patients who were not surveilled, 1.3% developed late symptomatic strictures (post-operative day 178 day). There was no statistically significant difference in any of the aforementioned variables, or indication for surgery, between patients who developed strictures and those who did not. All strictures, early and late, were successfully treated with outpatient endoscopic dilation without complication.

Conclusions/Discussion: This is the first study to investigate the role of routine, office-based endoscopy following creation of bowel anastomoses. Because the risks are low, we routinely surveille left-sided anastomoses in the office post-operatively. Our findings show that the use of early surveillance did identify several anastomotic strictures that were successfully treated endoscopically. This study is limited by retrospective review and small sample size; more studies are needed to determine if early identification and treatment of strictures improves long-term patient outcomes.

URINARY RETENTION IN ABDOMINOPERINEAL RESECTION AND LOW ANTERIOR RESECTION PATIENTS ON THE ENHANCED RECOVERY AFTER SURGERY PATHWAY.

P534

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Purpose/Background: Postoperative bladder dysfunction has been well-described following low pelvic dissection during abdominoperineal (APR) and low anterior resections (LAR). Foley catheters are often left in place for several days postoperatively given the risk of urinary retention. In the era of enhanced recovery after surgery (ERAS), patients are frequently ready for discharge earlier in the postoperative period. Foley catheters placed perioperatively may be a barrier to discharge. The goal of this study was to analyze Foley catheter utilization in APR and LAR patients during the era of ERAS and determine the factors associated with Foley reinsertion for urinary retention following LAR and APR.

Methods/Interventions: A retrospective chart review was completed to identify all patients undergoing LAR or APR at one tertiary care center from October 2015 to October 2017. All patients were managed in accordance with our institution's ERAS protocol. The primary outcomes were failure to void and catheter re-insertion. Patient demographics including age, gender, BMI as well as co-morbidities were collected. Variables associated with urinary retention were also collected, including failure to void, need for straight catheterization, Foley re-insertion, UTI, history of BPH, history of pelvic irradiation, epidural use, and history of urologic surgery.

Results/Outcome(s): A total of 279 patients were identified who underwent LAR or APR. Thirty two patients (11.9%) failed to void requiring straight catheterization or Foley replacement in the immediate postoperative period (21 LAR patients, 11 APR patients). Twenty-five patients (8.9%) had Foley catheters replaced during their hospital stay. Patients who had a Foley reinserted were more likely to have had prior urologic surgery ($p=0.02$). There were no associations between Foley reinsertion and gender, age, epidural use, UTI, history of BPH, diabetes, COPD, CAD, renal disease, or pelvic radiation. In multivariate logistic regression, history of urologic surgery was an independent risk factor for Foley reinsertion (OR: 3.44, 95%CI: 0.998-11.83, p value=0.05). The median time for Foley removal was 3 days and median time to Foley replacement was 1 day (0-2 days) after removal. Patients with Foley replacement had a significantly longer hospital length of stay (5 days vs 3 days, p value= 0.01).

Conclusions/Discussion: There appears to be a baseline rate of approximately 8.9% for Foley catheter replacement after APR and LAR in the enhanced recovery era. Understanding risk factors for Foley re-insertion after LAR

or APR can impact practice patterns in the immediate postoperative period. Further studies including a prospective trial comparing standard Foley removal patterns versus early removal in the enhanced recovery era may be necessary to further guide management.

A NOVEL ERAS PROTOCOL: THE QUEST FOR NARCOTIC-FREE COLECTOMY.

P535

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Purpose/Background: Enhanced Recovery After Surgery (ERAS) protocols result in shorter inpatient stays, early return to work, and decreased cost.. Decreased use of narcotics independently reduces length of hospital stay. While there is no consensus regarding the optimal ERAS protocol, general principles include nutrition optimization, goal directed fluid therapy, a multimodal pain management strategy, and post-operative early ambulation. This study examines the outcome of a new ERAS protocol which incorporates prehospital medication and education, as well as anesthetic and operative techniques to decrease narcotic use.

Methods/Interventions: A retrospective review was completed of all patients who underwent an elective colectomy using a new ERAS protocol. Operations were performed from March to October 2017. All patients received a standard bowel preparation and preoperative carbohydrate loading. Patients received Acetaminophen, Naprosyn, Gabapentin, and Methocarbamol in the mail prior to the operation along with detailed instructions. A single preoperative dose of each of these medications was taken immediately prior to leaving the house for surgery. Alvimopam was given to all eligible patients. After induction, transverse abdominis plane and posterior rectus sheath blocks were performed with liposomal bupivacaine. Intraoperatively, patients received continuous infusions of lidocaine, which were continued in PACU. Ketamine was also given intraoperatively, either as a continuous infusion or as an hourly bolus. Anesthesia providers were asked to minimize narcotic use. Fluids were kept to a minimum. Postoperative analgesia consisted of scheduled Acetaminophen, Naprosyn, Gabapentin, and Methocarbamol, with narcotics available as needed.

Results/Outcome(s): 31 patients underwent an elective partial colectomy during the 5 month period. There were 19 sigmoid colectomies and low anterior resections, 8 right colectomies, and 4 other colectomies. 25 of the operations were done robotically; there were 4 open procedures and 2 laparoscopic procedures. Completely narcotic-free hospitalizations were achieved for 11 of the 31 patients (35.5%), and 2 of 31 patients were discharged with any narcotics (6.5%). The mean length of stay was 1.38 days (1.17-1.6, 95% CI). The mean use of intraoperative narcotics was

1.13 morphine milligram equivalents (MMEs). The mean use of postoperative narcotics including PACU was 4.17 MMEs. In terms of complications, surgical site infection rate was 9.7% (3/31), and readmission rate was 3.2% (1/31). There were no anastomotic leaks.

Conclusions/Discussion: This ongoing study is promising in continuing the advancement of ERAS protocols. The combination of ketamine, lidocaine, and preoperative blocks were highly effective in decreasing narcotic use. In addition, patients had low morbidity and readmission rates. Once a sufficient number of patients have been accrued, a more comprehensive comparative study will be undertaken to further evaluate this protocol.

RISING USE OF ROBOTICS IN COLORECTAL SURGERY ASSOCIATED WITH LESS IN OPEN PROCEDURES BUT NO CHANGE IN LAPAROSCOPIC: AN ACS NSQIP DATABASE ANALYSIS.

P536

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Purpose/Background: Robotic assisted procedures are increasing in colon and rectal surgery. The relative impact robotic use is having on overall laparoscopic and open procedures is unknown. We sought to find out whether increasing use of robotic surgery is leading to a decrease in laparoscopic surgery, open, or both.

Methods/Interventions: Analysis of colon and rectal surgical procedures from 2013 -2016 was performed using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. Comparisons between laparoscopic (LC), open (OC) and robotic (RC) colorectal procedures were assessed for frequency of technique and indication for procedure. As

overall procedure reporting increased during the study period, relative use of LC, OC and RC procedures were compared.

Results/Outcome(s): From 2013-2016, 113,979 colon and rectal surgical procedures were reported through the ACS-NSQIP database. Reporting increased from 21,505 overall cases in 2013 to 35,905 in 2016. The percentage of overall surgeries that were performed or attempted robotically steadily increased from 3.1% in 2013 to 8.9% ($p<0.01$) in 2016, representing a 187% relative increase in robotic use over the four years. While planned LC procedures remained steady between 54.4% and 56.9% ($p=0.11$) of all procedures, planned OC procedures steadily decreased, from 40.7% in 2013 down to 35.7% ($p<0.01$) in 2016. Over the course of the study period, both RC and LC conversion to open rates decreased significantly, from 10.7% to 6.8% ($p<0.001$) and 13.7 to 12.1% ($p<0.001$), respectively. While there was no significant change in the proportion of OC procedures performed for cancer (25.3% in 2013 vs 26.1% in 2016; $p=0.22$), the percent of RC and LC surgery performed for colon cancer steadily increased over the study period, from 39.7% to 51.0% ($p<0.0001$) of all completed RC procedures and 35.6% to 42.1% ($p<0.001$) of all LC completed procedures.

Conclusions/Discussion: As robotic surgery for colorectal disease becomes more prevalent, open surgical procedures are decreasing as a relative proportion. In addition, both RC and LC procedures experienced significant decreases in conversions to open, which may be expected with progressive use and experience. Reported use of minimally invasive surgery for colon cancer steadily increased during the study period. Most analysis today compares LC and RC, but if some RC procedures are replacing OC procedures, identification of these may provide a more appropriate comparison for outcomes.

P534

Variable	Foley re-inserted	Foley not re-inserted	P value
Age, years, median	63 (49.5-75)	57 (48-67.5)	0.195
BMI, median	27 (23-34)	27 (23-31)	0.973
Length of Stay, days, median	5 (3.5-8.5)	3 (3-5)	0.012
Diabetes, n (%)	7 (28)	34 (13)	0.07
COPD, n (%)	0 (0)	7 (3)	1.00
Renal disease, n (%)	2 (8)	11 (4)	0.31
CAD, n (%)	4 (16)	18 (7)	0.12
Epidural, n (%)	8 (33)	120 (47)	0.19
UTI, n (%)	1 (4)	4 (2)	0.38
History of BPH, n (%)	3 (12)	18 (7)	0.42
BPH medications, n (%)	3 (12)	16 (6)	0.39
Coude catheter, n (%)	1 (17)	2 (3)	0.22
History of pelvic irradiation, n (%)	14 (56)	124 (49)	0.52
Prior urologic surgery, n (%)	5 (20)	14 (6)	0.02

NEGATIVE PRESSURE WOUND THERAPY IS BENEFICIAL IN THE TREATMENT OF PILONIDAL DISEASE WITH EXCISION AND PRIMARY CLOSURE.

P537

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Purpose/Background: There are multiple surgical approaches to the treatment of Pilonidal Sinus Disease (PSD). All are associated with wound complications including surgical site infections (SSI), dehiscence, and recurrence. Negative Pressure Wound Therapy (NPWT) has been reported to decrease wound complications after surgery. We report our experience with NPWT after excision with primary closure of PSD.

Methods/Interventions: We report 65 consecutive patients that underwent excision of pilonidal sinus disease with primary closure and placement of Negative Pressure Wound Therapy dressing. NPWT was placed over the closed incision for 3-7 days at -120mm hg. We compare these results with 65 consecutive patients prior to using NPWT who underwent excision PSD with primary closure. Both groups studied were well matched and there was no difference in Age, sex, OR time, Blood loss, incisions size. Early period complications (wound site infection, wound dehiscence, abscess, hematoma and seroma formation) developing within 30 days of operation was recorded from the medical files. Data were analyzed using SPSS ver. 12.0 (SPSS Inc., Chicago, IL, USA). Comparison of groups was done with ANOVA.

Results/Outcome(s): Mean age of patients was 25.4 ± 5.7 years and the male: female ratio was 4:1. Operation time did not differ between groups. Significant decrease in early wound complications occurred in those patients treated with NPWT, 11% (6/65,) compared to those patients that did not have NPWT, 25% (16/65) p, <0.001. Surgical site infection was significantly decreased in the NPWT group, 4.6% (3/65) compared to those who did not have NPWT 15% (10/65), p<0.001. Recurrence of pilonidal disease was significantly decreased in the NPWT patients 3% (2/65) compared to non-NPWT 12% (8/65), p<0.0001.

Conclusions/Discussion: The use of Negative Pressure Wound Therapy is beneficial in patients undergoing excision and primary closure of pilonidal sinus disease. NPWT leads to a decrease in early wound complications including wound seroma, dehiscence and SSI. In addition NPWT also significantly resulted in a decrease in recurrence of disease. We recommend the use of NPWT in the surgical management of pilonidal disease treated with excision and primary closure.

ANAL ABSCESS MANAGEMENT STRATEGY TO REDUCE THE INCIDENCE OF ANAL CANAL FISTULA FORMATION.

P538

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Purpose/Background: fistulas have been a very important health problem currently among 20 000 and 25 000 new cases are developed per year in the United States, approximately 95% of the fistulas arise an anorectal abscess of crypto-glandular origin Comorbidities have been reported such as bacterial colonization and smoking or the gender that influences the formation of abscesses Is clear relationship between abscesses and anorectal fistulas Its been reported that approximately one third of patients with abscess will have a concomitant fistula Some studies describe the male gender age <40 years, smoking, BMI> 25kg / m2 body surface as predisposing factors for its formation Further studies are needed, especially to determine if there are modifiable risk factors to reduce the incidence of anorectal fistulas

Methods/Interventions: A prospective, observational, longitudinal study was carried out of the patients who requested urgent medical attention at the Colon-proctology service of the *Lic. Adolfo López Mateos* Hospital in Mexico City, with diagnosis of perianal abscess Patients with a diagnosis of perianal abscess of crypto-glandular origin were included; all patients with a diagnosis of HIV, Crohn's disease, and those who did not have endo-anal USG were excluded to determine the type of fistulous tract. two groups, drainage abscess in consulting room, local anesthesia drainage + cryptectomy in operating room regional anesthesia. All patients received antibiotic treatment with metronidazole and those who presented hypersensitivity were treated with Clindamycin for 7 days. All patients were followed by the outpatient clinic for a minimum of 7 months

Results/Outcome(s): Patients Male 147 Demale 31 Total 178 61 fistula formation 117 no fistula formation
TYPE OF ABSCESS Intersphinteric 20 Perianal 96 isquioanal 38 supraelevator 1 superficial Postanal 12 deep Postanal 4 horseshoe 7 TOTAL 178
TYPE OF FISTULA Transsphinteric 27 Intersphinteric 22 Extrasphinteric 1 without secondary orifice 11 61 FISTULA FORMATION
INCIDENCE fistula formation is 34.3% 61 patients The gender was identified as a risk factor for the development of perianal fistula, with a value of p = <0.008, with a relative risk of 2.3, 95% confidence interval 1.2 to 4.4 man vs. woman. **DRAINAGE PLACE 39.56% fistula formation in consulting room p = <0.005 risk 1.2 IC 95% (1.09 - 1.44) 15.38% fistula formation in the operating room**
Other factors: Diabetes mellitus p = <0.16 Systemic arterial hypertension p = <0.65 Smoking p = <0.22 Median age with fistula formation 50.1 years Median age without fistula formation 51.09 years There is no significant difference with value of p = <0.64

Conclusions/Discussion: In the case of an anorectal abscess, surgical management showed a lower incidence in fistula formation versus consulting room drainage. For the formation of anorectal fistula, the age or comorbidities factors that were valued in this study do not intervene. The male gender had greater fistula formation as reported in the literature.

FORMAL ADOPTION OF CANCER QUALITY METRICS CAN REDUCE DISPARITIES BETWEEN CANCER CENTERS.

P539

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Ypsilanti, MI

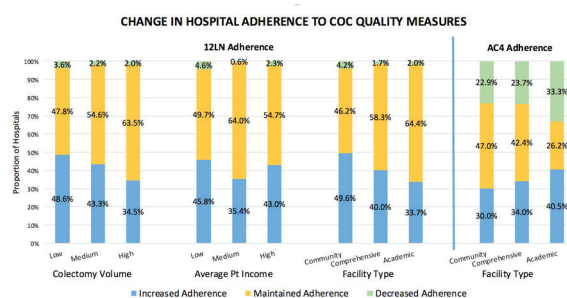
Purpose/Background: To improve performance and reduce variation in the quality of cancer care in the United States, the Commission on Cancer (CoC) introduced two colon cancer accountability measures for accreditation in 2008: (1) examination of ≥ 12 lymph nodes (12LN) in resection specimens and (2) receipt of adjuvant chemotherapy within 4 months of resection for patients with stage III disease (AC4). Previous studies have shown that community cancer centers have lower rates of adherence on these measures, while hospital procedure volume plays little role. It remains unknown whether introduction of CoC accountability standards has enabled improvements in these lesser-performing settings, or widened disparities by disproportionately increasing adherence in institutions already most capable of delivering high-quality care.

Methods/Interventions: Using the National Cancer Database, we identified 1,243 hospitals that performed 615,676 colectomies between 2004-2013. We compared hospital-level rates of adherence to 12LN and AC4 before and after formal guideline implementation. We identified the median adherence rate to 12LN and AC4 from 2004-2008 and used this number as the benchmark for improvement. We then compared each hospital's adherence rates in 2009-2013 to the benchmark and performed univariate analysis to evaluate hospital characteristics associated with improvement in guideline adherence.

