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General Surgery Forum

GS1

SHOULD WE "EAT" THE COST OF DOUGHNUTS? NO CLINICAL BENEFIT FROM ROUTINE HISTOLOGIC EXAMINATION OF DOUGHNUTS AT LOW ANTERIOR RESECTION FOR RECTAL CANCER.

J. Sugrue[1], F. Dagbert[2], J. Blumetti[2], V. Chaudhry[1], R. Emmadi[3], S. Marecik[4], A. Mellgren[1] and J. Nordenstam[1] *[1]Division of Colon and Rectal Surgery, University of Illinois at Chicago, Chicago, IL, [2]Division of Colon and Rectal Surgery, John H. Stroger Hospital of Cook County, Chicago, IL, [3]Department of Pathology, University of Illinois at Chicago, Chicago, IL and [4]Division of Colon and Rectal Surgery, Advocate Lutheran General Hospital, Park Ridge, IL.*

Purpose: Circular end-to-end anastomotic staplers are commonly used to create an anastomosis as part of a low anterior resection for rectal cancer. These staplers cut 2 circular doughnuts of tissue from inside the anastomosis and are frequently sent for pathology. This study aims to evaluate the utility of routine histologic examination of these doughnuts.

Methods: 486 patients who underwent a low anterior resection with stapled anastomosis for rectal cancer between 2002 and 2015 at three institutions were reviewed retrospectively. Primary outcomes were pathologic findings in the doughnuts and their impact on patient management. Tumor characteristics that may influence how often doughnuts were included in the pathology report (location, disease stage, gross distal margin distance) were analyzed with multivariate logistic regression analysis. The cost of histologic examination of doughnuts was also analyzed.

Results: 412 patients (85%) had doughnuts included in their pathology reports. Two of these patients had cancer cells in their doughnuts and both of these patients also had a positive distal margin in their primary tumor specimen. No other patients had cancer cells in their doughnuts or at the distal margin of their primary tumor specimen (Table). 33 patients had benign findings in their doughnuts: non-specific inflammation (12), hyperplastic (10), adenomatous (3) or radiation (3) changes, microcalcification (2), diverticula (1), melanosis coli (1), and inflammatory bowel disease (1). Doughnut pathology did not change clinical management in any patients. Patients with rectosigmoid tumors were less likely to have their doughnuts included in the pathology report compared to patients with low tumors (p=0.004). The stage of the disease and gross distal margin distance did not influence how often doughnuts were included in the pathology report. Doughnuts add additional cost when processed by pathology as a unique specimen separate from the primary tumor specimen and this was practiced in 374 (77%) of our patients. The average pathology professional fee across our 3 institutions was $185 per doughnut specimen.

Conclusions: This study demonstrates no clinical benefit in sending anastomotic doughnuts for histopathological evaluation after performing a low anterior resection with a stapled anastomosis for rectal cancer. Cost can be reduced if doughnuts are not analyzed unless clinically indicated.

Table: Frequency of cancer in the doughnuts and the distal margin

	Doughnuts Positive	Doughnuts Negative
Distal Margin Positive	2 (0.5%)	0
Distal Margin Negative	0	410 (99.5%)

GS2

PERINEAL WOUNDS, PERHAPS LESS IS MORE: A NATIONWIDE ANALYSIS OF PERINEAL RECONSTRUCTIN IN ABDOMINOPERINEAL RESECTIONS.

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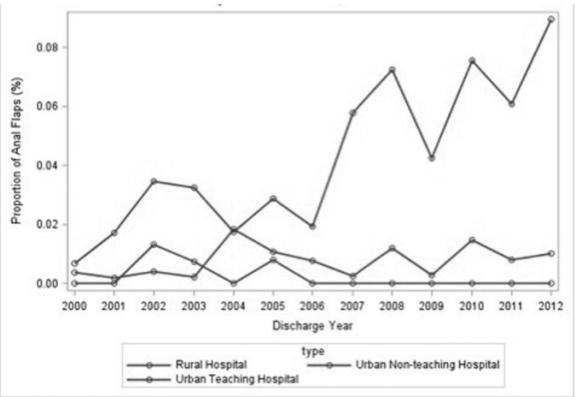
Purpose: Wound complications are common after abdominoperineal resection (APR). They are generally attributed to poorly vascularized, irradiated tissue, non-collapsable dead space, and bacterial contamination associated with rectal resection. Retrospective series have shown that vascularized tissue flaps (TF) can decrease wound complications, but these studies are limited by small numbers of patients. Here we aim to identify national trends in the use of TFs as well as the effect of this approach on peri-operative complications, length of stay (LOS) and total hospital charges.

Methods: We used the National Inpatient Sample (NIS) database to identify patients, ages 18-80 years old, with rectal or anal cancer, treated with APR (ICD-9-CM 48.4 – 48.5) between 2000 and 2012. All patients undergoing urgent or emergent procedures, or additional pelvic organ resections were excluded. We compared patients who underwent concurrent TF reconstruction and those who did not. Our primary outcomes were trends in use, complications, LOS, and total hospital charges. Crude analyses were calculated using chi-square and student's T tests, where appropriate. Multivariable regression was performed using linear and logistic regression, controlling for patient and hospital characteristics.

Results: We identified 14,737 patients undergoing APR for rectal or anal cancer from 2000-2012. 389 had concurrent TF (2.6%) while 14,384 (97.6%) did not. Over the 12 year time period, TF was used at increasing rates, particularly in urban teaching hospitals, where it was used in 9% of cases in 2012 ($P < 0.0001$). On bivariate analysis smokers ($P < 0.0001$) and patients with weight loss ($P = 0.002$) were more likely to receive TFs. Venous thromboembolic (VTE) (4.4% vs. 2.3%; $P = 0.006$), wound (12.3% vs 2.7%; $P < 0.0001$), infectious (13.6% vs. 2.7%; $P < 0.0001$) and bleeding complications (5.7% vs. 3.3%; $P = 0.005$) were more common in patients with TF. Median LOS was 9 days in TF vs. 8 days without TF. Median total charges were $68,012 vs. $40,831 ($P < 0.0001$). On multivariate analysis VTE (OR1.8, 95% CI 1.03-3.14; $P = 0.04$), wound complications (OR 4.1, 95% CI 2.83- 5.94; $P < 0.0001$) and infectious complications (OR 1.82, 95% CI 1.31-2.54; $P = 0.0004$) were more common in patients who had TF.

Conclusions: Contrary to smaller published series, an analysis of a nationwide database shows that the use of loco-regional tissue flaps in combination with APR is associated with significant increases in rates of peri-operative VTE, wound, and infectious complications, as well as increased LOS and total charges. These findings may be secondary to patient selection and risk factors which we are unable to further elucidate using this database. However, given the increasing use of tissue flaps, fur-

ther studies are required to clarify the utility of this approach in perineal closure prior to more widespread adoption of the technique.



Rates of perineal tissue flap reconstruction among anal and rectal cancer patients undergoing APR, 2000-2012

GS3

CONDYLOMA ACUMINATUM, AIN AND ANAL CANCER IN THE SETTING OF HIV: DO WE REALLY UNDERSTAND THE RISK?

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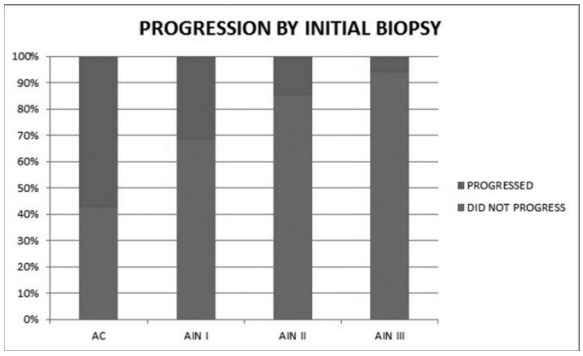
Purpose: The incidence of Anal Intraepithelial Neoplasia (AIN) has risen in HIV patients, and places them at risk for the development of anal cancer. The gold standard for surveillance is unclear. At our institution, the surveillance schedule is as follows: 3-6 months for biopsy proven AIN II/III(HGAIN), and 1 year for condyloma acuminatum without dysplasia or AIN I(LGAIN). The aim of this study was to stratify patients for risk of progression of disease, and determine appropriate intervals for surveillance of patients with anal disease.

Methods: A retrospective review of HIV positive patients with anal lesions, treated with excision and fulguration, was conducted between 2007 through 2014 at our institution. Only patients with at least one year follow up from index evaluation, pathology, documented physical examination and anoscopy findings were included for analysis. When available, HPV serotype was reviewed and divided into 3 groups: low risk(LR), high risk(HR), or negative. Chi square analysis was performed to determine statistical significance.

Results: Ninety-four patients met inclusion criteria. The mean age was 45.7 years and mean follow up was 40.1 months (12-108 months). On initial pathology 7 patients (7.4%) had a diagnosis of condyloma acuminatum without dysplasia, 19 patients (20.2%) had AIN I, 34 (36.2%) had AIN II and 34 (36.2%) had AIN III. 73 patients (77.7%) had repeat procedures. Four of seven patients with condyloma(57%), and six of nineteen patients with AIN I (32%) progressed to HGAIN with an interval range of 7-65 months to progression. Five of 34 patients with AIN II(15%) progressed to AIN III and 2 patients with AIN III (5%) developed SCC(2.1% for the entire cohort), with an interval range of 6-38 months to progression. HPV serotyping was available for 55 patients. Two of seventeen patients with LR strains (11%), seven of nineteen patients with HR strains (36%), and five of twelve patients with negative serotyping (41%) had progression of disease (*p*-value: 0.19).

Conclusions: All HIV positive patients with condyloma or AIN, regardless of the presence of dysplasia or HPV serotyping, should be surveyed at equivalent time intervals as their risk of progression of disease is high. Based on our data, and taking into account the interval time to progression in this cohort, we recommend a surveillance interval of no greater than 6 months.



GS4

SACRAL NERVE STIMULATION IS AN EFFECTIVE TREATMENT FOR LOW ANTERIOR RESECTION SYNDROME.

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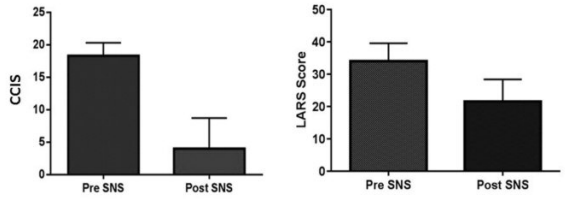
Purpose: Some patients develop a constellation of bowel dysfunction symptoms after undergoing low anterior resection (LAR). Symptoms may include urgency, clustering, fecal incontinence, and constipation, which are frequently defined as low anterior resection syndrome (LARS). Sacral Nerve Stimulation (SNS) has become a preferred method for the treatment of fecal incontinence (FI) in patients who fail conservative (non-operative) therapy. In previous, small case studies, SNS has demonstrated improvement of FI and quality of life (QOL) in some patients with LARS. The objective of the present study was to evaluate the efficacy of SNS in the treatment of LARS, using a recently developed and validated LARS instrument to quantify symptoms.

Methods: A review of prospectively collected data was conducted in 12 consecutive patients with LARS who were treated with SNS at two institutions from February 2012 - June 2015. Pre and post treatment Cleveland Clinic Fecal Incontinence Score (CCIS) and Low Anterior Resection Syndrome Score (LARS score) were obtained. Paired sample t-tests' were used to compare the effect of SNS on symptoms.

Results: Twelve patients (50% men) suffering from LARS with a mean age of 67.8 (± 10.8) years underwent SNS test stimulation. Nine patients had undergone LAR for cancer (4 received neo-adjuvant chemo-radiotherapy) and 3 had been treated with resection rectopexy for rectal prolapse. Seven patients had a coloanal anastomosis and 5 patients had a colorectal anastomosis. At SNS test stimulation, ten patients (83%) experienced symptom improvement with >50% reduction of FI episodes and these 10 patients subsequently underwent permanent implant with SNS. Median time from LAR to SNS implant was 16 (range, 5-108) months. At a median follow-up of 17.5 (range, 3-42) months, there were significant improvements ($P<.001$) in both CCIS and LARS score (Figure).

Conclusions: SNS significantly improved symptoms in a majority of patients suffering from LARS and may therefore be a viable treatment option in these patients.

Variable	Pre-SNS	Post-SNS
CCIS*	18.3 (± 2.0)	4.0 (± 4.7)
LARS Score*	34.0 (± 5.6)	21.6 (± 6.8)



Median follow up 17.5 months

*P <0.001

GS5

SUCCESS OF ENHANCED RECOVERY PROTOCOL IMPLEMENTATION IN COLORECTAL SURGERY AT MONMOUTH MEDICAL CENTER.

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Purpose: Patients undergoing colorectal surgery traditionally experience significant decline in function requiring prolonged rehabilitation and hospital stay during the post-operative period. Enhanced Recovery Protocol (ERP), also called "fast track pathways", are evidence based pathways designed to improve outcomes, reduce cost, and reduce physiological stress by implementing evidence based medicine into patient management. Multimodal analgesia, prevention of fluid overload, postoperative rehabilitation, including early oral feeding and mobilization are a part of many ERP's across the country, and have been shown to decrease length of stay without increasing hospital readmission or complication rates. Two surgeons decided to implement a standardized pathway incorporating these same elements into all elective laparoscopic colon procedures. Our goal was to demonstrate if the ERP has successfully decreased length of stay without increasing rates of readmission, complication rate or hospital cost.

Methods: With the use of ICD-9 procedure codes, appropriate colonic and rectal procedures from two colorectal specialists from Monmouth Medical Center were analyzed. All elective laparoscopic colon procedures were analyzed from July 1, 2013 to May 1st 2015. A total period of 22 months was analyzed, including 11 months prior to implementation of ERP and 11 months afterwards. Our data set included 206 patients who underwent elecive laparoscopic colorectal procedures. Excluded data included any open or emergent procdure. Data was obtained from the Crimson Continuum of Care Database. Data was analyzed with the use of control charts via Microsoft Excel to assess for process changes across time. Assessments of length of stay, direct cost, complications, 30 day readmissions, and case mix index (CMI) were performed. Statistical analysis of data was performed using the two tailed Mann-Whitney U Test.

Results: After the implementation of ERP on June 23, 2014, a decrease in length of stay was demonstrated with average median length of stay decrease from 3.8 to 2.9 days (P<.05). This process change was sustained throughout the 11 month period analyzed. A trend toward decrease in direct hospital cost was also noted. Average median direct cost savings was 5% since starting ERP. Our results also showed no change in 30 day readmission rate and a decrease in average complication rate from 20% to 17%. Additionally, a review of CMI (Case Mix Index) demonstrated no significant change in average complexity of cases performed.

Conclusions: ERP is a safe perioperative tool that has proven tremendous benefit in patients undergoing elective laparoscopic colon surgery across the country. Our multifaceted protocol has demonstrated a sustained process change towards decreasing hospital stay without increasing hospital costs, morbidity or 30 day readmission rate.

GS6

OPTIMAL TIMING OF THE FIRST SURVEILLANCE COLONOSCOPY FOLLOWING CURATIVE RESECTION FOR COLORECTAL CARCINOMA.

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Purpose: The purpose of this study was to determine the optimal timing of the first surveillance colonoscopy following curative colorectal carcinoma resection. The American Society of Colon and Rectal Surgeons and National Carcinoma Comprehensive Network guidelines recommend a colonoscopy at 1 year while the Canadian Association of Gastroenterology recommends surveillance at year 3 years post-operatively. The aim of this study was to determine the significant polyp detection rate at the first surveillance colonoscopy following colorectal carcinoma resection, and the optimal timing of this colonoscopy.

Methods: After institutional review board approval, we conducted a retrospective review of all colorectal carcinoma resections with a curative intent performed at our institution from 2007-2012. Only patients who had a complete preoperative colonoscopy, underwent elective colorectal resection with curative intent and had at least one complete post-operative colonoscopy at our institution were included. Colonoscopic findings were classified as normal, non-significant polyps, significant polyps and recurrence. Significant polyps were defined as: adenoma ≥1cm, villous or tubulovillous adenoma of any size, adenoma with high grade dysplasia of any size, 3 or more adenomas of any size, sessile serrated polyps ≥1cm or with dysplasia.

Results: From 2007-2012, 857 patients underwent a colorectal resection, of which 188 patients met the inclusion criteria. The mean age of patients at the time of resection was 67.2 (±10.71) years and 52.6% were male. Proctectomies accounted for 42.6% of resections, while 57.4% were colon operations. There were 35.4%, 28.7%, 33.2% and 2.7% patients with Stage I, II, III and IV disease. With regards to timing of colonoscopy, 25.5% of patients underwent their first surveillance colonoscopy in the first post-operative year, 48.9% in the second year, 14.4% in the third post-operative year, 8.5% in the fourth post-operative year and 2.7% in the fifth post-operative year. The median time to first surveillance colonoscopy was 420.5 days (IQR 367 to 743). Overall all-polyp detection rate was 30.8%; 18.8% for the first post-operative year, 33.7% for the second and 40.7% for the third post-operative year. The overall significant-polyp detection rate was 9.6%; 10.4% for the first post-operative year, 8.7% for the second, 7.4% for the third post-operative year. Two recurrences were reported; one in the first and another one in the third post-operative year.

Conclusions: In this study population, the significant polyp detection rate was highest for the first post-operative surveillance colonoscopies performed at one year. Thirteen percent of patients were found to have significant polyps or recurrence at this time interval. Thus, surveillance colonoscopy at one year post-colorectal cancer resection is prudent.

GS7

ADJUVANT CHEMOTHERAPY AFTER PREOPERATIVE CHEMORADIATION IMPROVES SURVIVAL IN PATIENTS WITH LOCALLY ADVANCED RECTAL CANCER.