Results/Outcome(s): In 2004-2008, the average hospital level adherence rate for 12LN was 57% which improved to 74% ($p < 0.001$) in 2009-2013. Hospitals performing a low volume of colectomy ($p = 0.003$), that were designated as community cancer programs ($p = 0.003$), and served a patient population with low average income ($p < 0.001$) were more likely to show significant improvements in adherence to 12LN after guideline implementation. In 2004-2008 the average hospital level adherence rate for AC4 was 81% and increased slightly to 83% ($p = 0.01$) in 2009-2013. Analysis of this measure demonstrated that community institutions were least likely to decrease adherence compared to academic institutions ($p = 0.003$). Hospital volume, patient income, education and insurance

payer composition had no significant relationship to improvement (Figure 1).

Conclusions/Discussion: Implementation of quality guidelines in colon cancer care was associated with improved rates of adherence to quality metrics. Further, measure adoption led to decreased disparities between institutions, as low volume, community cancer centers showed greatest improvement in guideline adherent care. Because high-volume, academic hospitals with a greater proportion of moderate or high income patients had higher pre-2008 adherence, they exhibited lesser degree of change than centers most in need of improvement. These findings suggest that implementation of CoC colon cancer quality measures was associated with decreased variability and narrowed disparities in the quality of colon cancer care delivered in US cancer centers.



PREDICTIVE FACTORS OF ILEUS FOLLOWING ELECTIVE PROCTECTOMY: THE FIRST REPORT FROM THE NSQIP TARGETED PROCTECTOMY FILES.

P540

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Purpose/Background: Ileus is one of the most common postoperative complications following colorectal surgery. The aim of this study was to determine the predictors of ileus following minimally invasive and open elective rectal resections.

Methods/Interventions: The 2016 National Surgical Quality Improvement Program (NSQIP) targeted proctectomy files were used to examine clinical data of patients who underwent elective proctectomy. Emergent and disseminated cancer cases were excluded. Univariate analysis was used to compare characteristics of the ileus and no-ileus cohorts. A multivariate logistic regression model was utilized to identify risk factors predictive of ileus.

Results/Outcome(s): Of the 2,997 proctectomy procedures identified, 17.2% (515/2,997) of the patients experienced ileus. Univariate analysis showed patients with ileus were more likely to be male (63.5% vs. 36.5%, $P = 0.001$) and have had longer median operative time [293 min

(Range: 32-1027) vs 233 min (Range: 2-1084), $P < 0.01$]. Overall, the ileus cohort had a significantly longer median hospital stay (11 days vs. 5 days, $P = 0.02$). Patients with ileus had significantly higher 30-day mortality (2.1% vs. 0.5%, AOR 7.48, $P < 0.001$) and overall morbidity (45.5% vs 23.2%, AOR: 2.61, $P < 0.001$). Multivariate analysis revealed that risk factors predictive of ileus included anastomotic leak (8.4% vs. 1.9%, AOR 2.25, $P < 0.001$), organ/space surgical site infections (18.3% vs. 5.3%, AOR 2.09, $P < 0.001$), longer operative time (AOR 1.34, $P < 0.001$) and open surgery (AOR 1.35, $P = 0.02$).

Conclusions/Discussion: In this targeted NSQIP file, we found that ileus is a common condition following rectal resections, with an incidence of 17.2%. Anastomotic leak, organ/space surgical site infections, and longer operative time are significantly associated with higher risk of ileus. Utilizing minimally invasive approach may decrease the risk of ileus.

INSURANCE STATUS AND 30 DAY READMISSIONS AFTER COLECTOMIES: AN ANALYSIS OF NATIONAL READMISSIONS DATABASE.

P541

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Purpose/Background: Patient readmission after surgery represents a significant burden to patients and a substantial financial burden for hospitals. As a result, the Centers for Medicare and Medicaid Services (CMS) are imposing heavy financial penalties for these readmissions. Understanding the factors driving readmission is an important step toward the improvement of care and efficiency of our healthcare system. We sought to determine the influence of insurance status on 30-day readmissions after colectomies using a national dataset.

Methods/Interventions: We analyzed the national readmission dataset for all adult patients who underwent a colectomy, either laparoscopic or open, between January and August of 2013. Patients with a readmission within 30 days of their hospital discharge were identified. Multivariable logistic regression analyses was used to determine the likelihood of 30 day readmission based on insurance status. We also stratified patients into cancer vs non-cancer groups. Variables in the model included patient demographics, comorbid conditions, procedure performed, location of the tumor, post-operative complications, length of stay, and facility level factors. Models accounted for clustering by facility.

Results/Outcome(s): A total of 27,531 patients underwent laparoscopic and open colectomies. The mean age was 62.4 years and 44.3% were male. 27.6% had a cancer operation. A major complication occurred in 7,334 (25.9%) patients, the median length of stay was 5 days and

27,497 (97.2%) were discharged alive. 30 day readmission rate was 11.8%. Private and public insurance accounted for 29.6% and 70.4% respectively. Readmissions rates were higher among the publicly insured patients (13.1%) when compared to those privately insured (9.1%). In our multivariable analysis, the likelihood of 30 day readmission was higher for non-cancer surgery (OR 1.23 95%CI 1.14-1.34) when compared to 30 day readmissions following non-cancer surgery (OR 1.16, 95%CI 1.01-1.34). For both groups, there was a higher likelihood of prolonged length of hospital stay (OR 1.43, 95%CI 1.34-1.54), those who suffered a major complication (OR 1.12, 95%CI 1.02-1.23), those who were discharged to a facility (OR 1.29 95%CI 1.19-1.41), teaching compared to nonteaching hospitals (OR 1.13 95% CI 1.06-1.21). Open surgery was associated with more readmissions than open surgery (OR 1.31 95%CI 1.23-1.39).

Conclusions/Discussion: Patients with public insurance were more likely to be readmitted within 30 days of colorectal surgery when they had a non-cancer diagnosis when compared to those with a cancer diagnosis. Our findings may be secondary to increased point of contacts with the health care system upon diagnosis of cancer. Further research is needed to analyse these points of contacts in order to improve hospital readmission rates.

A RETROSPECTIVE STUDY ASSESSING THE RISK FACTORS ASSOCIATED WITH POSTOPERATIVE COMPLICATIONS IN THE TREATMENT OF NEOPLAIS BY TRANSANAL ENDOSCOPIC MICROSURGERY (TEM).

P542

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Purpose/Background: Transanal endoscopic microsurgery (TEM) is a minimally invasive technique that is used in the treatment of benign as well as early malignant rectal neoplasias (T1/T2). Although, TEM is a safe and effective local treatment method for rectal lesions, post-operative complications can occur. These complications can be significant and debilitating. The aim of this study is to evaluate the factors that contribute to the incidence and severity of TEM complications.

Methods/Interventions: A retrospective analysis of 31 patients who underwent TEM for curative intent at a single institution by an experienced surgeon between May of 2010 and August of 2017 was performed. The variables assessed are: sex, age, American Society of Anesthesiologists (ASA) score, neoadjuvant chemotherapy and radiation, distance of the lesion from the anal verge (AV), histology, lesion size, and suture closure method. The Clavien-Dindo classification is used to define and grade the post-operative complications.

Results/Outcome(s): Within this study, the overall complication rate is 29%. The complications range from a perforation requiring a return to the operating room (3.2%) to the more common complications of urinary retention, fecal incontinence, and rectal bleeding (9.6%, 9.6%, and 9.6%). Only one patient had rectal bleeding severe enough to require blood transfusions. Patients who had distal lesions (5 cm or less from the AV) and who underwent neoadjuvant chemotherapy and radiation were more likely to present with multiple complications. Clavien-Dindo Grades I and II complication rates were 22.5% and 3.2%, respectively, while those of Grade III were 3.2%. The parameters involving sex, age, ASA score, and closure technique of either using the LSI Ti-Knot device versus interrupted PDS and Vicryl sutures did not influence chance of complications. Most complications were detected within the 2 weeks following surgery.

Conclusions/Discussion: The risk factors that contribute to TEM post-operative complications are distance of the neoplasm from the anal verge and neoadjuvant chemotherapy and radiation. Although post-operative complications from TEM are not uncommon, they oftentimes can be managed without surgical intervention and intensive care unit involvement. Mortality remains low with TEM.

Table 3 Clavien - Dindo complication classification

Grade	n (%)
0 No complication	22 (70.9%)
General complications	9 (29%)
I Any deviation from the normal postoperative course with minimal pharmacologic treatment (allowed drugs are antiemetics, antipyretics, analgesics, diuretics, electrolytes, and physiotherapy)	7 (22.5%)
II Requiring pharmacologic treatment other than in Grade I Blood transfusion and TPN	1 (3.2%)
III Requiring surgical, endoscopic, or radiological intervention	1 (3.2%)
IV Life-threatening complication requiring ICU management Single or multiorgan dysfunction	0
V Death of patient	0

HOME TO STAY: AN INTEGRATED MONITORING SYSTEM USING A MOBILE APP TO SUPPORT PATIENTS AT HOME FOLLOWING COLORECTAL SURGERY.

P543

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Purpose/Background: Patients undergoing colorectal surgery are vulnerable during their transition home from hospital and face high readmission rates. This study assessed the feasibility of an integrated monitoring system using a mobile app to support patients after discharge home from colorectal surgery.

Methods/Interventions: Patients undergoing elective colorectal surgery were invited to download the mobile app while in hospital on post-operative day 3. The patient was then emailed a "daily health check" on days 1-14, 21 and 30 following discharge. The "daily health check" was a tailored questionnaire to elicit patient symptoms and status of their post-operative recovery measured on the Quality of Recovery (QoR 15) scale. The app had picture taking capability and also included educational components for self-management of post-operative problems. The patient responses to the questionnaire were displayed in real time on a secure website that automatically "red flagged" extreme responses and prompted a telephone call to the patient from the surgical team. A survey was sent to the patients 30 days after discharge to assess satisfaction with the app.

Results/Outcome(s): Over a 4-month period, 106 patients were enrolled in the study, of which 92 patients ultimately downloaded and used the app, for a participation rate of 87%. Of these, 82 patients used the app within the first 14 days at home and were included in the results of this study. The median age of these patients was 43 years, 63% had inflammatory bowel disease, 40% had a laparoscopic procedure, 47% had a stoma created. The median length of stay was 6 days. The mean number of app entries was 7.2 (range 1-14), with the highest usage on days 2 to 8. The mean overall QoR score increased from 110.0 on Day 1 to 125.6 on Day 14 with pain, nausea, anxiety and depression significantly decreasing over this time period. The 30-day re-admission rate was 6% (5/82) and was lower than the 30-day readmission rate of 18% reported for the 4 months prior to the introduction of the mobile app. In addition, 3 (60%) of these readmissions were anticipated and coordinated using the mobile app such that patients were directly admitted to hospital avoiding an ER visit for readmission. Overall, patient satisfaction with the app was high with 92% of patients reporting their overall experience with the app was good or excellent, and 84% reporting that the mobile app helped them feel more confident at home.

Conclusions/Discussion: This study shows that an integrated monitoring system using a mobile app to support patients at home following discharge after surgery is highly feasible with high patient uptake and satisfaction with the mobile app. Furthermore, this study provides compelling data to suggest that an integrated monitoring system may significantly reduce the 30-day readmission rate following discharge.

INCREASE INCIDENCE OF YOUNG PATIENTS WITH RECTAL CANCER IN A SINGLE SURGEON EXPERIENCE.

P544

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Purpose/Background: The incidence of colorectal cancer have been decreasing in developing nations in those who are 50 years and older. Screening colonoscopy for those 50 and older helped identified and treated patients with colorectal cancer earlier and prevent future cancers with polypectomies at the time of colonoscopies and allow for earlier treatment. However, the number of patients with rectal cancer have been increasing in younger individuals. We report the experience of a busy surgeon at a major institution

Methods/Interventions: A retrospective study used to assess the incidence of rectal cancer over the last 17 years from a single surgeon experience at an academic institution. Age, ethnicity, diet, BMI as well as presentation and stage of the cancer are assess for all patients diagnosed with rectal cancer. Patient who presents with early rectal cancer from preoperative workup underwent laparoscopic or robotic low anterior resection. Those with later stage underwent preoperative chemoradiation followed by laparoscopic or low anterior resection with and without diverting loop ileostomy.

Results/Outcome(s): 178 patients have been identified between July 2000- October 2017. Most patients were symptomatic at the time of diagnosis for those younger than age 50. 69 (38%) were female with 109(61%) male. 102 (57%) of the patients were Asians. Of these 102 Asian patients, 3 were from Japan, 4 from India with 95 (93%) of Chinese descent. all of the 102 patients were not born in the US. The incidence of patient under the age of 50 increased over the last 4 years. In 2016 alone, 3 patients with the diagnosis of rectal cancer were under the age of 30. 79% of patients did not have family history or predictive factor for rectal cancer. There were no common denominator of food, BMI, alcohol consumption or smoking among the patients.

Conclusions/Discussion: The incidence of colorectal cancer in younger patients have increased. Young patients with rectal cancer presents at a higher stage with a proportion of young patient die earlier after curative cancers, the cause of rectal cancer in this group is still unknown. Genetics as well as environmental changes may play a role in the genesis of rectal cancer in the younger patients. There is no consensus on screening in patients under age 50 with no known risk factors. Currently, aside from early detection in those with know risk factors of family history, personal history, IBS or polyposis or known cancer syndrome, awareness of this cancer can exist in young patients allow for suspicion if they present with early symptoms.

A DECISION ANALYSIS FOR LOCALLY ADVANCED RECTAL CANCER IN PATIENTS WITH HNPCC: TOTAL PROCTOCOLECTOMY WITH ILEAL POUCH-ANAL ANASTOMOSIS VERSUS LOW ANTERIOR RESECTION.

P545

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Purpose/Background: Surgical management of locally advanced rectal cancer in hereditary nonpolyposis colorectal cancer (HNPCC) creates the possibility of performing different procedures that impact both quality of life and/or survival. The operation chosen must balance the choice between the impact on survival and the quality of life. The aim of this study was to perform a decision analysis to help quantify the tradeoffs between total proctocolectomy with ileal pouch-anal anastomosis (IPAA) versus low anterior resection (LAR) in patients with locally advanced rectal cancer and HNPCC.

Methods/Interventions: We created a disease simulation Markov model (TreeAge DATA Pro, Williamstown, Mass) to simulate the clinical events following IPAA or LAR in a cohort of individuals at the age forty. We utilized available literature to obtain different transition probabilities and health-states utilities. The output parameters were quality-adjusted-life-years (QALY) and life years (LY). Deterministic and probabilistic sensitivity analyses were performed.

Results/Outcome(s): Our model showed that in base-case analysis mean QALY's for IPAA was 12.51 and for LAR was 13.29. Mean LY's for IPAA was 14.42 and 14.24 for LAR. One way sensitivity analysis was performed for all the parameters in the model. None of the deterministic sensitivity analyses changed the model results across the range of plausible values. Probabilistic analysis identified that in 81 percent of scenarios LAR had improved QALY's compared with IPAA.

Conclusions/Discussion: In our model LAR was found to be preferable for patients with locally advanced rectal cancer in HNPCC patients when quality of life is taken into consideration. The model was robust based on both deterministic and probabilistic sensitivity analysis, and this data should be taken into consideration when counseling the patients regarding surgical approach in locally advanced rectal cancer in HNPCC.

PERIOPERATIVE OUTCOMES OF OLDER ADULTS UNDERGOING ELECTIVE CURATIVE RESECTION FOR RECTAL CANCER.

P546

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Purpose/Background: Elderly patients with rectal cancer are increasingly common. There can be apprehension about offering aggressive therapy to these patients, however studies suggest older patients enjoy similar cancer specific survival as younger patients. There is a paucity of data specifically relating to outcomes in rectal cancer in the elderly. This study seeks to determine the peri-operative outcomes for older patients undergoing elective curative resection for rectal cancer.