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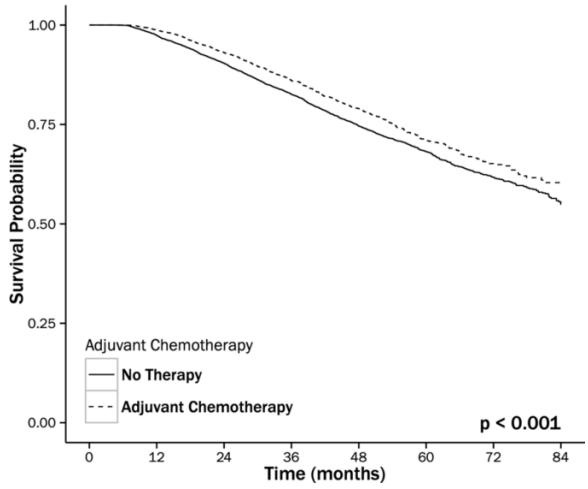
Purpose: Several prospective studies have failed to show a survival difference with use of adjuvant chemotherapy (AC) in the setting of preoperative chemoradiation for rectal cancer despite current guidelines. Given this discrepancy, population-based outcomes should be evaluated.

Methods: Adults with pathologic stage II and III rectal adenocarcinoma who were treated with preoperative chemoradiation followed by surgery from the 2006-2012 National Cancer Data Base were grouped by receipt of AC. Patients with any unplanned readmissions or 90-day mortality were excluded. Multivariable regression modeling was used to examine overall

survival and predictors of AC utilization, while accounting for clinical, tumor, and treatment characteristics.

Results: Among 12,696 patients included, 4,023 (32%) received AC. Utilization of AC steadily increased over the study period from 23% to 36%. While older age and black race were associated with a lower likelihood of receiving AC, patients with higher education level and stage III disease were more likely to receive AC (all p<0.05). At 7-years, overall survival was improved among patients who received AC (60% vs. 55%, p<0.001). After risk adjustment, use of AC was associated with improved survival (adjusted hazard ratio [HR] 0.79, 95% CI 0.71-0.88, p<0.001). In the subgroup of patients with stage II disease, survival was also improved among patients who received AC (68% vs. 58% at 7-years, p<0.001; adjusted HR 0.71, 95% CI 0.58-0.86, p=0.001). Among patients with stage III disease, use of AC was associated with a smaller but still persistent survival benefit (56% vs. 51% at 7-years, p=0.017; adjusted HR 0.83, 95% CI 0.73-0.94, p=0.004).

Conclusions: In this large analysis, use of adjuvant chemotherapy among rectal cancer patients who received preoperative chemoradiation does confer a survival benefit. Given this finding, current poor utilization of adjuvant chemotherapy should be addressed.



GS8

MORTALITY PREDICTORS ON OCTOGENARIANS AFTER EMERGENCY HARTMANN'S PROCEDURE: A NSQIP STUDY.

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Purpose: Surgical resection for perforated diverticulitis is associated with a high morbidity and a reported mortality rate of 10-20%. As the population is aging, elderly patients are presenting with acute cases of complicated diverticulitis and likely account for a significant morbidity and mortality. We sought to investigate the 30-day outcomes for patients undergoing emergent Hartmann's procedures for diverticular disease

Methods: The ACS-NSQIP database from 2005-2013 was queried to identify all patients 80 years of age or older who underwent an open and laparoscopic Hartmann's procedure in an emergency setting (CPT: 44143, 44206) for diverticular disease (ICD-9:562.xx). These patients were divided into two groups: those with 30-day postoperative mortality (expired) and those alive after 30-days (alive). A univariate analysis was utilized to assess the risk of mortality and to identify associated risk factors. Statistical analysis was performed using student T test, Kaplan Meier and Log Rank. A p value <0.05 was considered statistically significant with a confidence interval of 95%. For categorical variables, an analysis to determine frequencies, proportions, and Chi2 was also performed.

Results: 464 patients met inclusion criteria: 91 patients in the expired group and 373 in the alive group (mortality rate of 19.6%). There were no statistical difference between the groups with regards to demographic factors (age, gender distribution, BMI), preoperative factors (smoking status, alcohol use, prior chemotherapy/radiotherapy), comorbid conditions (diabetes, hypertension, current hemodialysis use), and operative time. Factors identified to be associated with a higher risk for death were congestive heart failure (3.0, 1.1-8.1), steroid use (3.0, 1.79-5), chronic obstructive pulmonary disease (OR 2.1, 95% CI 1.2-3.8), preoperative albumin, serum creatinine, BUN, and ASA classification >3. Additionally, the development of postoperative cardiac arrest (22.9, 4.9-106), MI (8.7, 2.1-35.5), renal failure (6.3, 1.04-38.4), respiratory failure (4.7, 2.8-7.8), and septic shock (5.6, 3.1-9.9) were associated with death. A laparoscopic procedure was shown to have a protective effect (0.169, 0.023-1.26).

Conclusions: Patients over the age of 80 presenting with diverticulitis requiring an emergent Hartmann's procedure have a 30-day mortality rate of 19.6%. Preoperative factors associated with increased mortality are congestive heart failure, steroid use and chronic obstructive pulmonary disease. A laparoscopic approach was found to have a protective effect.

Research Forum

RF1

REPROCESSED BIPOLAR ENERGY FOR LAPAROSCOPIC COLECTOMY: IS IT WORTH IT?

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Purpose: Bundled payments for care improvement and cost-effective measures in surgery have arrived and are impacting how we deliver care for colorectal disease. Reprocessed (re-sterilized) bipolar energy devices represent one major effort to reduce costs in the operating room. While they have been utilized for years, their effectiveness, safety, and overall cost savings have not been evaluated. We hypothesized that reprocessed devices are associated with significant cost savings, improved profit margins, and equivalent clinical outcomes.

Methods: Seventy-six laparoscopic colectomies performed with a reprocessed bipolar energy device (*Ligasure: Stryker Sustainability*) were case-matched (1:1) to laparoscopic colectomies performed with a new, identical model bipolar energy device (*Ligasure: Covidien*). Matching criteria included age, gender, diagnosis, DRG (329, 330, 331), prior abdominal surgery, operation performed, and conversion. Primary clinical outcomes included operative time, estimated blood loss, additional interventions required for vascular pedicle ligation, morbidity, and length of stay. Financial outcomes included charges, receipts, direct and indirect costs, and direct and total margin.

Results: Overall, there was no difference in body mass index (33 vs. 31), operative time (128 vs. 131 minutes) length of stay (3.5 vs. 3.8 days), estimated blood loss (25 vs. 20 cc), or failed pedicle ligation requiring intervention (3 vs. 4 cases) between reprocessed and new devices, respectively (all P>0.05). In 15 (19.7%) of the reprocessed cases the surgeon opened an additional new device after being dissatisfied with the quality of the reprocessed instrument during dissection. Operating room costs ($2674 vs. $2956; P <0.05) and total costs ($6277 vs. $6537; P < 0.05) were less for the reprocessed energy group. However, the direct profit margin was similar between the two groups ($5805 vs. $5888; P = 0.345). The actual cost dif-

ference between the reprocessed and new device alone ($225) was 3% of the direct margin. The most significant factor impacting mean total margin was patient insurance for DRG-331 (Medicare $3583 vs. Commercial $2682: P <0.05; Commercial $2682 vs. PPO $2104: P < 0.05).

Conclusions: Despite the marginal savings in operative expense with the use of reprocessed bipolar energy devices, the contribution margin was largely unaffected and primarily determined by insurance type. Furthermore, the high (~20%) surgeon dissatisfaction rate regarding safety concerns with the reprocessed equipment led to additional cost and could potentially lead to more complications in less experienced hands. Currently, the minor cost differential between reprocessed and new equipment is not significant enough to warrant its usage for laparoscopic colectomy.

RF2

USE OF AN ACE INHIBITOR OR ANGIOTENSIN RECEPTOR BLOCKER IS A MAJOR RISK FACTOR FOR DEHYDRATION REQUIRING READMISSION IN THE SETTING OF A NEW ILEOSTOMY.

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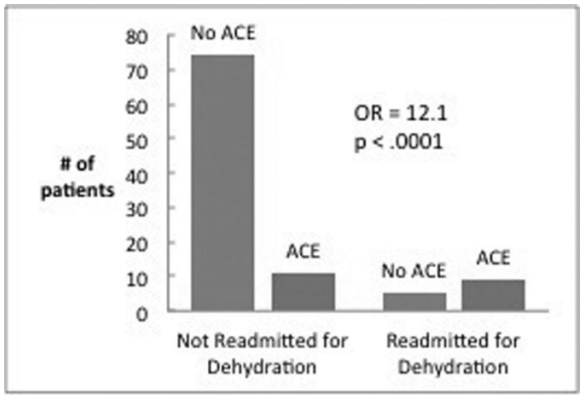
Purpose: Diverting ileostomies help prevent major complications related to downstream anastomoses after colorectal resections, but can cause metabolic derangement and hypovolemia thus leading to readmission. Our objective was to determine whether diuretic use, particularly of ACE inhibitors (ACEi) and Angiotensin Receptor Blockers (ARB), increases these risks.

Methods: We performed a retrospective, single institution review of 99 patients who underwent diverting ileostomy from 2009-2015. Patient demographics, comorbidities, and diuretic use were recorded. Univariate followed by multivariate regression analysis of the factors found to be associated with readmission for dehydration were performed.

Results: Of the 99 patients, the most common indication for diverting ileostomy was resection for colorectal cancer (59%), and the 60 day readmission rate was 36% (n = 36). Of the readmitted patients, 39% (n = 14) were admitted for dehydration with significant laboratory abnormalities. Other major causes of readmission included infection (33%) and obstruction (3%). The majority (64%, n = 9) of patients readmitted for dehydration were on diuretics. All 9 of these patients were taking an ACEi or an ARB. Overall, compared to patients not readmitted for dehydration, those who were re-admitted for dehydration were more likely to be on an ACEi or an ARB (11/85, 13% vs. 9/14, 64%, OR = 12, p < .0001) No other diuretic was statistically associated with readmission for dehydration in our population.

Conclusions: On multivariate analysis, use of an ACEi or ARB was found to be an independent risk factor for readmission due to dehydration after ileostomy creation. This seems reasonable given that activation of the RAAS axis is the body's primary mechanism for sodium and water retention in the setting of hypovolemia. In the absence of an urgent indication, it may be prudent to hold these medications with monitoring, or prescribe alternative agents for control of blood pressure, over the lifespan of a temporary ileostomy.



RF3

IDENTIFICATION OF PROGNOSTIC BIOMAQRKERS FOR COLORECTL CANCER DISEASE RECURRENCE.

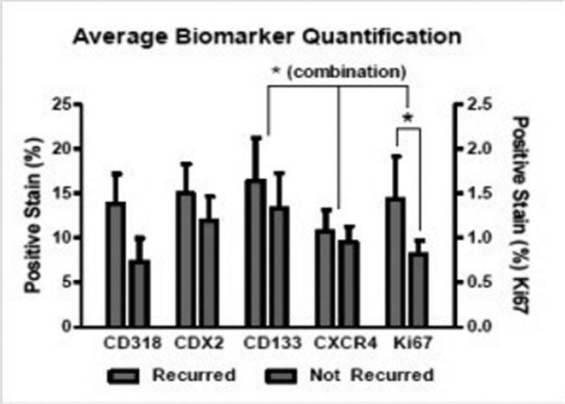
N. Hite, D. Beck, T. Hicks, B. Kann, D. Vargas, C. Whitlow and D. Margolin *Colon and Rectal Surgery, Ochsner, Metairie, LA.*

Purpose: Tumor-initiating cells (TIC) are a small subset of cells within solid tumors which are deeply involved in tumor behavior. We have previously shown that the interaction between TICs and the LN stromal microenvironment can influence tumor growth and metastases. These special cells may also be prognostic in terms of recurrence. Several markers have been discovered that can potentially identify these CRC-TICs (CD133, CD318, CXCR4, and Ki67). Our aim was to determine whether any of these tumor markers are differentially expressed between tumors which recur after resection and those which remain in remission.

Methods: We identified 68 Stage II CRC patients with archived paraffin-embedded primary tumor tissue. The patients were matched by age, gender, tumor location, and degree of differentiation and grouped by those who developed recurrent disease with those who remained disease-free. We created tissue microarrays and used immunohistochemistry techniques to stain them for potential TIC markers. We stained for CD133, CD318, CXCR4, and Ki67. We also stained for CDX2, a cancer marker unrelated to TICs (our positive control). The absolute percent staining and the fold difference in staining of individual pairs were determined between groups.

Results: On individual biomarker analysis, patients with recurrent disease showed significantly increased Ki67 positivity (1.43 vs. 0.81 % positive stain, p<0.05). On principal component analysis, the combination of Ki67 with CD133 and CXCR4 also showed a significant difference between patients with recurrent tumors and those without (p<0.05). Addition of CD318 to the principal component analysis resulted in loss of significance.

Conclusions: Ki67 showed more positivity in primary tumors that eventually recurred. Tumors with a combination of Ki67 with CD133 and CXCR4 also showed a propensity to recur. CD318 does not appear to be an effective marker of colon cancer recurrence, even in combination with the other markers. It is likely that the co-expression of biomarkers is important for CRC-TIC interaction; this interaction leads to recurrence. The analysis of markers individually may not reflect their synergistic effect. Further work is required to identify additional markers that may be used for prognositication. It is important to note that this is a preliminary study and that our study was underpowered.



RF4

GENETIC PREDICTORS FOR NEOPLASIA IN INFLAMMATORY BOWEL DISEASE — THE BEGINNING OR END OF SCREENING FOR COLITIS-RELATED NEOPLASIA?

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Purpose: Introduction: Although the precise risk of colorectal cancer in patients with long-standing inflammatory bowel disease is uncertain, regular colonoscopy with random biopsies remain the standard of screening for colitis-related neoplasia. Given the many limitations to this methodology, our aim was to identify if a certain genetic profile was associated with neoplastic development in inflammatory bowel disease.

Methods: Method: The Ion AmpliSeq comprehensive cancer panel (409 oncogenes and tumor suppressor genes) was used to evaluate the tumor specimens and the normal appearing colon tissue harvested at the time of surgery of 10 patients and frozen and stored at xxx. The same panel was also used to evaluate 9 samples of patients with rectal prolapse as a control group. All variants were considered rare which had a minor allele frequency of less than 0.0006 per 1000 genomes and were non-synonymous. . The Gene Ontology enRIchment anaLysis tool and visuaLizAtion tool (GOrilla) was used to identify and visualize statistically significant enriched genes via the Benjamini and Hochberg method (1995).

Results: Results: Ten patients (7 male/3 female, mean age 60.7 years) were identified who underwent surgery for inflammatory bowel disease – associated cancer (5 ulcerative colitis, 5 Crohn's disease). Mean duration of disease prior to surgery was 31.2 years and 6 of 10 patients were known to have dysplasia before surgery. All patients with cancer had at least one rare variant (pathogenic, likely pathogenic or variant of unknown significance nature) that were found in both tumor and normal tissue in the same patients. Genes with rare variants were significantly enriched for histone H3-K4 methylation (p= 0.000128) when compared with all genes included on the panel; enriched genes included KDM6A (p.Asp1340Gly), KMT2D (p.Pro1191Leu, p.Gly3710Arg), TET2 (p.Ala1443Val), and KMT2C (p.Leu4219Val) respectively, suggesting chromosomal methylation may predispose the disease progression of colitis related neoplasia. None of these mutations were seen in the rectal prolapse patients.

Conclusions: Conclusion: In patients with IBD associated colorectal cancer, a comprehensive cancer panel revealed multiple rare variants in oncogenes/tumor suppressor genes in matched cancer and normal tissues. The validity of these findings will need to be confirmed in a larger data set and tested further in IBD patients without cancer and at various lengths and activity of disease. Evaluation of the variant histone methylation genes deserves special attention. Finally, more prospective studies are required to narrow the number of target genes needed for analysis.

RF5

COMPARING ORTHOTOPIC COLORECTAL CANCER MOUSE MODELS FOR PRIMARY TUMOR GROWTH AND SUBSEQUENT METASTASIS.

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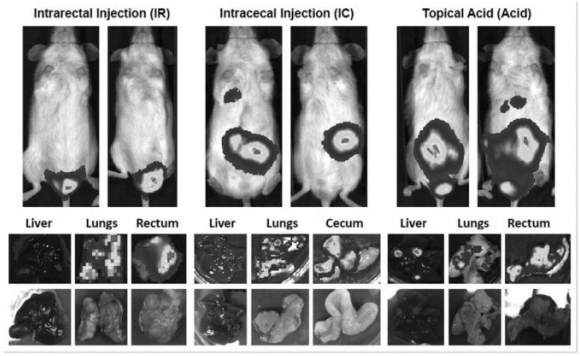
Purpose: Colorectal cancer (CRC) is the third most common cancer and second leading cause of cancer-related deaths in the US. Tumor-initiating cells (TIC) are a small subset of stem-like cells within colon cancers, as well as other solid tumors. The interaction between TICs and the LN stromal microenvironment can influence tumor growth and metastases. Having previously established primary tumor growth that relies on lymph node stromal cells (HK) by intra-rectal (IR) injection in NOD/SCID mice, we sought to compare different orthotopic models that could more accurately emulate human CRC distant organ metastasis. These include sub mucosal intra rectal injections, intra cecal injections, and tumor cell enemas after injection of acetic acid. We hypothesized that the optimal technique to emulate human CRC tumor growth and distant organ metastasis would be the intra rectal sub mucosal model.