Methods/Interventions: All patients aged 65 or older diagnosed with rectal cancer in Alberta in 2015 undergoing curative intent resection were identified. Data extracted from the medical record included comorbidities and Charlson Comorbidity Index Score, procedure type, Clavien-Dindo classification of complications, anastomotic leak, percutaneous drainage of intraabdominal fluid or abscess, return to the operating room, post-operative imaging completed during the hospital stay, admission to the intensive care unit, length of stay during index admission, and readmission within 30 days of discharge. Linear multivariable regression using log scale was used to examine the relationship between age and length of stay, accounting for the possible effects of procedure type, gender, in hospital complications, neoadjuvant chemotherapy, or neoadjuvant radiation on length of stay. Logistic regression was used to compare rates of in hospital complications, ICU admission, anastomotic leak, percutaneous drainage, return to the operating room, and readmission within 30 days for patients of different ages. Rates of temporary diverting stoma and stoma reversal were recorded.

Results/Outcome(s): There were 158 patients aged 65 or older who underwent resection for rectal cancer with curative intent: 38 patients ≥ 80 years old; 26 patients 75-79 years old; 46 patients 70-74 years old; 48 patients 65-69 years old. Average length of stay for these patients was 13.5 days, 17.0 days, 12.5 days, and 8.0 days and average Charlson Comorbidity Index Score was 1.24, 1.45, 1.00, and 0.71 respectively. There were no deaths within 30 days of discharge. Linear regression demonstrated age to be statistically significantly associated with length of stay ($p=0.01$). There was no statistically significant association between age and frequency of admission to the intensive care unit, anastomotic leak, need for percutaneous drainage post operatively, need for return to the operating room, or readmission within 30 days of discharge. Of patients who received a temporary diverting stoma, 89% underwent surgery to restore bowel continuity.

Conclusions/Discussion: Older patients required a longer post-operative hospital stay following curative surgery for rectal cancer, but do not demonstrate significantly higher rates of post-operative complications. This study supports the practice of offering radical surgery to appropriately selected patients with a low burden of comorbid disease.

DOES IT MEASURE UP: COMPARING PELVIC MRI TO RIGID PROCTOSCOPY FOR MEASURING DISTANCE TO ANAL VERGE.

P547

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Purpose/Background: The use of pelvic magnetic resonance imaging (MRI) for staging of primary rectal tumors has become quite prevalent, with radiologists often noting the distance from the inferior tumor margin to the anal verge. For colorectal surgeons that distance is measured using direct visualization via the rigid proctoscope. Obtaining an accurate measurement clearly plays a role in guiding further treatment by the multidisciplinary team. Upon multidisciplinary review of MRI staging images, radiographic distance on MRI is approximated with a series of stepwise lines parallel to the long axis of the bowel lumen, while the rigid proctoscope straightens the lumen for a more direct measurement. Based on our experiences in a Multidisciplinary Tumor Board, we hypothesized that MRI over-estimates the distance from tumor to anal verge in comparison to proctoscopy.

Methods/Interventions: A retrospective chart review was performed of 58 patients with a diagnosis of rectal cancer from years 2015 to 2017. Those included were patients who underwent rigid proctoscopy followed by MRI evaluation of the pelvis with rectal protocol at a high-volume cancer center. Proctoscopic examination was performed by one of five board certified Colon and Rectal Surgeons. Documentation requirements included numeric description of distance from inferior tumor margin to anal verge, specifically. Excluded patients were those with MRI results available prior to proctoscopic evaluation. The differences between the reported proctoscopic distance and reported MRI distance were calculated.

Results/Outcome(s): Of the 58 patients, 31 were male, and average age was 62 years. Average body mass index (BMI) was 28 kg/m². Among all patients, MRI identified the inferior tumor margin 1.2cm closer to the anal verge than proctoscopy. For more distal tumors, those identified by proctoscopy at 5cm or less from the anal verge, MRI on average measured 0.2cm closer to the verge. For tumors identified higher than 5cm from the verge, MRI identified the tumor margin 1.5cm closer to the verge. Average TNM T-stage was 2.8 for patients with both positive and negative measurement differences.

Conclusions/Discussion: Based on this retrospective examination, evaluation of the inferior tumor margin in relation to the anal verge is likely to yield a shorter distance on pelvic MRI as compared to rigid proctoscopy, rejecting our hypothesis. There appears to be more variability between the two techniques higher in the rectum. Depth of tumor invasion does not appear to affect the measurement discrepancies. While the discrepancy may be small, it reiterates the need for surgeons trained and skilled in both proctoscopic examination and radiographic interpretation in order to properly define the relationship between the tumor and the pelvic floor.

SHORT-TERM OUTCOMES OF PERI-OPERATIVE BLOOD TRANSFUSIONS IN COLORECTAL CANCER SURGERY: A PROPENSITY-ADJUSTED ANALYSIS.

P548

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Purpose/Background: Perioperative blood transfusions in cancer surgery have been implicated with poor long-term oncologic outcomes. However, the impact of peri-operative blood transfusions on short-term outcomes is not well studied. The aim of this study was to assess the impact of peri-operative blood transfusions on short-term outcomes following elective colorectal cancer surgery.

Methods/Interventions: After institutional review board approval, patients who underwent elective colorectal resections for cancer from 2005 -2016 were identified from the American College of Surgeons National Surgical Quality Improvement Program database (ACS-NSQIP). Patient demographics, comorbidities, and operative variables were collected. The intervention was defined as the need for peri-operative blood transfusions (≤ 72 hrs from surgery). The primary outcome was 30 day mortality and secondary outcomes were readmission rates, total length of stay in hospital and hospitalization >30 days. An estimated propensity score, using generalized boosted regression modeling, was implemented to match patient cohorts between the two intervention groups for patient characteristics and operative variables. Multivariate propensity-weighted linear and logistic regression models, controlling for NSQIP-defined major morbidity (including reoperation, deep incisional SSI, organ space SSI, sepsis or septic shock, wound dehiscence, cardiac arrest, myocardial infection, pneumonia, acute renal failure, and DVT/ PE), were performed.

Results/Outcome(s): Of the 73,249 patients that underwent colorectal cancer surgery, 9.7% had received a blood transfusion within the first 72hrs of surgery. On univariate analysis, transfusions were associated with an increase in mortality (2.8% vs 0.7%, $p<0.001$), major

morbidly (28.9% vs 12.2%, $p<0.001$), readmission rate (14.6% vs 10.0%, $p<0.001$), total length of stay (10.6 vs 6.44 days, $p<0.001$), and hospitalization >30 days (2.1% vs 0.5%, $p<0.001$). Using multivariate propensity score adjusted models, peri-operative blood transfusions were an independent predictor of mortality (OR 2.78, 95% CI [2.19-3.51]), readmission (OR 1.44, 95% CI [1.30-1.60]), total length of stay (additional 18.9 days $p<0.001$), and hospital stay >30 days (OR 4.03, 95% CI [3.09-5.25]).

Conclusions/Discussion: Peri-operative blood transfusions during elective colorectal cancer surgery are associated with significantly worse short-term outcomes.

RECTAL OBSTRUCTION AND FECAL INCONTINENCE SECONDARY TO A PRIMARY UROTHELIAL CNCR OF THE URINARY BLADDER.

P549

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Purpose/Background: Obstructive rectal lesions are most commonly due to rectal carcinoma. Bladder cancer has a tendency to metastasize to the lymph nodes, bone, lung and liver. Metastasis to the gastrointestinal tract is extremely rare [3]. Changes of the rectal mucosa and findings of annular constriction is even more rare, even more so when present upon initial diagnosis of bladder carcinoma[1]. We report an unusual case of an obstructing, circumferential lesion of the rectum with mucosal involvement secondary to a locally invasive urothelial cancer of the urinary bladder.

Methods/Interventions: An 82 year old man presents with acute kidney injury secondary to obstructive uropathy and a serum creatinine of 4.3. He also complained of new onset constipation. His work up revealed bilateral hydronephrosis and an obstructing, circumferential mass of the rectum just above the anorectal ring. Tumor markers were obtained showing an elevated CEA of 4.4 and normal PSA of 0.26. Colonoscopy revealed an obstructing mass. Biopsies showed poorly differentiated carcinoma within the lamina propria with positive GATA-3 stain favoring metastasis with urothelial or pancreatobiliary as primary. Due to rectal obstruction the patient had a laparoscopic colostomy performed. Tumor was noted within the median and medial umbilical ligaments with no evidence of disease outside of the pelvis. Cystoscopy showed the inability to identify the ureteral orifices and poorly differentiated urothelial carcinoma invading the muscularis propria. He was offered chemotherapy but 2 months after his initial diagnosis the patient had a pulmonary embolus and expired.

Results/Outcome(s): CT, Intraoperative and colonoscopic images.

Conclusions/Discussion: Genitourinary neoplasms are a rare cause of rectal obstruction. What is unique about this case is rectal mucosal involvement on histology, causing rectal obstruction. There are only 2 other reported cases where rectal obstruction was present upon initial diagnosis of bladder cancer [5,6] Most other cases report an annular constriction of the rectum as a complication of recurrent bladder cancer, not primary bladder neoplasm. It has been reported that extension from the prostate and bladder is thought to occur by penetration Denonvillier's fascia allowing spread in the anterior and posterior directions [4]. Most case studies report normal appearing mucosa which would suggest an extrinsic process [4]. Prior cases have been reported of bladder cancer involving the rectum but few patients with direct bladder extension to rectum had pathologically proven involvement of rectal mucosa. Few patients experienced fecal incontinence much like our patient [1]. This case report revealed involvement of the mucosal lamina propria with poorly differentiated carcinoma on initial biopsy, making our case the 2nd to report presence of mucosal changes from direct extension.

COLECTOMIES ARE SAFE IN THE APPROPRIATE NONAGENARIAN DIAGNOSED IWTH COLON CANCER.

P550

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Purpose/Background: Multiple studies have looked at colectomies for the "elderly"; however they define elderly as those greater than 65. Kuakini Health System has the privilege of care for one of the oldest populations in the US. "Elderly" at our hospital is typically reserved for those greater than 80. The aim of this study is to determine if colectomies in nonagenarians is a safe and reasonable option.

Methods/Interventions: The Kuakini Health System Cancer Registry was reviewed between 2000 and 2016. All patients greater than 90 years old, diagnosed with colon cancer and had a colectomy were identified.

Results/Outcome(s): 33 patients were identified; 10 male and 23 female, to have a colectomy for colon cancer. The average age was 92.3 (92.5 vs. 92.4: female vs. male). Median LOS (total vs. post op)- 14 vs. 10.1; 14.3 vs. 10.5 in men and 13.1 vs. 9.1 in women. The average survival (in months) is 34.9; 39.5 vs. 38.4 in male vs. female.

Conclusions/Discussion: The term "elderly" has been used to define those greater than 65years of age. However, at our hospital it is not unusual to care for a highly functional nonagenarian. This study shows that in the appropriate patient a colectomy is a safe and viable option in the nonagenarian diagnosed with colon cancer.

ACCURACY OF THE REVISED BETHESDA CRITERIA FOR DETECTION OF MISMATCH REPAIR PROTEIN LOSS IN A CHILEAN POPULATION.

P551

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Purpose/Background: Mismatch repair protein (MMR) loss is associated with specific treatment alternatives, making the identification of this patients clinically relevant. Classically, MMR loss screening has been performed in a selective strategy manner using the Revised Bethesda Criteria (rBC). There is growing evidence supporting the use of universal screening based tumor immunohistochemistry (IHC) as gold standard, but there are no categorical evidence that support this conduct in a Chilean population. The aim of the present study was to compare the accuracy of the rBC against a gold standard universal IHC-base screening strategy for MMR loss in a large public hospital in Chile.

Methods/Interventions: This is a diagnostic test study performed during March 2016 to March 2017 at Complejo Asistencial Doctor Sotero del Rio, including all consecutive patients older than 15 years that underwent elective or urgent colorectal resections secondary to adenocarcinoma. Exclusion criteria were tumors treated with neoadjuvant chemoradiation and tumor size less than 1cm. All patients were assessed for positivity rate of the rBC and compared against a universal MMR loss screening strategy based on IHC for MLH1, MSH2, MSH6 and PSM2 proteins obtained from a full thickness biopsy of tumor and normal colonic tissue. Demographic data, clinical presentation, tumor pathological characteristics and surgical related variables were collected. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for rBC were calculated.

Results/Outcome(s): A total of 65 patients were enrolled. The median age was 58 years (22 to 88 years). Thirty five percent (54%) were women and most of the tumors were located at the left colon (48%), followed by right colon (21%). Nineteen patients (29%) had positive rBC. Only 8 (12%) patients had a previous history of hereditary nonpolyposis colorectal cancer-related tumors in their family, all in the MMR intact group. There were 8 (12%) patients with MMR loss detected by IHC: five were MLH1/PSM2, two MSH2/MSH6 and one MSH6. The sensitivity, specificity, PPV and NPV for rBC to assess MMR loss was 50%, 73.8%, 21.1% and 91.3%, respectively.

Conclusions/Discussion: In our population, the use of a screening strategy with rBC for detection of patients with MMR loss is associated with a low sensitivity and PPV when compared to a gold standard universal screening method based on IHC. This data supports a universal MMR loss screening strategy in our country, but more studies are necessary to validate this conduct.

ONGOING VIDEO ROOM

NEXT GENERATION ETAMIS: ENDOSCOPIC MEDIATED TRANSANAL MINIMALLY INVASIVE SURGERY.

VR1

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Purpose/Background: In 1983 Buess introduced transanal endoscopic microsurgery (TEM) for rectal lesions. Compared to TransAnal Excision (TAE), TEM associated with significantly improved outcomes - particularly lower recurrence rates. TEM is seen as a disruptive surgical technique. Recently renamed Transanal minimally invasive surgery (TAMIS), it has gained widespread interest. TAMIS is facilitated by soft platforms (SILS, GelPOINT Path) and rigid platforms (Richard Wolf and Karl Storz TEM equipment) but have limitations. Limitations of TAMIS include: Poor maneuverability, Instrument 'Sword-fighting' and Poor visibility.

Methods/Interventions: We set out to Evaluate a unique flexible endoscopic mediated platform enabling full surgical control endolumenally e.g. grasping and dissection. The endoscope can be exchanged in the sheath with advanced instrumentation e.g. staplers and sutures. Our Hypothesis: Next generation eTAMIS approach facilitates complex polypectomy using complete surgical principles: Tissue grasping and dissection Stapling Defect closure with suturing We used fresh porcine ex-vivo colon with a 3cm 'polyp' marked with electrosurgery. The tissue was mounted within an established ESD trainer. Equipment Double-balloon platform C2, Ig and Is (DiLumenTM, Lumendi, USA) - Instrument are 140 cm long, flexible and articulating. Fuji pediatric colonoscope (EC-550L) ERBE electrosurgical generator (50W Cut 50W Coagulation) Submucosal injection - 0.04% methylene blue, normal saline solution) Boston Scientific 25G endoscopic needle injector EndoGIA Ultra with 45mm vascular cartridge (Covidien, IRL) V-lock suture 4.0

Results/Outcome(s): We were able to successfully remove the lesion using all the surgical modalities including stapling and suturing. No perforations were observed.

Conclusions/Discussion: Next generation eTAMIS platform enabled complex lesion removal. It appears to overcome many limitations of conventional TAMIS. Permits additional instrumentation such as stapling devices. Disposable, non-robotic actuation may reduce costs. Further evaluation on-going and may facilitate true endolumenal full thickness resection.

TRANSANAL ENDOSCOPIC MICROSURGERY: SPECIAL TECHNIQUES LESSONS LEARNED FROM THE MINNESOTA EXPERIENCE.

VR2

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¹Lebanon, NH; ²Minneapolis, MN

Purpose/Background: The use of transanal minimally-invasive resection has increased given the development of TEM, TEO, and TAMIS as well as the advent of taTME. The purpose of this video is to demonstrate special techniques learned from the Minnesota experience.

Methods/Interventions: TEM videos from operations performed by the senior author were reviewed to find those which demonstrated five special techniques: intra-peritoneal entry and suture closure, control of mesorectal bleeding, foley balloon dilation, snare technique for lesion debulking, and TI-Knot for large defect alignment for closure. This video was compiled using the best clips demonstrating these special techniques.

Results/Outcome(s): As shown in the video.

Conclusions/Discussion: A variety of techniques exists to deal with intraoperative issues related to minimally-invasive transanal excision. These techniques can be utilized for other transanal platforms including TAMIS and TEO as well as taTME.

ANAL SPHINCTER RECONSTRUCTION WITH GRACILIS MUSCLE FLAP.

VR3

R. Kumar, S. Wexner, L. Force, V. Hui
Weston, FL

Purpose/Background: The options for anal reconstruction had transiently significantly increased and have unfortunately again receded to a single option. Specifically, the stimulated graciloplasty, artificial bowel sphincter, sling, and magnetic anal sphincter procedures have all been removed from the market. Thus, only two remaining current options include gluteoplasty and non-stimulated graciloplasty.

Methods/Interventions: This 22 year old male patient sustained extensive pelvic trauma including multifocal sphincter disruption during a motor vehicle accident one year prior to the demonstrated surgery. During his index trauma operation he underwent construction of a loop ileostomy along with pelvic stabilization. After healing of the superficial and deep perineal injuries, evaluation revealed significant anal sphincter loss. Accordingly the patient was referred for sphincter reconstruction with a non-stimulated gracilis transposition.

Results/Outcome(s): The patient was discharged home on the 5th post-operative day and is awaiting stoma reversal.

Conclusions/Discussion: Non-stimulated graciloplasty is one of the two viable autologous muscle transfer options for reconstruction of severely damaged or absent anal sphincter muscle.

XENOLIFT: LIGATION OF INTERSPHINCTERIC FISTULA TRACT WITH PORCINE XENOGRAFT INTERPOSITION.

VR4

M. Dolberg
Pembroke Pines, FL

Purpose/Background: This video presents a case of a 35 year old male with an anal fissure and a transsphincteric anal fistula. He had failed medical management directed at the fissure. He was taken to the operating room and was treated with a lateral internal sphincterotomy and an anal seton. He was brought back to the OR 7 weeks later. Ligation of Intersphincteric Fistula Tract (LIFT) procedure was performed. An acellular porcine xenograft was placed as an interposition between the two ligated ends of the fistula.

Methods/Interventions: This is a retrospective review of 32 patients who underwent treatment of a transsphincteric anal fistula using the LIFT procedure. 16 patients underwent standard LIFT procedure. 16 patients were treated with a XenoLIFT – LIFT with placement of a porcine xenograft interposition.

Results/Outcome(s): The patient was discharged from the recovery room following the procedure. He was seen in the office 4 weeks after surgery. The wound was completely healed with no evidence of fistula recurrence. 32 consecutive LIFT procedures were examined. These were all performed by a single surgeon over a 4 year period. 16 patients were treated with the standard LIFT procedure. The most recent 16 patients were treated with a XenoLIFT. The surgical procedure was identical in all patients except for the placement of the interposition graft in the XenoLIFT group. The standard LIFT procedure group had a recurrence rate of 50%. These patients required 1-3 (average = 2) additional surgeries to obtain complete closure of the fistula. 37.5% of the patients who recurred were active smokers. 25% of the patients who healed without a recurrence were active smokers. The XenoLIFT group had a recurrence rate of 0%. 1/16 (6.25%) of these patients was an active smoker.

Conclusions/Discussion: Review of these 32 patients undergoing treatment of a transsphincteric fistula reveals a decreased recurrence rate in the 16 patients who received a XenoLIFT. Although the demographics in the two groups were similar, the standard LIFT group did have a higher percentage of active smokers. The true impact of smoking on this procedure will need to be further examined. Also, the patients who received the xenograft will need to be followed over a longer time period to

ensure that the recurrence rate remains low. Despite the small sample size, these initial results are promising. The XenoLIFT procedure has provided complete fistula closure with no recurrences.

Results

- 32 patients with transsphincteric fistulas treated with seton placement followed by LIFT procedure
 - (16) Standard LIFT procedure
 - Avg Age: 40.75
 - Avg BMI: 33.81
 - Smoking: 31.25%
 - DM: 12.5%
 - Recurrence: 8/16 (50%)
 - (16) XenoLIFT – LIFT with porcine xenograft interposition
 - Avg age: 44.88
 - Avg BMI: 32.28
 - Smoking: 6.25%
 - DM: 6.25%
 - Recurrence 0/16 (0%)

LAPAROSCOPIC REPAIR OF A URETERAL INJURY DURING SIGMOID COLECTOMY.

VR5

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Miami, FL

Purpose/Background: Iatrogenic injury to the ureter is a potentially devastating complication of modern surgery. While maneuvers such as perioperative stenting have been adopted as a mean to avoid ureteral injury, these techniques have not been adopted universally. Colon and rectal procedures, are responsible for 9% of all ureteral injuries. This video demonstrates the ability to deal with an intraoperative complication during laparoscopic sigmoid resection in a minimally invasive fashion.

Methods/Interventions: The patient presented in the video was a 57 year old female with recurrent episodes of severe diverticulitis. She was taken to the operating room for a laparoscopic sigmoid colectomy. Risks and complications were explained as stated in the preoperative informed consent. We began the dissection from lateral to medial, because of the inflammation at the base of the mesentery. An energy device was used for dissection. The base of the mesentery in the left lateral wall was fibrotic and adhered to the left ureter. During the dissection, an inadvertent laceration of the anterior wall of the left ureter occurred and was identified intraoperatively. The urologist was called to the operating room, a cystoscopy was done and the double-J stent was passed into the left ureter under fluoroscopy. The distal and proximal ureteral ends were spatulated in preparation for a primary anastomosis. The ureteral transection was repaired with interrupted 4-0 chromic sutures, intracorporeally tied. A ureteroureterostomy free of tension was created. After successful repair the sigmoid resection and anastomosis were completed.

A colorectal anastomosis free of tension was created, it was tested under flexible sigmoidoscopic insufflation where no evidence of leak was observed.

Results/Outcome(s): 8 weeks after the procedure a retrograde pyelography was conducted, where integrity of the left ureter was observed.

Conclusions/Discussion: Ureteral injury may be due to ligation, crush injury or electrocautery thermal spread, which can lead to the development of hydronephrosis, loss of renal function, fistula formation and possible sepsis if not detected intraoperatively, which is why ideally a iatrogenic ureteral injury is discovered in the intraoperative setting and dealt with immediately. Often with small (2-3 cm) defects of the mid-ureter and upper ureter a primary ureteroureterostomy can be performed. Ureter size, the need for careful mucosal apposition, and precise suturing all necessitate advanced laparoscopic skills for this procedure. Compared to open surgery, laparoscopic ureteroureterostomy offers several advantages, such as less postoperative pain, shorter hospital stay and less scarring. As long as surgeons operate near the ureters, the potential for iatrogenic ureteral injury will exist and requires a dynamic approach for management.

A ROBOTIC ANTERIOR APPROACH FOR A PRESACRAL TUMOR.

VR6

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Duarte, CA

Purpose/Background: Presacral tumors are classically excised with a posterior approach (Kraske procedure). Here, we present a case of a presacral mass that was excised via an anterior approach using robotic assistance.

Methods/Interventions: The patient is a 47 year old female who had recently undergone a robotic total abdominal hysterectomy and bilateral salpingo-oophorectomy. During an intraoperative rectal examination, she was found to have a presacral lesion. Postoperatively, cross-sectional imaging demonstrated a 7x9 cm mass in the presacral area. This tumor was biopsied and the results were consistent with a spindle cell tumor (likely a solitary fibrous tumor). Pathologic staining was not suggestive of a sarcoma or GIST. Her case was presented at our institutional tumor board with the recommendations of either up front excision or pre-operative radiotherapy. Ultimately, the patient elected to undergo immediate surgical resection.

Results/Outcome(s): A step-by-step approach is presented in the video. There were no immediate complications with the surgical procedure. Operative time was approximately four hours. Estimated blood loss was 700 mL. The final pathology was a solitary fibrous tumor with no mitotic figures or necrosis.

Conclusions/Discussion: With appropriate patient selection, presacral tumors with favorable histology can be

excised via an anterior approach. Robotic assistance can facilitate the resection of these tumors.

TRANS-INGUINAL TOTAL ABDOMINAL COLECTOMY & INGUINAL HERNIA REPAIR FOR MASSIVE INGUINOSCROTAL HERNIA.

VR7

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Charlotte, NC

Purpose/Background: This report describes the multimodal management of a 53-year-old man with a 20-year history of a massive left inguinoscrotal hernia (8428cm³). The patient chose not to seek medical attention until a high-grade fever prompted evaluation. A CT scan revealed a left inguinoscrotal hernia with herniated bowel, loss of abdominal domain, and a large abscess within the scrotum, presumably from diverticulitis, for which he was treated with percutaneous drainage and antibiotics.

Methods/Interventions: After treatment of and recovery from the infectious process, attention was turned to the hernia. Initial management of the hernia included bilateral chemical component relaxation with injection of botulinum toxin A into the bilateral flanks as well as progressive preoperative pneumoperitoneum (PPP) via a peritoneal dialysis catheter. In total, six sessions of PPP across a week were performed, insufflating between 300 to 2000ml of filtered room air. Preoperative colonoscopy to ~120cm was unremarkable. At the time of surgery, the herniated viscera extended from proximal jejunum to rectosigmoid. A standard inguinal incision was made, as well as a second scrotal incision to aid in dissection. Due to their extensive involvement in severe inflammatory adhesions, omentectomy and right orchiectomy were necessitated. With no discernable landmarks to aide a segmental resection and no definitive etiology of the previous peritoneal-based infection, a total abdominal colectomy was performed via the inguinal incision. An end-to-side ileorectal anastomosis was fashioned with a 25mm circular stapler. A left inguinal herniorrhaphy was carried out with preperitoneal placement of biologic mesh.

Results/Outcome(s): The patient was extubated at conclusion of the case and maintained an unremarkable postoperative course, being discharged on the sixth postoperative day after return of bowel function, tolerance of a diet, and voiding without difficulty.

Conclusions/Discussion: Giant inguinal hernias are defined as extending below the midpoint of inner thigh in the standing position. Repair of massive inguinoscrotal hernias possess several unique challenges rarely encountered by surgeons in developed countries, including loss of domain of the abdominal viscera, postoperative intraabdominal hypertension, and large scrotal hematoma. Often the need for visceral debulking is required to accommodate reduction of the herniated contents. Alternatively,

resection may be required due to coexisting pathology. Review of the literature reveals only a handful of cases with the entire colon herniated. No previous case of a trans-inguinal total colectomy have been described. From a colorectal standpoint, when consulted for assistance with massive inguinoscrotal hernias, it is imperative that preoperative planning is carried out in tandem with the hernia surgeon. When possible, colonoscopy to identify colonic-based disease is advised.

TRANSANAL MINIMALLY INVASIVE SURGERY FOR THE EXTRACTION OF A RECTAL FOREIGN BODY.

VR8

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San Diego, CA

Purpose/Background: The variety of techniques employed to extract a rectal foreign body (RFB) range from digital rectal examination and rigid proctoscopy to laparoscopy or even laparotomy with proctotomy. Factors necessitating more invasive surgical procedures include the size and shape of the object and the distance from the anal verge. We present a video of the fourth case at our institution of the extraction of a high RFB utilizing transanal minimally invasive surgery (TAMIS) or transanal endoscopic microsurgery (TEM).

Methods/Interventions: A 61 year old male presented with 24 hours of rectal pain and admitted to inserting a RFB the previous day. The object could not be viewed on gross inspection and was not palpable on digital rectal exam. A plain film showed the object above the level of the coccyx. Bedside proctoscopy showed the object 12 cm above the anal verge. Bedside extraction techniques were unsuccessful. The patient was consented for a TAMIS for the extraction of the high RFB with possible laparoscopy or laparotomy if TAMIS was unsuccessful.

Results/Outcome(s): This patient underwent TAMIS for the extraction of a high RFB. Several instruments were used during the procedure including alligator graspers, an Endoloop and an Endocatch bag. The vacuum created proximal to the RFB did not allow easy release of the object and the most distal plastic portion of the object made it difficult to grasp. By using the elliptical deployment portion of the Endocatch bag, we were able to encircle the distal aspect of the RFB and extract it safely. The RFB removed was a vibrator 9 inches in length. The entire procedure took approximately 30 minutes. The patient tolerated the procedure well and was discharged home from the recovery-room. Previous RFBs removed at our institution using TAMIS or TEM include another vibrator, a cucumber wrapped in a condom and a light bulb. All patients were male, all were discharged home directly from the PACU, none required post-operative narcotics and none of them showed up for their follow-up appointments. All of these

patients would have had transabdominal surgery to remove their RFBs if TAMIS or TEM was unavailable.

Conclusions/Discussion: Compared with RFB removal transabdominally, TAMIS is safer, has fewer short and long-term complications, has a much shorter hospital course with a faster recovery, is incisionless and decreases overall hospital costs. TAMIS should be considered for RFB removal when digital rectal exam and rigid proctoscopy alone are unsuccessful.

LAPAROSCOPIC COMPLETION COLECTOMY, LIVER METASTECTOMY, PELVIC PERITONECTOMY, AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR METASTATIC COLON CANCER.

VR9

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S. Wexner
Weston, FL

Purpose/Background: This describe a rare case of laparoscopic completion colectomy with construction of ileostomy, cholecystectomy, intraoperative ultrasound of the liver, partial hepatectomy of segment 7 liver metastasis, pelvic peritonectomy, hyperthermic intraperitoneal chemotherapy with mitomycin-C.

Methods/Interventions: A 43-year-old male with stage 4 sigmoid cancer with liver metastasis initially underwent a laparoscopic sigmoid colectomy with distal Hartman's pouch and peritoneal biopsy. Pathology was reported as poorly differentiated adenocarcinoma with signet ring cell. After adjuvant chemotherapy, the patient was found to have recurrent cancer at the ileocecal valve. The hepatic mass in segment VII had responded to chemotherapy on follow up imaging. Under general anesthesia, the patient underwent a laparoscopic completion colectomy, cytoreductive surgery with HIPEC along with the liver metastectomy. An Alexis port through the colostomy site and three ports were placed through the previous port sites for the colectomy. We then performed a selective pelvic peritonectomy and a liver metastectomy. Through the existing port sites, we introduced the HIPEC catheters through which we filled the abdomen with 2 L of normal saline and added 40 mg of mitomycin-C for 60 minutes that circulated through the circuit at 43°C.

Results/Outcome(s): Pathology showed an invasive poorly differentiated adenocarcinoma with signet ring cell involving the cecum, liver, and pelvic peritoneum. Adjuvant chemotherapy was planned. The patient had an uncomplicated postoperative course.

Conclusions/Discussion: Laparoscopic liver metastectomy, cytoreductive surgery, and HIPEC can be safely utilized in patients with aggressive colorectal cancer to prevent significant morbidity of laparotomy.

ROBOTIC RECTOSIGMOID RESECTION WITH SINGLE-DOCK INTRACORPOREAL ANASTOMOSIS (VIDEO).

VR10

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Purpose/Background: Use of robotic technology for colorectal resections is on the rise. Early, emphasized advantages for low anterior resections included superior visibility and maneuverability in the deep, narrow pelvis. Cost concerns, beyond the equipment itself, includes prolonged operating times. Undocking/re-docking maneuvers or hybrid approaches interrupt progress and are associated with increased operating times. Improved set-up and docking efficiency are therefore central to continued refinement efforts. The standard for left-sided colorectal resections is a stapled end-to-end anastomosis (EEA). In laparoscopy, the anvil is inserted extracorporeally through exteriorization and proximal transection of the specimen, a step that on the robot would require undocking. In order to robotically perform an entire left-sided colorectal resection with stapled EEA anastomosis without undocking, we demonstrate a single-dock technique whereby the EEA anvil is inserted/parked inside the abdomen before robot docking: it stays out of the field yet is easily retrievable once the anastomosis is ready to be performed.