Methods: Luciferase-tagged CRC cell line Ht-29 cells were co-inoculated with lymph node stromal cells and then injected the rectal sub-mucosa (9 mice, IR), the cecal wall (21 mice, IC), or introduced to the rectum following topical acetic acid treatment (9 mice, acid). Tumor growth was monitored weekly by luciferase activity using the In Vivo Imaging System (IVIS). The mice were sacrificed based on primary tumor size and signs of systemic decline. At necropsy liver and lungs were evaluated for metastases via histology and bioluminescent image (BLI) photon level > 10^5.

Results: At 14 days IR injection had the highest average bioluminescence compared to the IC and acid models. The IR injection group also had the least variability between samples. At necropsy, evidence of liver and lung metastasis was present in 56% of IR mice versus 44% in the acid group, and 13% in the IC group. The average tumor BLI of the explanted tumors was 8.00×10^8 photons in the IR group, 6.41×10^6 in the IC group, and 2.39×10^5 in the topical acid group. Of note, IC injection requires an abdominal incision and there were multiple deaths in the first week following surgery. None of the mice in the IR or acid groups died following injection. Regarding technique, IR injection was the most reproducible.

Conclusions: The intra rectal injection method had the highest average primary tumor BLI, the least amount of variability in bioluminescence, and the highest rate of distant organ metastasis when compared to intra cecal injection or acid treatment. The IR injection method appears to be the most reproducible method, produces a consistent metastatic pattern, and is subjectively the easiest to teach.



RF6

DOES AHR MEDIATED NOTCH SIGNALING CONTRIBUTE TO COLORECTAL CARCINOGENESIS?

P. Carney, M. Nukaya and G. Kennedy *Surgery, University of Wisconsin-Madison, Madison, WI.*

Purpose: Multiple studies have implicated aberrant Notch signaling in a variety of cancers, including colorectal cancer (CRC), however its mechanism of action in CRC remains unclear. Notch signaling is an important pathway in determination of cell fate in various tissues and regulation of colon homeostasis. Recently our study revealed that Notch signaling is essential for generation of innate lymphoid cells (ILCs) producing interleukin (IL)-22 which protects the intestinal mucosa from infection. Interestingly, the Notch signaling was dependent on aryl-hydrocarbon receptor (AHR). We hypothesize that AHR dependent Notch signaling contributes to colorectal carcinogenesis and is a potential target for future therapies. To test this hypothesis, we are currently investigating Notch expression in CRC cell lines and hope to expand this work to *in vivo* models.

Methods: To examine the AHR-dependency on the regulation of *Notch* genes i*n vitro*, we used the potent AHR agonist 3,3'-Diindolylmethane (DIM). DLD-1 human colon adenocarcinoma cells were treated with either 0.1% DMSO or 100 μM DIM for 24 hours and the expression of *Notch* signaling genes was assessed by RT-PCR. To determine the effect of AHR knockdown on Notch signaling, we used the Si-AHR and Si-Scramble cell lines established by our lab from the HCT116 human colon carcinoma cell line. The levels of *Cyp1a1*, an indicator of AHR activity, and *Notch1* were assessed by RT-PCR after a 24-hour treatment with a DMSO control.

Results: In DLD-1 cells treated with DIM, *Cyp1a1* and the Notch signaling genes *Notch1*, *Notch2*, *Notch3*, *Hes1*, and *Jagged1* were all significantly induced ($p<0.05$). In the Si-AHR cell line compared to the Si-Scramble line, basal expression of *Cyp1a1* and *Notch1* were both significantly downregulated ($p<0.05$). *Hes1* activity was also downregulated, but not in a statistically significant manner.

Conclusions: Our results suggest that Notch signaling in colorectal cancer is AHR driven. Expression of Notch signaling genes follows induction and suppression of AHR signaling in colorectal cancer cells *in vitro*. While various Notch isoforms and signaling pathway components are implicated, it is still unclear which of these mediate human colorectal cancer. We hope to expand this research to further elucidate the exact mechanism of AHR control over the Notch signaling pathway by studying the effect of a variety of toxic and non-toxic AHR ligands *in vitro* and correlating these observations to our *Notch1* murine hypomorph model of inflammatory colon cancer. In addition, we hope to use matched human normal and tumor colon tissue to determine the expression of Notch signaling genes.

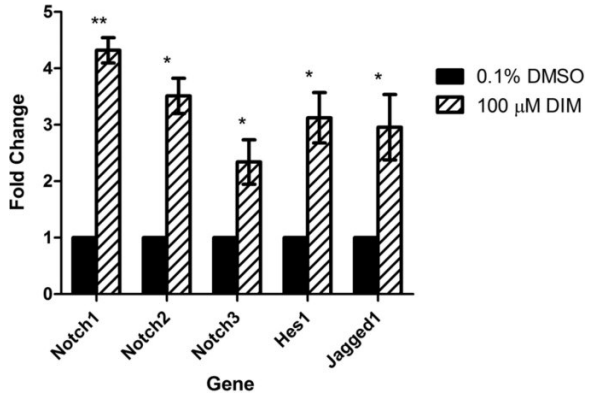


Figure 1: Expression of genes associated with the Notch signaling pathway in DLD-1 human colon cancer cells after treatment with DIM for 24 hours. Cyp1a1 (not pictured) is also significantly induced (450-fold, $p<0.0001$) in these cells, indicating increased AHR activity.

RF7

ANOTHER LOOK AT INCIDENTAL FINDINGS AFTER HEMORRHOIDECTOMY: SHOULD WE SEND ALL HEMORRHOID SPECIMENS FOR ROUTINE HISTOLOGIC EXAMINATION?

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Purpose: In the United States, it has been over twenty years since the routine histologic examination of hemorrhoidectomy specimens has been formally studied. Epidemiologic changes in human immunodeficiency virus (HIV) and human papillomavirus (HPV) infections, as well as the number of immunosuppressed patients, may warrant another look at whether we should send hemorrhoid specimens routinely. Therefore, the purpose of this study was to evaluate the incidence of abnormal histology findings in grossly normal hemorrhoid specimens and compare it to the previously reported incidence of one percent.

Methods: A 20-year retrospective review was conducted of all specimens that were sent to the pathology lab at a large tertiary referral center between 1995 and 2015. Data collection included demographics; indication for hemorrhoidectomy; specimen label; and final pathology diagnoses of normal hemorrhoid tissue, low and high grade dysplasia, anal intraepithelial neoplasia I, II, and III (AIN I, II, and III), anal squamous cell carcinoma, and adenocarcinoma; and any additional findings. Low grade dysplasia and AIN I were considered low grade anal squamous intraepithelial lesions (LSIL). High grade dysplasia and AIN II and III were classified as high grade anal squamous intraepithelial lesions (HSIL). Analyses were conducted to explore the number and rate of unexpected pathologic findings in the hemorrhoid specimens.

Results: Pathology reports for 1284 hemorrhoid specimens were reviewed. The average age for patients was 51.1 ± 15.3 years, and 48.8% were males. Overall, 97.9% of the hemorrhoid specimens were normal hemorrhoid tissue. Unexpected pathology was present in 1.6% (95% confidence interval, 0.9 – 2.3%) of grossly normal hemorrhoid specimens. Five specimens had more than one abnormal finding. The overall incidence of low and high grade dysplasia was 0.2% each, while the overall incidence of intraepithelial neoplasia I, II, and III was 0.5% each. The overall incidence of LSIL and HSIL was 0.7% and 1.2%, respectively. There was one squamous cell carcinoma (0.1%) and one adenocarcinoma (0.1%) found unexpectedly.

Conclusions: Based upon our data, routine histologic examination of grossly normal hemorrhoid specimens may not be supported. To our knowledge, although a small sample size, this is the most recent study performed in the United States that evaluated both incidence of pre-malignant and malignant findings. However, further study and definitive follow-up guidelines regarding LSIL and HSIL surveillance may need to be established to better validate whether or not grossly normal hemorrhoid specimens should be sent for routine histologic examination.

RF8

INTRATUMORAL HETEROGENEITY IN RECTAL CANCER MAY LIMIT THE ABIITY FOR THE MOLECULAR PREDICTION OF RESPONSE TO NEOADJUVATN CHEMORADIATION THERAPY.