Methods/Interventions: Our video shows the key steps of a robotic rectosigmoid resection with intracorporeal EEA anastomosis: 1) Robot incisions are marked. 2) A GelPOINT Mini Advanced Access Platform (Applied Medical, Rancho Santa Margarita, CA) with trocar is placed through a mini-Pfannenstiel incision. 3) A Prolene suture is tied to the EEA anvil. 4) The anvil is inserted through the GelPOINT port but retracted by the Prolene just underneath the abdominal wall. 5) After camera insertion, all other ports are placed under visual guidance. 6) The DaVinci Xi robot is docked and targeted after placing the patient in Trendelenburg position. 7) The rectosigmoid is mobilized in standard fashion, followed by vascular transection, splenic flexure mobilization, and total mesorectal pelvic dissection. 8) After proximal and distal transection, the specimen is parked. 9) The proximal staple line is excised and a pursestring suture placed. 10) The parked anvil is parachuted into the field, inserted into the proximal bowel end, and secured with a pursestring suture. 12) The EEA stapler is inserted transanally, the anastomosis performed, and then it is tested in standard fashion. Optional robotic steps include: ICG fluorescence imaging for perfusion assessment, and circumferential oversewing of the anastomosis.

Results/Outcome(s): Stapled intracorporeal EEA anastomosis (e.g. rectosigmoid resection) can be performed in a single docking of the robotic platform without further laparoscopic or open manipulation. It can be completed, checked, and oversewn using the robot.

Conclusions/Discussion: The single-dock technique accelerates the procedure and retains the advantages of the robot for all surgical steps. This is associated with shorter operative times and may increase systems-based efficiency and robot utilization rates.

STANDARDIZED TOTALLY ROBOTIC COMPLETE MESOCOLIC EXCISION FOR RIGHT SIDED COLON CANCER.

VR11

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Istanbul, Turkey

Purpose/Background: Complete mesocolic excision (CME) technique includes central vascular ligation of the vessels supplying and draining the tumor bearing colonic segment, removal of the same segment with an adequate longitudinal clearance and within an intact mesocolon. Previous studies have shown that as the tumor location moves distally from cecum to the transverse colon in the right sided colon tumors, the incidence of lymph node metastasis to infrapyloric region, to inferior of pancreas, and to root of middle colic artery increases. Therefore, dissection of the region above the superior mesenteric vein is crucial in distal ascending colon- and proximal transverse colon tumors. Adequately extensive lymph node dissection in these areas with a standardized technique is obligatory if the surgeon aims to offer the best survival chance for the patient. In this video vignette, we present our standardized robotic approaches for right sided colon tumors.

Methods/Interventions: For tumors located in the cecum and proximal ascending colon, we performed the CME with medial to lateral approach, for tumors located in the distal ascending colon and proximal transverse colon, we developed a novel modified approach: "top to down no-touch" technique. Both techniques enable us to achieve the crucial hallmarks of CME surgery by providing a favorable exposure of the vessels and relative anatomical planes during the dissection. A total of 35 patients underwent surgery with one of the aforementioned techniques, all operations were performed with the da Vinci Xi system (Intuitive Surgical Inc., Sunnyvale, CA, USA).

Results/Outcome(s): For tumors located in the cecum and proximal ascending colon, we performed the CME with medial to lateral approach, for tumors located in the distal ascending colon and proximal transverse colon, we developed a novel modified approach: "top to down no-touch" technique. Both techniques enable us to achieve the crucial hallmarks of CME surgery by providing a favorable exposure of the vessels and relative anatomical planes during the dissection. A total of 35 patients underwent surgery with one of the aforementioned techniques, all operations were performed with the da Vinci Xi system (Intuitive Surgical Inc., Sunnyvale, CA, USA).

Conclusions/Discussion: The medial to lateral and top to down no-touch robotic techniques appear to be useful for colon cancer and provide oncologically remarkable outcomes.

ENDOSCOPICALLY GUIDED LAPAROSCOPIC PARTIAL CECECTOMY FOR MANAGEMENT OF BENIGN CECAL POLYPS.

VR12

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Los Angeles, CA

Purpose/Background: Oncologic resection is often performed for large cecal polyps not amenable to endoscopic removal. Even with a laparoscopic approach, colectomy is associated significant morbidity. Lesions in close proximity to the ileocecal valve or involving the appendiceal orifice are especially challenging to address with advanced endoscopic techniques. For benign cecal lesions, it may be effective and less invasive to perform endoscopically guided laparoscopic cecectomy (ELC). Our objective is to describe our initial experience with a novel technique for complete resection of benign cecal polyps by endoscopically guided laparoscopic cecectomy.

Methods/Interventions: We performed a retrospective review of 15 cases in which ELC was employed for resection of polyps or benign appearing lesions of the cecum. Standard laparoscopic instruments were utilized

for mobilization of the cecum and ascending colon. Stapled partial cecectomy was performed under direct colonoscopic visualization to allow real-time verification of staple line placement in relation to the polyp margin and ileocecal valve. The endoscope may additionally be positioned within the terminal ileum during stapler closure, thereby becoming a physical barrier to protect the ileocecal valve, similar to the use of a bougie in foregut and bariatric surgery.

Results/Outcome(s): 15 patients underwent successful ELC. Complete resection of the targeted lesion with negative margins was achieved in all cases. There were no conversions and no intraoperative complications. Mean OR time was 104 minutes. Morbidity was low, 6.7% (1/15): one patient experienced a prolonged post-operative ileus and underwent reoperation. The median length of hospital stay in our cohort was 1 day (range: 0-17). There were no cancers identified on final pathology.

Conclusions/Discussion: Endoscopically guided laparoscopic cecectomy is a safe and effective technique for management of benign polyps of the cecum and ascending colon not otherwise amenable to endoscopic resection. Utilization of this technique allows for complete resection, while preserving the ileocecal valve, and avoids colectomy.

VR11 Demographic and clinical characteristics of the patients

	Medial to Lateral n=19	Top to Down No Touch n=16
Gender	Female (11)	Female (5)
Mean Age (years)	65.3	63.75
Mean BMI (kg/m ²)	28.23	26.13
Mean Operative Time (min)	276.5	307.5
Mean Estimated Blood Loss (ml)	50	109
Intraoperative Complications	0	SMV injury (2)
Postoperative Complications	n=7	n=6
	pneumonia (1)	bleeding (1)
	arrhythmia (1)	atelectasis (1)
	wound infections (4)	pulmonary embolism (1)
	seroma (1)	ileus (1)
		wound infection (1)
		hematoma (1)
Mean Length of Hospital Stay (days)	5,7	7,8
Mean Number of Lymph Nodes Harvested (range)	37.5 (25 – 61)	46.9 (31 – 65)
Number of Positive Lymph Nodes	n=9	n=6
	Mean 1.7	Mean 1.1
Grade of the Mesocolon	Grade 3 (17)	Grade 3 (12)
	Grade 2 (2)	Grade 2(4)

Table 1: Case Details

	Age (yrs)	Sex	ASA	Polyp Location	OR TIME (min)	Pathology	LOS (days)	Complications
1	61	M	2	Cecum	200	TA	2	None
2	69	M	1	Cecum	130	TVA	1	None
3	77	M	2	Cecum	NA	TA	1	None
4	66	M	1	Cecum	NA	TA	2	None
5	72	M	1	Cecum	120	TA	1	None
6	75	F	2	Cecum	90	TVA	2	None
7	65	M	1	Cecum	150	TVA	4	None
8	81	M	2	Cecum	90	TA	4	None
9	82	M	2	Cecum	90	TA + HGD	17	Reoperation
10	31	M	1	Cecum	59	TA	0	None
11	67	F	3	Ascending colon	79	TVA	1	None
12	73	F	3	Cecum	58	TVA	1	None
13	56	M	2	Ascending colon + AO	178	TA	1	None
14	75	M	3	Cecum	50	TVA	1	None
15	41	M	2	AO	56	SSA	1	None

AO = Appendiceal orifice; TA = Tubular adenoma; TVA = Tubulovillous adenoma; SSA = Sessile serrated adenoma; HGD = High grade dysplasia; LOS = Length of stay

A PERSONAL TECHNIQUE OF HAND ASSISTED LAPAROSCOPIC-ROBOTIC HYBRID TOTAL PROCTOCOLECTOMY WITH ILEAL POUCH-ANAL ANASTOMOSIS.

VR13

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Pisa, Italy

Purpose/Background: Total proctocolectomy with ileal pouch–anal anastomosis (IPAA) is the surgical approach chosen for ulcerative colitis (UC) refractory to medical management and is recommended as a prophylactic procedure in patients diagnosed with familial adenomatous polyposis (FAP). Even if laparoscopy has become very popular for colorectal surgery, laparoscopic total proctocolectomy with IPAA has not had the same dissemination mainly due to the intrinsic technical limitations of the laparoscopic approach in the deep pelvis and the steep learning curve. The enhanced surgical dexterity offered by robotic assistance is expected to overcome some of the limitations of conventional laparoscopy, thus improving the acceptance of minimally invasive techniques in colorectal surgery. We present our surgical technique of hand-assisted hybrid laparoscopic–robotic total proctocolectomy with restorative IPAA for patients diagnosed with FAP.

Methods/Interventions: An 18-years old man with a finding at colonoscopy of hundreds of sessile polyps (low-grade dysplasia) was referred to our center. The patient underwent to a proctocolectomy with ileal pouch-anal anastomosis with a personal minimally-invasive hybrid technique. The procedure can be divided into three phases. The colectomy was carried out laparoscopically with hand assistance through a suprapubic incision; the same incision was used to create the ileal pouch. In the second phase the proctectomy was performed with the da Vinci Si. The third step is the execution of the hand-sewn IPAA through a transanal approach fashioned at the dentate line using interrupted absorbable sutures.

Results/Outcome(s): The procedure was successfully completed in 370 min. There were no surgical complications or a need for conversion to laparotomy. The postoperative course was uneventful and the patient was discharged from hospital after 6 days.

Conclusions/Discussion: In our experience, the hand assisted laparoscopic–robotic hybrid total proctocolectomy with IPAA resulted to be an appealing alternative to laparoscopy and open surgery, in selected patients with FAP or UC. This hybrid personal technique could combine the benefits of the three approaches to overcome the inherent limitations of each technique.

ROBOT-ASSISTED LAPAROSCOPIC SINGLE PORT RIGHT COLECTOMY: A CASE REPORT.

VR14

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Enfield, CT

Purpose/Background: Single-port laparoscopic abdominal surgery (SPLS) remains technically challenging in part due to loss of instrument triangulation and extracorporeal instrument conflicts. In recent years, robotic surgical technology has been applied to try to overcome limitations of SPLS. We present a case of a single incision, robot-assisted laparoscopic right colectomy.

Methods/Interventions: A 68-year-old woman with an endoscopically unresectable cecal tubulovillous adenoma underwent a single-port robot-assisted right colectomy using an access technique consisting of a wound protector and a surgical glove to facilitate making an airtight seal around the instruments. A medial to lateral approach was performed. Resection and stapled anastomosis were performed extracorporeally after undocking the robot.

Results/Outcome(s): The procedure was completed in 120 minutes without intraoperative complications or need to convert to either standard multiport laparoscopy or open laparotomy. Pathology demonstrated two cecal tubulovillous adenomas, 2cm and 1.2cm in size. Eighteen lymph nodes were retrieved, which were all histopathologically normal. Hospital length of stay was 5 days. Postoperatively, the patient developed a small incisional seroma that drained on its own without evidence of infection, and bowel function returned to baseline.

Conclusions/Discussion: Single-port robotic surgery using the glove and wound protector access technique appeared to be a safe and oncologically sound alternative to standard multiport laparoscopy. More direct comparative studies are warranted before larger conclusions can be drawn.

TECHNIQUES AND FEASIBILITY OF THE LAPAROSCOPIC RADICAL EXTENDED RIGHT HEMICOLECTOMY WITH CAUDAL-TOTOCRANIAL APPROACH COMBINED RESECTION OF THE PARA SMA LYMPH NODES.

VR15

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Purpose/Background: Due to the emphasis of oncologic principle, complete mesocolic excision (CME) for laparoscopic right hemicolectomy was recommended. According to European CME and Japanese guidelines, the lymph nodes around the right size of the superior mesenteric artery (SMA) should be dissected away and removed enbloc with the specimen. The caudal-to-cranial approach was shown to reduce the difficulty and increase the safety of laparoscopic radical extended right hemicolectomy with CME. Based on our more than 3000 previous laparoscopic surgeries for colon cancer and further understanding of surgical oncology and lymph drainage of right mesocolon, we present a caudal-to-cranial approach combined resection of the para SMA lymph nodes for laparoscopic right colectomy with CME.

Methods/Interventions: First, expose the “tri-junction” and continues laterally to the right mesocolon. Cut the peritoneum, dissecting pancreatic duodenal anterior fascia from caudal to cranial to expose the posterior lobe of right-sided mesocolon, and then exposing the SMV/SMA and their branches. Continue to expand the Toldt’s space. Second, the junction of right mesocolon and mesostenium was incised and the retroperitoneal in front of SMA was cut from the distal to proximal end. The SMA, ileocolic artery, right colic artery and middle colic artery were exposed and separated, and the lymph nodes along the right size of SMA were dissected. Then the SMV was separated and the ileocolic vein, right colic vein and middle colic vein were isolated, ligatured and cut at their roots, and Henle’s trunk was exposed, and then the accessory right colic vein, right gastroepiploic vein and right gastroepiploic artery are divided and cut at their roots. Third, the greater omental was dissected on the right size 2/3 and the NO. 6 lymph nodes were dissected followed by complete mobilization of the right colon mesentery.

Results/Outcome(s): There were 13 male and 15 female patients, with a mean age of 65.4 years (range, 33–85) and a mean BMI of 25.1 kg/m² (range, 17.5–37.7). All procedures were successful without any conversion to open surgery or any serious perioperative complications. The mean operation time was 175.5 min (range, 130–240), and the mean blood loss was 40.0 ml (range, 10–300 ml). The mean number of harvested lymph nodes was 26.5 (range, 12–55), and postoperative exhaust time and hospital stay

were 38 hours (range, 25-120 hours) and 7.0 days (range, 4-21 days). The mean postoperative abdominal drainage was 655 ml (range, 150-2800 ml), Minor complication was occurred in 3 patients and no post-operative mortality was observed.

Conclusions/Discussion: The caudal-to-cranial approach combined resection of the para SMA lymph nodes is a feasible and safe procedure, and more in accordance with the principles of CME.

LAPAROSCOPIC RIGHT HEMICOLECTOMY WITH TRANSVAGINAL SPECIMEN EXTRACTION.

VR16

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Harbin, China

Purpose/Background: To evaluate the technical feasibility, safety and short-term outcomes of laparoscopic right hemicolectomy with transvaginal specimen extraction.

Methods/Interventions: Patients with histologically diagnosed colon cancer or benign diseases underwent laparoscopic right hemicolectomy with transvaginal specimen extraction. All the patients were content with inclusion criteria of this approach. Preoperative, intraoperative and postoperative data as well as short-term outcomes were evaluated, respectively.

Results/Outcome(s): The mean age of the patients was 55.5 years (range 53-58 years). Mean body mass index(BMI) was 27.13 kg/m² (range 24.64-28.98 kg/m²). The mean operation time was 216.25 min (range 155-250 min), the mean blood loss was 72.5 ml (range 20-200 ml), the mean postoperative exhaust time was 67.5 hours (range 43-86 hours) and the mean length of hospital stay was 17.25 days (range 17-18 days). No postoperative morbidity happened. The mean size of the tumor was 5.13 cm (range from 3.0-7.0 cm). Both of the two cancerous patients were identified as T2 stage and the others were diagnosed with benign diseases(tubular adenomas and lipoma). The number of harvested lymph nodes met the criterion from the NCCN guideline. These patients are still under follow-up.

Conclusions/Discussion: Laparoscopic right hemicolectomy with transvirginal specimen extraction may be an efficient strategy and It is possible that this technique could be an alternative procedure for the conventional laparoscopic right hemicolectomy.

DEROTATION OF THE RIGHT COLON (DELOYERS' PROCEDURE) FOR COLONIC INERTIA.

VR17

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Purpose/Background: Functional results after total abdominal colectomy with ileorectal anastomosis for chronic constipation caused by colonic inertia are often limited by postoperative diarrhea, bowel obstruction, incontinence, and abdominal bloating. A proposed variation to preserve the ileocecal valve and reduce the side effects of diarrhea and electrolyte abnormalities is a subtotal colectomy with an isoperistaltic ascending colorectal anastomosis (Deloyers Procedure).

Methods/Interventions: Our patient is a 43-year-old female with chronic constipation refractory to medical management including diet modification, fiber and fluid supplementation, laxatives, and multiple constipation medications (Linzess, Amitiza, Trulance). She underwent extensive workup in consultation with gastroenterology. She had an abnormal colonic transit study showing over 20% of markers retained at five days. Of note, none of the markers remained in the right or transverse colon, suggesting a functional right colon. Defecography and anal manometry were normal without evidence of pelvic floor dysfunction or obstructive defecation. She underwent a laparoscopic-assisted subtotal colectomy with ascending colon to rectal anastomosis via derotation of the right colon.

Results/Outcome(s): At the twelve-week postoperative follow visit, our patient's constipation had improved from one bowel movement every four days with laxatives to two bowel movements a day without use of laxatives. The left sided abdominal pain she reported preoperatively had resolved. She did report occasional straining to stool. She had no issues with incontinence to flatus or stool.

Conclusions/Discussion: Subtotal colectomy with isoperistaltic ascending colon to rectal anastomosis via derotation of the right colon may be a viable alternative to total abdominal colectomy with ileorectal anastomosis in select patients with slow-transit colonic constipation with preserved right colonic function. This procedure may be associated improved functional outcomes due to preservation of the ileocecal valve.

IMMUNOFLUORESCENCE IN ROBOTIC COLON AND RECTAL SURGERY.

VR18

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Purpose/Background: The indocyanine green (ICG) fluorescence imaging system is a surgical tool with increasing applications in colon and rectal surgery that has received growing acceptance in various surgical disciplines as a potentially valid method to enhance surgical field visualization, improve lymph node retrieval and decrease anastomotic leak. The aim of this video is to illustrate the different applications of ICG immunofluorescence in robotic colorectal surgery.

Methods/Interventions: ICG was used with the FireFly™ fluorescence imaging system for intraoperative ureter identification, assessment of bowel perfusion, and colorectal lesion identification during robotic colorectal operations.

Results/Outcome(s): ICG fluorescence using the FireFly™ imaging system during robotic colorectal operations allowed for accurate intraoperative ureter identification, bowel perfusion, and colorectal lesion identification.

Conclusions/Discussion: ICG fluorescence is a simple, safe, and useful tool that can be used in several aspects of robotic colorectal surgery. Its true impact on intraoperative ureter injury, oncologic staging, and anastomotic complications is to be determined.

ROBOTIC EXCISION OF LEVATOR ANI ANGIOMYXOMA.

VR19

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Purpose/Background: We present a video case report of a 45 year old female incidentally found to have a left pelvic mass during computed tomography (CT) imaging performed for workup after a motor vehicle accident. Her medical history was significant for asthma, reflux, obesity with a body mass index (BMI) of 40, and an obstetrics history of 6 vaginal deliveries and 1 caesarian section. She was asymptomatic at presentation and her abdominal exam was normal. Anal exam revealed vague fullness of the left lateral aspect at the level of the levator muscle, but with no discrete mass palpated. Rigid proctoscopy showed normal rectal mucosa. Upon review of her imaging, CT of the abdomen and pelvis showed a mass in the left lower pelvis. Magnetic resonance imaging (MRI) similarly demonstrated a mass in the left hemipelvis, abutting the left mesorectal fascia and iliococcygeus muscle, noted to be discrete from the rectum, vagina, and uterus. The patient underwent CT-guided core needle biopsy of this

pelvic lesion, and final pathology was consistent with deep angiomyxoma. Given the rarity and unusual nature of this histology, we recommended excision.

Methods/Interventions: Due to the patient's BMI of 40, and preoperative images which localized the lesion to be 18 centimeters (cm) from the skin, we opted for a robotic abdominal approach, as opposed to a perineal approach. The patient was taken to the operating room for a robotic excision of deep pelvic mass, including part of the left levator ani, with complete rectal mobilization and reperitonealization.

Results/Outcome(s): Final pathology revealed deep angiomyxoma forming a 3.9 x 3.8 x 3.6 cm mass. Histopathologic assessment demonstrated a hypocellular lesion with abundant myxoid stroma, prominent round vessels, and occasionally enlarged symplastic cells. Surgical margins were negative. Our patient recovered uneventfully and was discharged on post-operative day 2. The patient was seen back in clinic after her surgery, and was recovering well from her surgery. Digital rectal exam revealed good sphincter tone, and the patient reported no fecal incontinence.

Conclusions/Discussion: Deep angiomyxoma is a rare mesenchymal tumor that occurs most commonly within the pelvis and perineum of females. Wide surgical excision with tumor free margins forms the basis of curative treatment. Long-term follow-up is recommended for angiomyxomas, given the propensity for recurrence. We will plan to see our patient again in a few months. This case illustrates the importance of preoperative evaluation with imaging and biopsy, as well as thorough discussion with the patient that allowed for appropriate patient counseling and a successful minimally invasive approach.

ROBOTIC ILEOCOLIC RESECTION WITH INTRACORPOREAL ANASTOMOSIS FOR COMPLEX CROHN'S DISEASE.

VR20

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Purpose/Background: Robotic surgery offers similar morbidity and mortality rates to the laparoscopic approach in colorectal surgery. As surgeons have gained more experience, and the da Vinci Xi[®] has allowed for the ease of multi-quadrant surgery, the robotic platform has been used successfully in increasingly challenging Crohn's resections. 3-Dimensional, high-definition visualization, increased dexterity, availability of the wristed instruments, and use of simultaneous energy devices (vessel sealer & fenestrated bipolar) provide additional technical benefit in the management of Crohn's disease.

Methods/Interventions: We report a case of a 27-year-old female with a history of Crohn's disease who presents with recurrent fever and right lower quadrant

pain. A right lower quadrant abscess with phlegmon is demonstrated on computed tomography (CT) imaging, despite intravenous antibiotics given an outside hospital on recent admission (body mass index of 22.1 kg/m²). She underwent CT guided drainage, and subsequent imaging confirmed resolution of intraabdominal abscesses, with concern for enterocolic fistula. After a five-week interval, she was taken to the operating room for a robotic ileocolic resection with intracorporeal anastomosis and ileosigmoid fistula takedown, using the da Vinci Xi[®] platform. Patient was placed in the lithotomy position and bilateral ureteral stents were placed, and indocyanine green (ICG) injected into the stents. The small bowel was examined and a segment of disease in the terminal ileum (TI) with entero-enteric and ileosigmoid fistula was identified. In a lateral to medial approach, the enteric fistulae were taken down and the TI and right colon were mobilized laterally. The right ureter was identified with ICG and protected. An area distal to the cecum where the colon appeared normal was transected with the robotic stapler. Subsequently, an area free of disease, approximately 1 foot proximal to the ileocecal valve was identified and divided. The mesentery was then divided using the vessel sealer and fenestrated bipolar. The area of the sigmoid fistula was repaired in 2 layers. An intracorporeal side-to-side isoperistaltic ileocolic anastomosis was then performed. After establishing hemostasis, the specimen was removed through a 3-cm Pfannenstiel incision incorporating the suprapubic port site.

Results/Outcome(s): There were no intraoperative or postoperative complications. The postoperative recovery was uneventful, the patient regained bowel function on POD (postoperative day) 3 and the patient left the hospital on POD 4.

Conclusions/Discussion: Robotic ileocolic resection with intracorporeal anastomosis (using da Vinci Xi[®]) is safe and feasible for complex Crohn's disease in experienced hands.

ANASTOMOTIC TECHNIQUES IN TRANSANAL ILEAL POUCH-ANAL ANASTOMOSIS.

VR21

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Purpose/Background: Total proctocolectomy with ileal pouch-anal anastomosis (IPAA) is the standard operative treatment for patients with ulcerative colitis requiring colectomy for medically refractory disease, dysplasia, or cancer. Transanal proctectomy, initially developed for the surgical management of rectal cancer, is gaining popularity in benign disease and transanal ileal pouch anal anastomosis (Ta-IPAA) has been described. The anastomosis is the critical point during IPAA surgery. Detailed videos describing Ta-IPAA anastomotic techniques are lacking.

Methods/Interventions: We conducted a thorough review of anastomotic techniques after Ta-IPAA and obtained intraoperative footage of their application.

Results/Outcome(s): We highlight 3 anastomotic techniques after Ta-IPAA: a double purse-string stapled anastomosis, mucosectomy with a hand-sewn anastomosis, and a hand-sewn anastomosis to the rectal cuff. Choice of anastomotic technique is based on intraoperative and patient factors including length and reach of the pouch, the health of the distal rectal cuff, and presence of cancer or dysplasia. These techniques are encompassed in a supplemental video overview with intraoperative application.

Conclusions/Discussion: Ta-IPAA is challenging but may offer a unique opportunity to tailor the anastomosis to optimize patient outcomes. This video provides an overview of 3 anastomotic techniques after Ta-IPAA.

DOUBLE BALLOON HYBRID EMR OUTCOMES COMPARED TO CONVENTIONAL METHOD.

VR22

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Purpose/Background: Large complex polyps require piecemeal EMR and are associated with higher risk of recurrence (particularly those greater than 3cm). Endoscopic submucosal dissection (ESD) was developed for en bloc resection but it is a technically difficult procedure requiring specialized training. ESD vs EMR = longer procedure time and associated with a higher risk of perforation. Hybrid techniques employ both dissection and snaring to reduce the number of specimens produced – the technique is still limited. Here we report a new hybrid EMR technique – facilitating efficient resection utilizing a double balloon platform enabling separate snare delivery without occupying the working channel. In addition, the device facilitates movement of the scope tip with the snare stationary, enabling accurate evaluation of the lesion margins.

Methods/Interventions: Evaluation of a unique en-bloc polyp resection method facilitated by double balloon platform. **Hypothesis:** Double Balloon Hybrid EMR approach (DB-Hy-EMR) facilitates en-bloc resection of large polyps compared to conventional methods. We used fresh ex-vivo porcine rectum with 4cm ‘polyps’ demarcated with electro-surgery mounted in an ESD trainer. **Equipment** Double-balloon platform (DiLumen™, Lumendi, USA) Fuji pediatric colonoscope (EC-550L) ERBE electrosurgical generator (50W Cut 50W Coagulation) Submucosal injection - 0.04% methylene blue, normal saline solution) Boston Scientific 25G endoscopic needle injector Boston Scientific biopsy forceps 27mm hot snare (Olympus Snaremaster) Duallknife (Olympus)

Results/Outcome(s): The double balloon hybrid EMR technique permitted en-bloc resection of the lesion in approximately the same time period as conventional EMR (approximately 20 min each)

Conclusions/Discussion: DB-Hy-EMR enabled complex lesion removal en-bloc. Appears to have procedural time equivalence. Device permits visualization of proximal margin whilst specimen snared in place which may increase safety and decrease recurrence. Further evaluation is on-going.

SUBSerosal AND INTRAMUSCULAR LIFTS DURING EMR AND ESD: DO THEY OCCUR?

VR23

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Purpose/Background: Safe ESD and EMR requires a submucosal lift which increases the distance between the muscularis propria and the mucosal polyp and decreases the chances of perforation when a hot snare or needle knife is used to excise the polyp. In ESD the polyp is detached in the submucosal plane with a needle knife. It is assumed by most endoscopists that when a mucosal lift is obtained that the lift solution is in the submucosal space. During a recent clinical case, after establishing a mucosal lift the mucosa was incised and cap dissection was mistakenly carried out in the subserosal plane that had been expanded by the lift injection inadvertently. This case raised the possibility that other layers of the bowel wall or potential spaces can be expanded when injected and led to the current study of bowel wall injections and lifts.

Methods/Interventions: Large bowel wall injections in an ex vivo bovine model as well as in human colon specimens was carried as was review of clinical ESD and other endoscopic cases. The breadth and extent of mucosal elevation in response to injection was qualitatively assessed and the distribution of the lift solution in the bowel wall determined by cutting through the final lift with a scalpel and examining the resulting cross section. Direct injections into the cut edge of the bowel into the different layers was also carried out to determine the feasibility of subserosal and intramuscular lifts.

Results/Outcome(s): Many video clips are included in the presentation which well demonstrate the different bowel wall lifts. Both subserosal and intramuscular lifts were demonstrated in both the ex-vivo and clinical settings. Subserosal injections likely account for the great majority of deep wall lifts. Deep wall lifts result in broad and less prominent mucosal elevations than do submucosal lifts which are more bleb like and localized. It was

demonstrated that it is possible to make a superficial lift on top of a deep lift and that the lift solution in a deep lift is usually found in the subserosal plane whereas in a superficial lift the solution is in the submucosal layer. A few examples of intramuscular lifts are also shown.

Conclusions/Discussion: Deep wall mucosal lifts occur and are difficult to distinguish from submucosal lifts. ESD and EMR should be carried out only in the presence of a submucosal lift. Endoscopists need to critically evaluate each lift and recognize deep wall lifts when they occur.

APPROACH TO LAPAROSCOPIC TOTAL ABDOMINAL COLECTOMY FOR ULCERATIVE COLITIS IN A PATIENT WITH A ROTATIONAL ANOMALY.

VR24

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Purpose/Background: The aim of this video is to demonstrate safe application of the laparoscopic approach to total abdominal colectomy with end ileostomy for medically refractory ulcerative colitis in a patient with a congenital rotational anomaly.

Methods/Interventions: The patient is a 31 y/o woman with Class 3 morbid obesity, cerebral palsy and autism who was diagnosed at age 13 with ulcerative colitis. She was well-controlled with infliximab for many years until she developed drug-induced lupus and subsequently became refractory to medical therapy with steroid intolerance and poor quality of life. Plan was made for laparoscopic total abdominal colectomy with end ileostomy. Pre-operative cross-sectional imaging demonstrated intestinal nonrotation. A step-by-step approach is presented in the video.

Results/Outcome(s): A midline extraction site was utilized to subsequently perform mesentery widening. Pathology was consistent with severely active ulcerative colitis, with no dysplasia. The patient was readmitted eight days postoperatively with a peristomal skin complication due to improper pouching. The patient's reluctance to perform stoma self-care contributing to this complication will be weighed alongside her morbid obesity and her short ileal mesentery when determining whether a restorative ileal pouch will be possible for her in the future.

Conclusions/Discussion: When the altered anatomy is appropriately identified, laparoscopic approach to total abdominal colectomy is safe in patients with intestinal rotational anomalies.

COMPOSITE GRAFT (ANTROPYLORIC/GLUTEUS MAXIMUS) GRAFT FOR TOTAL NEOANAL RECONSTRUCTION: A VIABLE OPTION.

VR25

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Purpose/Background: End stage Fecal Incontinence (ESFI) has a significant impact on patient's quality of life. Present techniques for Total Anal Reconstruction (TAR) have poor outcomes. Permanent stoma in these patients is often socially unacceptable. Composite graft using pylorus graft-smooth muscle for sustained tonic contraction and gluteus maximus- an accessory anal sphincter for voluntary control may be a viable option for such patients. The objective of the study was to evaluate the results of composite antropylic/gluteus maximus graft: total anorectal reconstruction as a substitute for permanent colostomy.

Methods/Interventions: Ten patients of ESFI were included in the study who had previously undergone antropylic transposition. APVT was performed as first procedure of the 3-staged surgery, followed by gluteoplasty in all these patients. Stoma closure was finally done once the composite graft healing and function were ensured. **Assessment:** 1. **Anatomical:** Magnetic Resonance Imaging (MRI), Real time endoultrasonography 2. **Functional:** Digital Rectal Examination (DRE), Distal loopogram, Saline retention test, High definition anal manometry, St Mark's Fecal Incontinence Score (SMIS). 3. **Quality of life:** Assessed by personal interview and SF-36 questionnaire. Qualitative and quantitative values were analysed using chi-square and t-test respectively. p value < 0.05 were considered as significant.

Results/Outcome(s): Ten patients with a mean age of 27.7 years (range: 13-45) (M:F= 7:3) underwent the procedure during the study period between October 2014 to April 2017. Median follow up was 16 month. Anatomical integrity was confirmed using MRI and endoultrasonography. Patients were able to hold saline for a mean of 135 seconds. Distal loopogram showed barium holdup with a bird beak. Functional results showed a significant improvement in both SMIS [24 vs 6; p: <0.0001] and manometry values following surgery [Resting pressure: 4 vs 21; p: 0.02, Squeeze pressure: 14 vs 102; p: 0.009]. On personal interview, most (n=9) patients were satisfied with the procedure. SF-36 questionnaire showed a median improvement in mental component scale (MCS) and physical component score (PCS) was 0.9 and 1.05 respectively.