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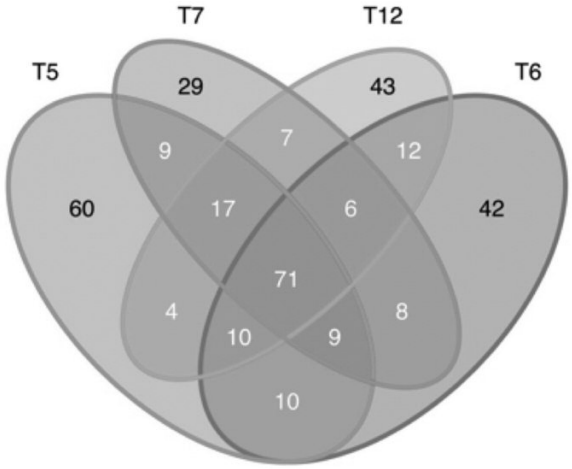
Purpose: Neoadjuvant chemoradiation (nCRT) may lead to complete tumor regression in patients with rectal cancer. No immediate surgery has been suggested to selected patients in order to avoid the morbidity and mortality associated to surgical management. A molecular signature derived from pre-treatment biopsy samples capable of predicting response to nCRT could provide an objective tool to identify candidates for this alternative treatment strategy. However, reported signatures have so far failed to provide sufficient accuracy in independent samples. In the present study, we demonstrate that significant intratumoral heterogeneity may represent

a limitation for the identification of a clinically useful and reproducible gene signature in the prediction of tumor response to nCRT.

Methods: Twelve different fragments from a single rectal adenocarcinoma were taken for pathological review. Of these, the four fragments with most morphological differences were chosen for sequencing analysis. We performed whole-exome sequencing and mutation detection analysis on primary tumor. Approximately 25Gb of mapped sequences were generated. Over 51% of the bases mapped to the targeted regions, resulting in an average fold-coverage of 30X. Captured sequences mapped to the reference human genome were then used for the detection somatic SNVs (single nucleotide variations).

Results: Overall, 337 single nucleotide variations (SNVs) were detected in any of the fragments. A total of 172 SNVs (51%) were exclusively present in only one of the fragments (fragment-specific mutations). Only 50 SNVs (15%) were shared at least by 2 fragments; 42 (12%) were shared by at least 3 fragments; and 71 (21%) were shared by all 4 fragments of the same cancer.

Conclusions: Significant intratumoral heterogeneity is present in rectal cancer with more than 51% of mutations being present in exclusively one out of four different tumor areas. Only 21% of mutations were shared by all 4 different tumor areas. Significant intratumoral heterogeneity may challenge the findings of predictive molecular features of tumor response based on single pre-treatment tumor biopsies.



174 SNVs were fragment-specific (51%); 50 (15%) shared by 2 fragments; 42 (12%) shared by 3 fragments; and 71 (21%) shared by 4.

Podium Presentations

S1

ANASTOMOTIC LEAK AFTER COLORECTAL RESECTION: A POPULATION-BASED STUDY OF RISK FACTORS AND HOSPITAL VARIATION.

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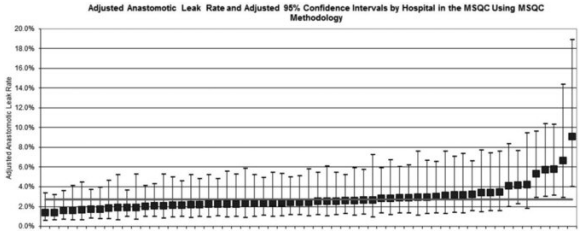
Purpose: Anastomotic leak is a major source of morbidity and mortality after colorectal resection. It is unclear whether patient characteristics can accurately predict leaks and, if so, whether hospital variation exists for clinically comparable patients. Using high-quality data abstracted from medical records, we sought to determine risk factors associated with leak and determine whether rigorously case-mix-adjusted leak rates varied significantly between hospitals.

Methods: Among colon and rectal resections in the Michigan Surgical Quality Collaborative (MSQC) between July 2012 and June 2015, we evaluated 30 clinically-relevant patient and operative factors for association with leak; statistically significant and clinically important variables were included in a risk-adjustment model. Hierarchical logistic regression was used to derive hospital-specific, case-mix-adjusted leak rates and 95% confidence intervals (CI).

Results: Of 9376 colorectal resections performed in 59 community and academic hospitals, 253 (2.7%) had a documented anastomotic leak (66% treated with reoperation, 34% with percutaneous drainage and/or antibiotics). 3.1% of patients with rectal anastomoses leaked, while 2.6% with colon anastomoses leaked (p=0.17). After controlling for abdominal v. pelvic anastomosis, open v. laparoscopic approach, and operative time, multivariable analysis showed that male sex (OR 1.92, CI 1.48-2.51), BMI greater than 30 kg/m2 (OR 1.74, CI 1.34-2.26), smoking (OR 1.55, CI 1.18-2.05), corticosteroid (or other immunosuppressive drug) use (OR 2.52, CI 1.73-3.70), platelet count >400K (OR 1.78, CI 1.19-2.66), and urgent/emergent surgery (OR 1.60, CI 1.20-2.13) were independently associated with higher risk for anastomotic leak (C-statistic for model = 0.75). As shown in the figure, there were five statistical outlier hospitals with higher than expected leak rates identified.

Conclusions: This population-based study shows that independent risk factors for anastomotic leak include sex, BMI, smoking, immunosuppression, platelet count, and urgent/emergent surgery; a model including these factors predicts most of the variation in leak rates. Anastomotic leak rates vary by hospital, even after accounting for case-mix. These results suggest the opportunity to decrease leak rates in selected hospitals.



S2

PREOPERATIVE IMMUNONUTRITION AND ELECTIVE COLORECTAL RESECTION OUTCOMES – A PROPENSITY SCORE-MATCHED ANALYSIS.

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Purpose: Surgeons have long recognized the impact of malnutrition on surgical outcomes, but the stress of surgery itself is increasingly being recognized as a state of acute nutritional depletion, related in part to the altered metabolism of arginine. Immunonutrition supplements composed of arginine, omega-3 fatty acids, and nucleotides are understood to improve host defenses (T-lymphocyte function) by correcting arginine depletion. Although several randomized clinical trials and meta-analyses have demonstrated reduction in infectious and other complications after surgery with gastrointestinal (GI) anastomosis, comparative effectiveness of these supplements in the community at large is not known. In May 2012, Washington (WA) State surgeons began participation in a public health initiative called Strong for Surgery (S4S) that focused on optimizing health

before elective surgery. One major intervention was the provision of preoperative immunonutrition supplements for patients undergoing GI surgery.

Methods: The use of preoperative immunonutrition was added to the Surgical Clinical Outcomes Assessment Program (SCOAP) registry in 2012. We studied a prospective cohort of all adult patients undergoing elective colorectal surgery at 55 WA hospitals participating in SCOAP from 2012 to 2015. Preoperative immunonutrition supplements were prescribed for patients three times daily for five days for those participating in the Strong for Surgery program. Immunonutrition use, clinical and demographic risk factors were assessed. Composite adverse event rate (CAE: operative reintervention, infection, anastomotic leak and/or death), and length of stay were evaluated using descriptive and comparative statistics. Patients who did and did not receive preoperative immunonutrition supplements were matched using propensity-score analysis.

Results: 8,680 patients (mean age 61.2, 55.5% female) underwent elective colorectal resection (56.7% colon) for a range of diagnoses (34.8% cancer, 24.1% diverticulitis) and 627 received preoperative immunonutrition. CAE were significantly less common among those who received immunonutrition (7.0% vs. 9.5%, p=0.04). Characteristics of those receiving immunonutrition were significantly different from those who did not (Table). After propensity score matching (346 pts/group), CAE was noted in 7.2% of those who received immunonutrition vs 11.6% (p=0.05) with an unadjusted OR of 0.60 (0.35-1.01). Mean length of stay was 5.8 days after immunonutrition vs 6.9 days (p<0.01).

Conclusions: Through a statewide public health initiative that encouraged the use of immunonutrition, preoperative administration in elective colorectal surgery was associated with improved patient outcomes. These findings from the community at large reinforce results from randomized trials and suggest that immunonutrition may be an effective surgical quality improvement intervention.

Unmatched patient characteristics

	Immunonutrition (n=627)	No Immunonutrition (n=8053)	p-value
% female	51.0	55.8	0.02
age (mean)	58.8	61.3	<0.001
ASA (mean)	2.43	2.37	0.02
% smokers	14.1	21.2	<0.01
albumin (mean)	3.8	3.7	<0.01
% cancer	43.3	34.2	<0.001
% prior colon or pelvic surgery	45.2	40.2	0.01
% S4S hospital	99.8	79.6	<0.001

S3

TRUTH IN REPORTING: HOW DATA CAPTURE METHODS OBFUSCATE ACTUAL SURGICAL SITE INFECTION (SSI) RATES WITHIN A HEALTHCARE NETWORK SYSTEM.

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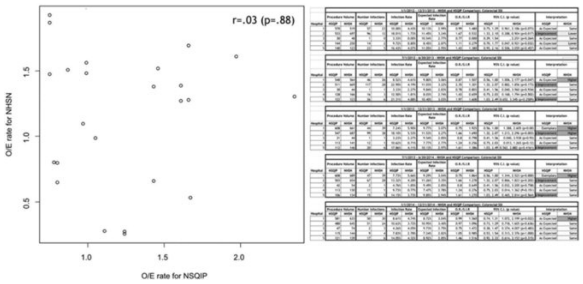
Purpose: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) and the Centers for Disease Control National Healthcare Safety Network (NHSN) both measure SSI rates following colorectal surgical procedures. NSQIP data collection is standardized across institutions and risk adjusted by patient risk factors. NHSN SSI capture techniques vary widely from 100 percent case review to surgeon self reported surveys. CMS pay-for-performance initiatives mandate NHSN data for hospital comparisons. We aimed to compare these two databases for concordance.

Methods: Our Colorectal Surgery Collaborative includes 5 participating hospitals (community :3, academic:2) performing more than 1500 colorectal procedures yearly. All hospitals have standardized NSQIP databases capturing SSIs in 100% of colectomies by CPT codes. In parallel, infection control units collect NHSN data on colorectal SSIs by ICD9 codes. Hospital 1 reviews 100% of the NHSN qualifying cases through chart reviews, phone calls and culture queries. Other hospitals collect NHSN data based on cultures and readmission triggers (Hosp 2,4,5) or surgeon self reporting surveys (Hosp 3). We compared complication rates captured through standardized NSQIP data to non-standardized NHSN data by comparing O/E ratio and standardized infection rate (SIR) and calculating a Cohen's Kappa coefficient.

Results: We gathered data and assessed 30 day SSI rates on 4171 (NSQIP) vs 4951 (NHSN) colorectal procedures (2012-2014). NSQIP database of Hospital 1 (N=1758 patients) routinely found "exemplary" or "as expected SSI rates (100%). NHSN data from same time period included a higher denominator (N=1813 patients) and a lower SSI rate overall (4-6%), but rates appeared "worse than national average" 75 % of the time. Four hospitals with less rigorous NHSN capture methods reported SSIs at "same" or "lower" rates than national average 95% of the time despite fact that during 35 % of the intervals their NSQIP rates were in the "improvement needed" range. The correlation between the NSQIP O/E ratio and NHSN SIR was 0.03 (p=0.88) [Figure]. As a matter of fact, during the 25 site-time period observations, NSQIP and NHSN data actually matched only half a time (52 % observations) . 13/25 had agreement on the level (12 ranked as both Average, and 1 ranked as both High). The remaining 12 had a discordance of ratings. The Kappa value was 0.10 (95% CI {-.1366, .3402} p=.403), indicating an obviously poor level of agreement between NHSN and NSQIP.

Conclusions: The variation in NHSN infection surveillance methodology leads to inaccurate results. This inadequacy is readily apparent when NHSN data are compared to data where these processes are standardized. We should use high quality data for performance metrics if we wish to make meaningful changes in practices or compare outcomes amongst different institutions.



A Comparison of O/E Ratios for SSIs Provided by NSQIP and NHSN Databases

S4

A NATIONAL DATABASE ANALYSIS COMPARING THE NIS AND ACS-NSQIP DATASETS IN LAPAROSCOPIC VS. OPEN COLECTOMIES: INHERENT VARIANCE MAY IMPACT OUTCOMES.

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Purpose: Clinical and administrative databases such as the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) and the Nationwide Inpatient Sample (NIS) have been increasingly used to evaluate colorectal surgery outcomes. Each database has fundamental distinctions and inherent limitations that may impact results. To assess the differences between NIS and ACS-NSQIP, we sought to compare the demographics and outcomes of identical procedures, focusing on the similarities, differences, and limitations of both datasets.

Methods: Review of all elective open and laparoscopic right, left and sigmoid colectomies from ACS-NSQIP (2006-2013) and NIS (2006-2012). ICD-9-CM coding was used to identify NIS cases, and CPT coding for ACS-NSQIP. Patient characteristics and co-morbidities common to both database

were identified. Thirty-day outcomes for NSQIP and in-hospital outcomes for NIS, were evaluated.

Results: There were 188,326 cases in the NIS database (laparoscopic=67,245; open=121,081), median age and interquartile range (IQR) was 64 (53-74) years. ACS-NSQIP identified 110,666 cases (laparoscopic=54,191; open= 56,475), median age 64 (53-75) years. All demographics, co-morbidities, and surgical indications were significantly different between laparoscopic and open approaches within each database, with the laparoscopic approach providing superior clinical outcomes. Among the laparoscopic cases, the prevalence of non-morbid obesity (BMI from 30-40 kg/m^2) and anemia found in NSQIP were more than twice those in the NIS, and cases with peripheral vascular disease and congestive heart failure in the NIS was more than twice that of NSQIP. In terms of inpatient adverse events (**Table 1**), sepsis or septic shock was found to be greater in NSQIP vs. NIS (2.1% vs. 1.1%; p<0.01), with urinary tract infections (2.2% vs. 1.1%; p<0.01) and acute kidney injury (2.7% vs. 0.5%; p<0.01) greater in the NIS vs. NSQIP cohort. Surgical site infections were higher in NSQIP (30-day) vs. NIS (8.4% vs. 2.6%; p<0.01), albeit less so when restricted to NSQIP complications that occurred before discharge (3.3% vs. 2.6%; p<0.01). In-hospital mortality rates were similar between both datasets.

Conclusions: This analysis of two large national databases regarding colectomy outcomes highlights the incidence of previously unrecognized data variability and discrepancy. This variance can impact study results and subsequent conclusions/recommendations. These findings underscore the importance of carefully choosing and understanding the different population-based datasets prior to designing and when interpreting outcomes research.

Table 1. Comparison of NIS vs. NSQIP (in-hospital and 30-days) outcomes of laparoscopic colectomies

	NIS	NSQIP			
		All (30-days)		Before Discharge	
	n (%)	n (%)	p	n (%)	p
Mortality	334 (0.5)	486 (0.9)	***<0.01***	259 (0.5)	0.64
Stroke	76 (0.1)	113 (0.2)	***<0.01***	71 (0.1)	0.37
Cardiac arrest	111 (0.2)	164 (0.3)	***<0.01***	118 (0.2)	***0.04***
Pulmonary embolism	178 (0.3)	250 (0.5)	***<0.01***	128 (0.2)	0.33
Deep venous thrombosis	194 (0.3)	421 (0.8)	***<0.01***	207 (0.4)	***0.01***
Myocardial Infarction	329 (0.5)	227 (0.4)	0.07	187 (0.3)	***<0.01***
Sepsis or septic shock	758 (1.1)	1734 (3.2)	***<0.01***	1140 (2.1)	***<0.01***
Postoperative intubation	986 (1.5)	839 (1.5)	0.24	722 (1.3)	***0.05***
Pneumonia	1072 (1.6)	755 (1.4)	***<0.01***	630 (1.2)	***<0.01***
Urinary tract infection	1501 (2.2)	1089 (2.0)	***0.01***	607 (1.1)	***<0.01***
Surgical Site infection	1742 (2.6)	4566 (8.4)	***<0.01***	1766 (3.3)	***<0.01***
Acute kidney injury	1800 (2.7)	369 (0.7)	***<0.01***	245 (0.5)	***<0.01***

S5

RISK FACTORS FOR SUPERFICIAL SURGICAL SITE INFECTION AFTER ELECTIVE RECTAL CANCER RESECTION: A MULTIVARIATE ANALYSIS OF 8,800 PATIENTS FROM THE ACS NSQIP DATABASE.

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Purpose: Surgical Site infection (SSI) is the most common complication after colorectal resection. The goal of this study was to determine the preoperative risk factors for superficial SSI in patients who underwent rectal cancer resection.

Methods: The ACS-NSQIP database was queried (via diagnosis and CPT codes) for patients with rectal cancer who underwent elective resection between 2005-2012. Patients for whom data concerning 27 demographic factors, co-morbidities, and operative characteristics were available were eligible. The following parameters/co-morbidities were included: BMI, smoking status, COPD, preoperative radiotherapy (RT) or chemotherapy, surgical approach, disseminated cancer, stoma formation, albumin levels, etc. A univariate and multivariate analysis was performed to identify possible risk factors for superficial SSI.

Results: A total of 8880 patients met the entry criteria and were included in the study. Superficial SSI's were diagnosed in 861 (9.7%) patients. Univariate analysis showed male gender (p<.0001), BMI>30 (p<.0001), history of DM (p<.0001), current smoking (p=.0019), dyspnea at rest or with moderate exertion (p=.0006), COPD (p<.0001), history of percutaneous cardiac intervention (p=.0155), history of cardiac surgery (p=.0053), HTN (p<.0001), ASA class III/IV (p<.0001), APR (p<.0001), stoma formation (p=.0034), open surgery (p<.0001), and duration of surgery >213 minutes (p<.0001)to be risk factors for incision site SSI. Multivariate analysis revealed the following statistically significant risk factors: male gender, BMI>30, current smoking, history of COPD, ASA III/IV, APR, stoma formation, open surgery (vs laparoscopic), and operative time >213 minutes. Of note, 54.2% of superficial SSI's were noted after hospital discharge. With regards to the timing of presentation, univariate analysis revealed a statistically significant delay in superficial SSI presentation in patients with the following factors/characteristics: BMI <30 (p=.0263), previous radiation therapy (p=.0028), APR (p=.0009), and stoma formation (p=.0006). Multivariate analysis suggested that only laparoscopic surgery (vs open) and preoperative radiation therapy were risk factors for delay.