No procedure related mortality was seen. One patient had anastomotic leak after colostomy closure, managed conservatively. Three patients had surgical site infection at the gluteus muscle donor site, managed conservatively. All patients required use of pads due to mucus secretion from the transposed duodenal mucosa.

Conclusions/Discussion: Composite graft using APVT and gluteus maximus wrap may be considered for selected patients of ESFI with effective outcomes. It simulates the function of both internal (pyloric graft, a smooth muscle) and the external anal sphincter (gluteus maximus, a skeletal muscle) and can obviate the need for a permanent stoma.

A COMPLEX CASES OF COMBINED PENETRATING PELVIC FLOOR FLOOR-ANORECTAL TRAUMA.

VR26

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Purpose/Background: Trauma to the rectum is uncommon and the majority is due penetrating injury. According to the most recent Eastern Association for the Surgery of Trauma (EAST) guidelines, non-destructive penetrating extraperitoneal rectal injuries can be managed with proximal diversion without the need for pre-sacral drains or distal rectal washout.

Methods/Interventions: This video presents a difficult case of a combined extraperitoneal and intraperitoneal anorectal trauma involving the pelvic floor.

Results/Outcome(s): A 24-year-old female sustained two stab wounds to the buttocks, violating the pelvic floor and gluteus muscles, leading to evisceration of the small bowel through the gluteus muscle. A trauma laparotomy was performed. She was found to have a penetrating injury to the small bowel, necessitating a limited small bowel resection and primary anastomosis. Both gluteal wounds were in communication with one another, as well as the rectum and peritoneal cavity. Intraoperative assessment revealed a combined intra-peritoneal and extra-peritoneal injury to the right lateral rectum.

Conclusions/Discussion: We present a complex penetrating injury to the pelvic floor and extra-peritoneal and intra-peritoneal rectum to which the standard EAST guidelines did not apply. As such, the patient was treated with diverting colostomy, washout, presacral drainage, and primary repair from a combined intra-abdominal and perineal approach.

PERINEAL HERNIA REPAIR WITH MESH FOLLOWING ROBOTIC APR.

VR27

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Purpose/Background: Perineal hernia is an uncommon complication after abdominoperineal resection (APR) and can be challenging to manage. In this video we present a mesh repair of a perineal hernia following APR.

Methods/Interventions: The patient is an 86 year old male who presented with perineal hernia 2 years following robotic APR. He had a BMI of 30 and his past medical history was significant for hypertension, coronary artery disease and Diabetes Mellitus. The hernia sac was excised and bioresorbable mesh was used to repair the defect. Details of the procedure are presented along with key technical points.

Results/Outcome(s): There were no peri- or post-operative complications and at outpatient follow-up seven months later, there was no recurrence.

Conclusions/Discussion: Mesh repair of perineal hernias following APR is feasible and can have favorable outcomes.

A NEW APPROACH FOR PERINEAL RECONSTRUCTION AFTER ABDOMINAL PERINEAL RESECTION – LAPAROSCOPIC VERTICAL RECTUS MYOFASCIAL FLAP.

VR28

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Purpose/Background: Vertical rectus abdominis myocutaneous flaps (VRAM) are commonly used to close large perineal defects after an abdominal perineal resection (APR). Closure with VRAM flaps has shown to be superior to gracilis flaps due to lower rates of complications such as pelvic abscesses or wound dehiscence. However, reconstruction may be technically challenging in certain patient populations, especially in the obese. The VRAM flap can be difficult to pass through the pelvic inlet, or the skin flap can die due to the increased layer of subcutaneous fat. In addition, there is high wound morbidity associated with these flaps secondary to the large abdominal wound and utilizing all layers of the abdominal wall. We now perform most abdominal perineal resections laparoscopically, and this leads us to consider alternatives to the traditional VRAM flap.

Methods/Interventions: We present a video demonstrating the laparoscopic approach to harvesting a vertical rectus abdominis myofascial (LVRAM) flap. The key elements of the procedure involve 1) incising the lateral

aspect of rectus fascia to expose the rectus abdominis muscle 2) transecting the rectus abdominis muscle and fascia superiorly and dissecting along the avascular plane below the anterior rectus sheath 3) ligation of the lateral intercostal neurovascular bundle and rectus perforators 4) preserving the rectus flap vascular pedicle 5) mobilizing adequate length to reach the pelvis 6) tension-free repair of pelvic defect. In this manner, we can leave the anterior rectus sheath in place and avoid an abdominal defect or a hernia.

Results/Outcome(s): We use footage from two cases in our video, the first being a 67-year-old male who presented with a right buttock myxoid liposarcoma with rectal involvement. We performed a laparoscopic APR, and a LVRAM flap was harvested and brought down to the perineal defect for a successful closure of the levator muscles. A left rotational advancement flap and right V-to-Y advancement flap of the buttock and posterior thigh was used to close the remaining skin defect. The second patient is a 20-year-old female who developed an anterior vaginal wall defect after suffering thermal damage at a young age. She underwent a successful reconstruction with a LVRAM flap and complex vaginal closure.

Conclusions/Discussion: LVRAMF is an effective and new approach for perineal reconstruction following an APR. With this flap, we can fill the pelvic defect and provide muscle and fascia to close the levator ani to prevent herniation of the abdominal contents into this wound.

COLOVAGINOPLASTY: MINIMALLY INVASIVE SINGLE PORT TECHNIQUE WITH FLUORESCENCE IMAGING.

VR29

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Purpose/Background: Mayer-Rokitansky-Kuster-Hauser (MRKH) syndrome is also known as Mullerian agenesis. It is the second most common cause of primary amenorrhea. Congenital absence of the uterus, cervix, and upper part of the vagina. Lower part of vagina and external features are normal. Fallopian tubes often normal but can be aplastic, hypoplastic or malformed. Ovaries also usually normal although gonadal dysgenesis and ovarian agenesis have occurred in a few cases. Patients are otherwise phenotypically normal 46 XX. Incidence of 1 in 4,500-5,000 newborn females. Mainly sporadic, familial cases have been described. Bowel vaginoplasty has been discussed in the literature Satisfactory sexual function can be achieved. Most common complications are mucosal prolapse and stenosis

Methods/Interventions: We present a minimally invasive technique to manage MRKH syndrome with vaginal and uterine agenesis. Involves the creation of sigmoid colon conduit for neo-vagina with primary colonic anastomosis.

Results/Outcome(s): The technique was successfully carried out as documented by the video.

Conclusions/Discussion: We present, to our knowledge, the first video-documented single-port technique laparoscopic colovaginoplasty utilizing a sigmoid conduit graft for the reconstruction. Angiography is used to confirm vascularization of the conduit graft.

MINIMALLY INVASIVE RESECTION OF SIGMOID INTUSSUSCEPTION IN ADULTS.

VR30

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Purpose/Background: Is a rare condition in adults (2–3 per 1,000,000) Up to 65% of cases are secondary to neoplasms The majority are located in the small bowel Only 17% of intussusceptions are colonic, in order of occurrence: Ileocolic, Colocolonic and Sigmoidorectal Many present with symptoms of partial bowel obstruction which can spontaneously resolve Recommended treatment is surgical resection

Methods/Interventions: We present a video documented technique to surgically treat intussusception in adults

Results/Outcome(s): Intussusception was able to be treated with minimally invasive technique for the resection of the affected segment and construction of a primary anastomosis

Conclusions/Discussion: Minimally invasive technique is a feasible option to surgically treat sigmoidorectal intussusception

ROBOTIC-ASSISTED TRANSANAL MINIMALLY INVASIVE SURGERY FOR REPAIR OF RECTOVAGINAL FISTULA WITH BIOLOGIC MEMBRANE INTERPOSITION.

VR31

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Purpose/Background: A rectovaginal fistula (RVF) is an abnormal epithelium-lined communication between the vagina and rectum. These compose less than 5% of all anorectal fistulae. Various techniques have been utilized for RVF repair, but durable repair is still a major challenge for surgeons. Transvaginal, transanal, and perineal approaches are commonly used for low fistulae, whereas a transabdominal method is employed for high lesions. The

transanal approach has the advantage of direct access to the high-pressure side but has limited exposure. The use of minimally invasive techniques for repair is limited but recent literature reports the use of transanal endoscopic microsurgery (TEM), vaginal access minimally invasive surgery (VAMIS), as well as robotic transanal minimally invasive surgery (TAMIS).

Methods/Interventions: In this video presentation, a robotic TAMIS approach for repair of a rectovaginal fistula with composite amniotic tissue membrane as interposition is demonstrated as an alternative method for RVF repair. The patient was an 88-year-old female with a past medical history of hypertension, arthritis, COPD that had developed a highly symptomatic 1.5 cm dia. RVF approximately 4 cm from the anal verge secondary to pessary trauma and resultant pressure necrosis. With the patient positioned prone jackknife, a self-retaining retractor was positioned to expose the anal canal, followed by insertion of the TAMIS port's access channel. The robotic technique was used to create a full-thickness rectal wall flap proximally to separate the fusion plane between the rectum and vagina along the RV septum, and the dissection was carried out until there were flaps on either side of the fistula. After the vaginal wall was reapproximated using an absorbable self-locking suture, the robotic cart was un-docked, and a straight TAMIS technique was used to completed the operation. A 3x3 cm amniotic membrane was placed as an interposition and the rectal wall was then re-approximated using TAMIS. The patient then underwent a diverting loop ileostomy.

Results/Outcome(s): Operative time for RVF repair was 95 min. There was no operative morbidity. Postoperatively, the patient was twice readmitted for dehydration related to high ileostomy output; this was corrected with medical management and fluid resuscitation. At six weeks post-op, a rectal exam including leak test with rigid proctoscopy revealed a completely healed RVF and her ileostomy was closed without further sequelae.

Conclusions/Discussion: Robotic-assisted TAMIS repair of a RVF with amniotic membrane interposition is feasible in select patients. Procedure-specific costs must be carefully balanced against the known advantages of robotic platforms.

LEVATOR ANI SYNDROME: TRANSPERINEAL BOTOX INJECTIONS.

VR32

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Purpose/Background: Levator ani syndrome is a notoriously difficult condition to treat. In this video we describe injections of botulinum toxin A (Botox) into the perineal sling via the perineal and not transanal approach. This is

a new modification to a previously described treatment option.

Methods/Interventions: A video recording is provided to demonstrate the technique used. This recording was approved by the institutional review board and the patient was appropriately consented at the time of surgery. The procedure is performed in lithotomy position with general or MAC anesthesia. The components include: - Perineal Local anesthetic block using bupivacaine liposome injectable suspension. - Injection of 200 units of Botox into the puborectalis muscle. - Levator ani massage focused on the area of spasm.

Results/Outcome(s): We have used Botox with some success at our centre. We have recently changed our technique from transanal to the transperineal approach. This new approach is a more accurate method of delivering the medication to the pelvic floor, whilst minimising the potential risk of infection inferred by the transanal injections.

Conclusions/Discussion: The optimal dose of botox has not been defined. Injection of the muscle with Botox can be repeated at three months following previous treatment, provided that symptoms of pain have decreased for a period of time. We delay reinjections for a minimum of 4-6 weeks.

ROBOTIC PELVIC LYMPH NODE DISSECTION.

VR33

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Purpose/Background: Rectal cancer patients with pelvic side wall (PSW) nodes have poor disease free survival compared to those without the presence of PSW nodes. The role of PSW nodal dissection is still not clearly defined in context of disease progression and patient morbidity. In West only selective patients undergo PSW dissection as the current treatment paradigm involving neoadjuvant chemoradiotherapy (CRT) has similar survival outcomes with reduced morbidity. However in Japan and Korea PSW nodal dissection is standard practice.. Most tumours with PSW nodal involvement are low rectal tumours which renders pelvic sidewall dissection a relatively difficult procedure by conventional means. Current surgical approaches used for PSW dissection include open, laparoscopic and robotic surgery. Robotic surgery is the most recent addition to the current surgical repertoire. The difficulty of dissection of low rectal cancers may be overcome with the use of a robotic approach, which gives improved vision and increased degree of dexterity leading to better access of the pelvis compared to the laparoscopic and open approaches.

Methods/Interventions: This video shows the method used for robotic PSW nodal dissection at our institute

Results/Outcome(s): This patient was discharged home on 7th post operative day with no complications.

Conclusions/Discussion: Robotic PSW nodal dissection is a feasible and safe option with minimal morbidity

CROSS SPECIALTY INSTRUMENT UTILIZATION FOR RECTAL CANCER IN THE FEMALE PELVIS.

VR34

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Chicago, IL

Purpose/Background: The patient is a 25-year-old woman with history of ulcerative colitis who presented with abdominal pain. She was diagnosed with multifocal adenocarcinoma in the sigmoid colon and rectum after a colonoscopy. Staging MRI demonstrated multiple enhanced lymph nodes and possible extension of the rectal mass into the vagina.

Methods/Interventions: We recommended that the patient undergo a total proctocolectomy for her cancer in the setting of ulcerative colitis. The procedure was performed laparoscopically. There did not appear to be gross extension of the tumor into the vagina or uterus; however, maintaining visualization of the rectovaginal plane was difficult especially deep in the pelvis. This lack of exposure and lack of cross-tension lead us to a gynecological instrument that helped with both. A uterine manipulator was placed through the vagina and cervix in order to inflate the balloon in the uterus. This allowed us to position the uterus to help facilitate the anterior rectal dissection with better visualization and cross tension.

Results/Outcome(s): We successfully utilized a uterine manipulator to provide better visualization of the rectovaginal plane, significantly aiding in the completion of the distal anterior rectal dissection.

Conclusions/Discussion: The uterine manipulator provides anterior and cephalad retraction of the uterus and allows for better visualization of the rectovaginal septum. With appropriate manipulation of the uterus via the uterine manipulator, it provides the necessary cross-tension needed for adequate anterior rectal dissection in the rectovaginal plane. This in turn also relieves the laparoscopic instruments from having to retract the uterus. Furthermore, because the uterine manipulator does not require constant attention from a surgical assistant, he or she is available to assist with the intra-abdominal portion of the procedure. The uterine manipulator proves to be a dynamic instrument that helps to facilitate low anterior rectal dissection in the female pelvis.

TRANSANAL TOTAL MESORECTAL EXCISION WITH PRIMARY TURNBULL CUTAIT DELAYED COLOANAL ANASTOMOSIS.

VR35

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Purpose/Background: We present the case of a 42 year old male with low rectal cancer, T3N1M0 who received neoadjuvant chemoradiation but was adamant about not having a stoma. Surgical options were extensively discussed and he was consented for a transanal total mesorectal excision (TATME) with Turnbull Cutait delayed coloanal anastomosis (CAA). This is a two-step operation, where the delayed CAA to allow for inflammatory adhesions to form around the conduit and mucosa of the rectal stump, which reportedly may lead to decrease anastomotic leak. It was traditionally used for redo colorectal anastomoses with few case reports in the literature about primary Turnbull Cutait.

Methods/Interventions: We started the laparoscopic portion with medial to lateral dissection with high ligation of the inferior mesenteric artery (IMA) and dividing the inferior mesenteric vein (IMV) at the level of the 4th stage of the duodenum. The transanal total mesorectal excision (TME) was performed transanally with a flexible platform. The procedure was done in the standard fashion till the peritoneum was breached and the two planes of dissection were met. The specimen was pulled through the anus and transected proximally. The neorectum was left open and it was secured to the peri-anal skin with interrupted sutures. The patient was admitted and followed an Enhanced Recovery After Surgery (ERAS) pathway. The second stage of the operation was done at post-operative day 7, where the rectal stump was incised longitudinally and the first suture of the CAA was placed at the apex. The stump was then sequentially divided as more sutures were placed along the way till the stump was divided at the level of the anal verge. More interrupted sutures were places circumferentially to complete the CAA.

Results/Outcome(s): This is the second patient where we performed a primary delayed CAA. The first patient was a morbidly obese patient with low rectal cancer. His weight precluded the creation of a diverting ileostomy and he underwent TATME with delayed CAA. Post-operatively, a part of the CAA had separated and this was conservatively managed. His function was affected by this but has shown some improvement since, with a Wexner Score improving from 19 to 12, and a Low Anterior Resection Syndrome (LARS) score of 39 from 41.

Conclusions/Discussion: A primary turnbull Cutait with delayed CAA is a feasible option in patients that refuse a stoma or in whom a stoma cannot be fashioned but wish to have sphincter preservation.

AUTONOMIC NERVE STRUCTURES ABOVE THE PROMONTORY DURING ROBOTIC ANTERIOR RESECTION.

VR36

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Purpose/Background: This video describes the autonomic nerve structures above the promontory relevant during anterior resection of the rectum. The patient is a 50-year-old male who had a rectal cancer involving the sphincters necessitating an abdominal perineal resection.

Methods/Interventions: The da Vinci Si robotic platform is used. The dissection starts above the promontory, where the nerve structures are predominantly sympathetic. They originate from the sympathetic trunks on both sides of the spinal column. Then they form the first plexus of relevance to us which is the IMA plexus. In continuation, the superior hypogastric plexus forms right below the bifurcation. From there symmetrical hypogastric nerves originate. The video demonstrates how to performed an appropriate dissection of the IMA preserving the IMA plexus. We also show how to separate the superior hypogastric plexus from the mesocolon and retroperitoneum. The patient's anatomy revealed tethering around the IMA root, which we have found not uncommonly. The tethering forms a kind of peel around the IMA and this dissection is done very carefully to spare nerve fibers.

Results/Outcome(s): An oncologic and nerve preserving procedure was performed. The patient recovered uneventfully with preserved genitourinary function.

Conclusions/Discussion: To perform an anterior resection of the rectum, it is imperative that the surgeon understand the anatomy of the nerve structures around the aorta and IMA. This video demonstrates very clearly this relationship, and it shows how the robotic platform can aid in preservation of these nerve structures.

AUTONOMIC NERVE STRUCTURES BELOW THE PROMONTORY DURING ROBOTIC LOW ANTERIOR RESECTION.

VR37

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Purpose/Background: Autonomic nerve structures are at risk of being disrupted during total mesorectal excision of rectum. This video provides detailed description of how to properly dissect through planes where the nerve structures are tethered, yet carefully preserving these structures.

Methods/Interventions: We present a male patient with a mid-rectal tumor who is undergoing robotic ultra-low anterior resection with no neoadjuvant chemoradiotherapy. We describe our technique and show how to

preserve the autonomic nerve structures at multiple sites during dissection.

Results/Outcome(s): The video demonstrates successful dissection and preservation of autonomic nerve structures.

Conclusions/Discussion: It is vital to be able to identify and preserve the autonomic nerve structures in a tethered operative field during low anterior resection for cancer.

SIMULTANEOUS TRANSANAL/ROBOTIC APR IN THE NON-COMPLIANT PATIENT.

VR38

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Purpose/Background: The management of rectal cancers is in a rapid phase of evolution utilizing varying degrees of medical and surgical techniques. Abdominoperineal resection (APR) completely removes the distal colon, rectum, and anal sphincter complex using both anterior abdominal and perineal incisions, resulting in a permanent colostomy. Despite advances in sphincter-sparing procedures, it remains an important tool in the treatment of rectal cancer. A traditional open or even laparoscopic APR can be a challenging procedure given limited exposure in a confined pelvic cavity especially in the obese male. The robotic-assisted approach may help with exposure to low rectal and anal cancers, while at the same time decreasing the number of surgeons needed at the bedside. This allows for another surgeon to simultaneously begin the transanal dissection while the abdominal TME is being performed. A two team robotic APR is shown in a patient with significantly delayed surgical resection following neoadjuvant chemoradiotherapy (CRT).

Methods/Interventions: We present a 64 year-old-male with history of uT3N1 rectal adenocarcinoma who underwent neoadjuvant CRT. He was lost to follow-up, and presented for care after developing pain and bloody bowel movements nearly two years after diagnosis with a palpable lesion on rectal exam. Restaging was negative for distant metastases, and the MRI revealed a T2 rectal cancer, ultralow, involving the levator ani and sphincter complex on the left posterior side at the dentate line.

Results/Outcome(s): The patient was offered robotic abdominoperineal resection. We describe a novel method of simultaneous transanal and robotic-assisted APR. As the abdominal portion begins, a separate team starts the transanal dissection to meet the abdominal dissection. Key considerations include patient positioning, robot docking, and transanal approach to prevent leakage from the bottom, which are detailed in the video.

Conclusions/Discussion: Simultaneous transanal/robotic-assisted APR offers enhanced exposure deep in the pelvis with the efficiency seen in a combined two-team approach. As the robotic approach may decrease the number of trained surgeons at the bedside, it allows for

the second surgeon to start from below simultaneously, and in effect decrease the operative time, and facilitates the completion of the procedure in an effective manner. This is a safe and efficient operative technique in patients requiring low pelvic dissection, especially with an abdominoperineal resection.

ROBOTIC ABDOMINOPERINEAL RESECTION WITH EN BLOC PROSTATECTOMY.

VR39

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Purpose/Background: Rectal cancer with local invasion presents a particular operative challenge. The standard procedure for locally advanced rectal cancer is a total pelvic exenteration (TPE), which is a highly morbid procedure. For select patients, the literature has demonstrated that bladder-sparing techniques involving en bloc resection of the prostate are safe and oncologically acceptable. However, little has been published concerning the combined robotic-assisted approach of both abdominoperineal resection (APR) and en bloc prostatectomy. Our video presents a case of T4N0M0 rectal adenocarcinoma with invasion anteriorly into the prostate after chemotherapy and radiation therapy. A combined approach with colorectal surgery and urology was done robotically.

Methods/Interventions: Robotic-assisted laparoscopic abdominoperineal resection with en bloc prostatectomy

Results/Outcome(s): The patient tolerated the procedure well. His post-operative course was uneventful. He was discharged with a foley on postoperative day 5 after having ostomy function and tolerating a diet.

Conclusions/Discussion: Robotic-assisted procedures offer the advantage of precision and visualization for pelvic operations. For locally invasive rectal cancer, robotic surgery allows the opportunity to create novel techniques for select patients in order to reduce the number of TPEs.

LAPAROSCOPIC SPECIMEN-ORIENTED ABDOMINOPERINEAL RESECTION OF A LOWER RECTAL TUMOR.

VR40

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Purpose/Background: We present a video of a specimen-oriented laparoscopic abdominoperineal excision (SOLAPE) performed as Circumferential Resection Margin (CRM)-negative surgery without over-resection of the pelvic diaphragm for the treatment of rectal cancer.

Methods/Interventions: If CRM-negative surgery is considered to be possible according to the preoperative diagnosis based on the findings of T2-weighted MRI, pathologically CRM-negative specimen-oriented surgery is performed by adjusting the extent of resection of the levator ani muscle according to the location and extension of the tumor using a combination of laparoscopic and TaTME techniques. If the tumor is localized within the external sphincter muscle in the anal canal or on the posterior side of the rectum, the coccyx and levator ani muscle that are exposed on the caudal side of the pelvic nerve plexus which is considered to be the resected lateral-posterior margin. When the tumor extends to the lateral or anterior side of the levator ani muscle, the internal obturator muscle is sufficiently exposed after the lateral lymph node dissection, and the tendinous arch is confirmed and set as the lateral margin of the levator ani excision, which is the same as the procedure for cylindrical resection. Depending on the degree of tumor extension, the pelvic plexus and vesicohypogastric fascia, including internal iliac vessels and its branches, are transected with the levator ani muscles as an *en bloc* specimen through a laparoscopic procedure. These procedures can be performed safely by combining laparoscopic and TaTME techniques. As the tumor infiltrates unilaterally in most of the cases, the levator ani muscle can be partially transected at the opposite side of the tumor for CRM-negative surgery.

Results/Outcome(s): From October 2013 until August 2017, 17 patients with low rectal cancer underwent SOLAPE at our hospital. The male to female ratio was 9:8, the median age was 73 years (range, 48-88 years), and the median BMI was 22.3 kg/m² (range, 14.0-29.6 kg/m²). Fourteen patients underwent preoperative chemoradiotherapy (45Gy+TS1). The distance of the tumor from the anal verge ranged from was 0 cm (range, 1-5 cm). Lateral lymph-node dissection was performed in 4 cases. The median duration of the operation was 343 min (range, 178 – 664 min) and the median blood loss was 149 g (range, 18 – 726 g). A pathological examination revealed that 14 cases were CRM-negative (≥ 1 mm). The perineal wound was closed directly without a flap. One case experienced perineal hernia requiring a composite mesh repair.

Conclusions/Discussion: SOLAPE is thus considered to be a useful surgical modality for the safe performance of CRM-negative APE without the need for either any postural change or additional perineal repair.

NEW TECHNOLOGY ABSTRACTS

TOWARDS ENHANCED SURGICAL EDUCATION USING AN AUGMENTED REALITY OPERATING ROOM ASSISTANT (ARORA).

NT1

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Purpose/Background: Segmentation of surgical procedures into 'workflows' can greatly enhance training by partitioning complex surgery into defined sequential steps. Training through workflows, can also improve efficiency within the operating room (OR) by displaying the sequence of procedure-specific steps allowing for better equipment preparation. Novel surgical platforms will be able to incorporate workflows to assess performance and potentially provide assistance during challenging future procedures through machine learning. In this pilot validation study, we describe an innovative system to improve the training experience of surgical teams by using digital tools including augmented reality (AR) within the OR as a ubiquitous assistive platform with the potential for future machine learning – Augmented Reality Operating Room Assistant (ARORA).

Methods/Interventions: The ARORA system consists of a mobile tablet that presents pre-generated workflow steps along with a real-time, first-person view of the operating field captured through a head-mounted or laparoscopic camera. The operating surgeon uses an input device (e.g. foot pedal) to advance the surgical steps of the procedure. The surgeon and rest of the OR team (including all assistants) can follow the procedure and prepare for the following step. The surgery is recorded within a secure system and the live video feed of surgery, the workflow and relevant surgical anatomy as a digital 3D asset can be viewed remotely using an AR device to support multiple trainees viewing the case.

Results/Outcome(s): The system was tested on cases of laparoscopic right hemicolectomy and laparoscopic anterior resection following segmentation of both procedures into custom workflow sub-tasks. Through an AR device, remote users were successfully able to experience the first person-view, the segmented workflow steps of the procedure together with 2D or 3D simulation content.

Conclusions/Discussion: The proposed ARORA system facilitates digital content delivery and capture for educational enhancement for end-users within, and remote to the OR. Surgeons, whether leading the case or training, are able to visualize generated surgical workflows intraoperatively in order to support better process for the full OR team. Trainees are able to experience the live view of surgery remotely from the theatre alongside reference procedures and educational simulation content. As the procedures are recorded in segments it facilitates machine learning for future integrated surgical platforms



USABILITY AND ACCEPTABILITY OF A CONNECTED MEDICAL DEVICE TO AID SELF-MANAGEMENT IN AN ILEOSTOMY PATIENT I.

NT2

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Purpose/Background: Colorectal surgery for benign and malignant conditions commonly results in the formation of an excretory stoma with population prevalence rates as high as 2-4 per thousand. Ostomates are prone to complications, hospital readmissions, peristomal skin complaints and impaired quality of life. Novel technologies are able to provide continuous monitoring of ostomy function and can alert a patient of imminent complication. We aimed to assess the usability and acceptability of such a device.

Methods/Interventions: The Alfred Alert Sensor is a medical device that uses a flexible sensor which attaches to a stoma bag and measures deformation of the bag whilst filling. It is able to relay volume data back to the patient and clinical team in real time via a Bluetooth connection to a smartphone or tablet. A 26 year old female with a history of subtotal colectomy and permanent ileostomy for ileocolonic Crohn's used an Alfred Alert stoma monitoring device for 8 consecutive days. The stoma output recorded by the device was tabulated and the patient was asked to complete a questionnaire at the end of the period. The questionnaire was based on a 5-point Likert scale concerning aspects of usability and acceptability. Open ended questions were also used.

Results/Outcome(s): The patient was able to use the Alfred Alert Sensor with usage increasing throughout the study period from 3-4h on days 1-2 to 20-24 hours on days 6-8. Average recorded stoma output across the duration of the study was 84.24ml/h. No complications were reported during the study period. The patient felt the device was easy to set up and to secure to a stoma bag along with a positive experience using the companion application (5 on Likert scale), but experienced difficulties in porting the device when changing bags (2 on Likert scale).

The device was found to be most accurate if unobstructed and when stationary. **Positive freetext comments included:** “I find it catches dehydration before I realize it is happening. The alarms alert me that my bag is filling more quickly, so I realize I need to replenish with electrolyte drinks,” and “I like that is able to tell me how full my bag is, without me checking. This helps me remember that I do in fact have an ostomy, and need to empty it!” **Suggestions for improvement included:** “The app needs to work better for more active people who move,” and “peeling off new adhesive each time to change the bag is difficult”.

Conclusions/Discussion: A novel non-invasive wireless monitoring device was found to be usable and acceptable to an IBD patient of working age with a permanent ostomy. The device was able to provide accurate volume output data and alert the patient to imminent complications. Through a system of early warnings and prompted early intervention, this device has the potential to reduce bag leakage events and guide fluid management with a view to reducing stoma-related complications.

LONG-TERM RESULTS OF A NEW ARTIFICIAL ANAL SPHINCTER IN TREATING FECAL INCONTINENCE.

NT3

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Purpose/Background: Fecal incontinence (FI) significantly affects patients' quality of life (QoL). Treatment of FI is still controversial. Correct selection of an effective procedure is crucial. A new artificial anal sphincter was devised with the aim to surround the anal canal with specifically designed self-expandable prostheses. The long-term results in patients (pts) treated for FI are reported.

Methods/Interventions: SphinKeeper (SK, THD SpA, Correggio, Italy) prostheses (length: 25 mm; diameter: 3 mm) are hydrophilic and self-expandable, changing, when immersed in body fluids, dimensions (length: 22 mm; diameter: 7 mm) and becoming soft with shape memory. SK implant was performed in lithotomy position, under

local anesthesia. Ten 2-mm perianal skin incisions were made equidistant each other. Under digital guidance, the dispenser cannula was inserted into the intersphincteric space reaching the upper part of the anal canal. Endoanal ultrasound (EAUS) confirmed the correct position. Then, the delivery system provided the automatic deployment of 10 prostheses along the anal canal circumference. Follow up (FU) was scheduled at 1 week, 1, 3, 12 months, and once a year, providing clinical assessment (including FI severity scores), EAUS and anal manometry (ARM).

Results/Outcome(s): Forty-one pts (9 men, 32 females; median age: 58 years, range 20–75) were submitted to SK implant. Mean procedure duration was 40 min (range 30–45). None intra-postoperative complication was registered, (including sepsis). No patient complained of anal pain/discomfort. For 19 pts FU duration was at least 12 months (range 12-15). Compared with baseline, reduction in mean episodes of soiling (from 8.4 to 3.6, $p=0.0014$), incontinence to gas (from 22.2 to 9.0, $p=0.0024$), liquid (from 6.0 to 1.8, $p<0.0001$), and solid stools (from 3.4 to 1.5, $p=0.065$) was achieved. In 10 pts (52.6%) a reduction of >75% episodes of FI events was accounted; 6 pts (31.6%) regained full continence. FI severity scores improved significantly: Wexner score, from 11.8 to 6.2, $p=0.0004$; Vaizey score, from 14 to 7.7, $p<0.0001$; AMS score, from 78.8 to 42.9, $p=0.0098$. If compared to baseline, ability to defer defecation for >5 minutes concerned a significantly higher number of pts. following the SK implant (21.1% vs. 52.7%, $p<0.001$). At ARM, resting pressure did not change significantly but squeeze pressure improved (from 102.2 ± 77.2 to 120.4 ± 65.3 , $p=0.02$) and the anal canal functional length increased (from 1.6 ± 1.0 to 1.9 ± 0.4 , $p=0.27$).

Conclusions/Discussion: This study demonstrates the long-term efficacy of the SK implant in treating FI pts. Also soiling and incontinence to gas resulted significantly improved. The mechanisms of action of SK implant must be better elucidated; however, this study showed an improved pts' ability to defer defecation, anal canal functional length, and squeeze pressure. Moreover, safety of SK implant was confirmed. This procedure can be considered a valid therapeutic option in FI.