Conclusions: Rectal cancer resections are associated with a high incidence of superficial SSI's, over half of which are noted after discharge. Nine patient and operative characteristics, including smoking, BMI, COPD, APR, and open surgery were found to be significant risk factors for SSI on multivariate analysis. Further, SSI presentation in patients who had laparoscopic surgery and those who had preop RT is significantly delayed for unclear reasons.

Univariate Analysis of Demographics and Comorbidities associated with Superficial Surgical Site Infection

Parameter		Cases (n, % of total)		Incidence of superficial SSI (n, % of each parameter)		P Value
All cases		8880	100%	861	9.7%	
Gender	Male	5364	60.4%	575	10.7%	0.0001
	Female	3516	39.6%	290	8.2%	
BMI	<=30	6261	70.5%	501	8.0%	<0.0001
	>30	2619	29.5%	364	13.9%	
DM	No	7559	85.1%	688	9.1%	<0.0001
	Yes	1321	14.9%	177	13.4%	
Current Smoking	No	7120	80.2%	658	9.2%	0.0019
	Yes	1760	19.8%	207	11.8%	
Dyspnea with moderate exertion or at rest	No	8202	92.4%	772	9.4%	0.0006
	Yes	678	7.6%	93	13.7%	
COPD	No	8526	96.0%	798	9.4%	<0.0001
	Yes	354	4.0%	67	18.9%	
History of PCI	No	8416	94.8%	804	9.6%	0.0155
	Yes	464	5.2%	61	13.1%	
PCS	No	8486	95.6%	810	9.5%	0.0053
	Yes	394	4.4%	55	14.0%	
HTN	No	4757	53.6%	401	8.4%	<0.0001
	Yes	4123	46.4%	464	11.3%	
ASA Class	I/II	4384	49.4%	342	7.8%	<0.0001
	III/IV	4496	50.6%	523	11.6%	
Type of Resection	APR	2757	31.0%	347	12.6%	<0.0001
	Other sphincter saving procedures	6123	69.0%	518	8.5%	
Stoma formation	No	3259	36.7%	289	8.9%	0.0034
	Yes	5621	63.3%	576	10.2%	
Surgical approach	Open	6841	77.0%	743	10.9%	<0.0001
	Lap	2039	23.0%	122	6.0%	
Duration of surgery (minutes)	<213	4690	52.8%	328	7.0%	<0.0001
	>=213	4190	47.2%	537	12.8%	

BMI- Body mass index; DM- Diabetes Mellitus; COPD- Chronic Obstructive Pulmonary Disease; PCI- Percutaneous Coronary Intervention; PCS- Previous Cardiac Surgery; HTN- hypertension requiring medication; ASA- American college of anesthesiologists; APR- Abdominoperineal Resection, Lap- Laparoscopic

S6

IS NONSTEROIDAL ANTI-INFLAMMATORY DRUG USE ASSOCIATED WITH AN INCREASED INCIDENCE OF ANASTOMOTIC LEAK IN COLORECTAL SURGERY? A SYSTEMATIC REVIEW AND META-ANALYSIS.

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Purpose: Non-steroidal anti-inflammatory drugs (NSAIDs) are common components of multimodal analgesic regimens in colorectal surgery. The aim of this study was to determine if post-operative NSAID use is associated with an increased incidence of lower gastrointestinal anastomotic leak.

Methods: We performed a systematic review and meta-analysis of observational studies and randomized controlled trials (RCTs) that report

on the association between post-operative NSAID use and dehiscence of lower gastrointestinal anastomoses. Summary measures of association were computed using random-effects models. Observational studies and RCTs were analyzed separately. Pooled estimates were further stratified by study characteristics and measures of study quality.

Results: A total of 9 observational studies with a combined 18,865 patients were included. Meta-analysis of these studies showed that post-operative NSAID use is associated with an increased odds of anastomotic leak (OR 1.30; 95%CI 1.08 – 1.52). This association was also noted for studies limited to non-selective NSAID use (5 studies; >4191 patients; OR 1.69; 95%CI 1.15 – 2.23), but was not statistically significant for studies limited to COX-2 selective NSAID use (3 studies; >697 patients; OR 1.28; 95%CI 0.47 – 2.08), studies limited to elective surgery patients (6 studies; 12,089 patients; OR 1.19; 95%CI 0.92 – 1.45), or studies limited to elective surgery patients exposed to non-selective NSAIDs (4 studies; >3519 patients; OR 1.58; 95%CI 0.97 – 2.18). A separate search for RCT data identified 6 studies with a combined 450 patients that have previously been pooled in a published meta-analysis. Our calculations identified no significant association between NSAID use and anastomotic leak (RR 1.53; 95%CI 0.58 – 4.01) within these RCTs. There was no evidence of statistical heterogeneity between studies ($I^2 = 0\%$ for all analyses). However, studies notably varied with respect to patient selection procedures, drug exposures, and definition of anastomotic leak.

Conclusions: Meta-analysis of observational studies suggests an association between post-operative NSAID use and dehiscence of lower gastrointestinal anastomoses. Caution may be warranted when prescribing medications of this class to patients following colorectal resections with primary anastomoses.

S7

THIRTY-DAY OUTCOMES FOLLOWING DICERTING LOOP ILEOSTOMY TAKEDOWN USING THE MICHIGAN SURGICAL QUALITY COLLABORATIVE DATABASE.

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Purpose: Diverting loop ileostomy (DLI) frequently accompanies colorectal procedures to protect downstream anastomoses from fecal contamination. The DLI is eventually reversed as a second stage procedure, thereby restoring intestinal continuity. Outcomes following this takedown procedure have not been studied on a large scale. The goal of this study was to evaluate 30-day outcomes of DLI takedown and assess risk factors for undesirable postoperative outcomes.

Methods: The Michigan Surgical Quality Collaborative (MSQC) database was queried to identify patients who underwent DLI takedown (using CPT codes 44625 and 44620) between January 1, 2010 and April 30, 2015. Preoperative clinico-pathologic data and 30-day outcomes were identified. Extended hospital length of stay (LOS) was defined as greater than two standard deviations above the mean. Multivariate analysis was used to identify risk factors for undesirable outcomes including extended LOS, surgical site infections (SSI), pneumonia, readmission within 30 days, reoperation within 30 days, and mortality within 30 days. The MSQC database does not allow identification of the etiology of DLI construction and the time from creation to takedown.

Results: 1,737 patients had DLI takedown. Rates of postoperative complications were: surgical site infection 10.5%, UTI 2.6%, pneumonia 2.2%, readmission within 30 days 11.2%, reoperation within 30 days 7.4%, and mortality within 30 days 1.1%. Mean LOS was 6.2 (±6.4) days; 3.4% of patients experienced an extended LOS. Risk factors for extended LOS were: ASA class 3 or 4, operative time greater than 60 minutes, and history of bleeding disorder. Risk factors for other undesirable outcomes are outlined in the Table below.

Conclusions: Diverting loop ileostomy takedown is associated with low rates of extended hospital length of stay and postoperative complications. Higher ASA class, longer operative times, history of bleeding disorder, and functional status appear to be risk factors for most undesirable outcomes. Colorectal care teams should be aware of these risk factors and counsel patients accordingly.

Factors for Poor Outcomes with Loop Ileostomy Takedown

Factor	Category	Odds Ratio (95% CI)
Extended length of stay		
ASA Classification	ASA 3	3.1 (1.5, 6.1)
	ASA 4	10.0 (3.9, 26.3)
Surgery Time	61-90 min	1.2 (0.5, 3.3)
	91-120 min	3.7 (1.5, 9.3)
	>120 min	3.1 (1.4, 6.8)
Bleeding Disorder	Yes	3.3 (1.5, 7.4)
Any SSI		
Surgery Time	61-90 min	1.4 (0.8, 2.5)
	91-120 min	2.1 (1.1, 3.8)
	>120 min	4.0 (2.5, 6.4)
Bleeding Disorder	Yes	2.3 (1.2, 4.4)
Tobacco Use	Yes	1.5 (1.0, 2.0)
Any UTI		
ASA Classification	ASA 3	1.1 (0.5, 2.0)
	ASA 4	5.1 (2.0, 13.2)
Gender	Female	2.8 (1.4, 5.5)
Tobacco Use	Yes	0.3 (0.1, 0.8)
Postoperative pneumonia		
Steroid Use	Yes	5.5 (2.2, 13.7)
Surgery Time	61-90 min	0.9 (0.3, 2.7)
	91-120 min	0.9(0.2, 3.6)
	>120 min	2.7 (1.2, 6.3)
Bleeding Disorder	Yes	4.9 (1.9, 12.3)
Peripheral Vascular Disease	Yes	4.1 (1.2, 13.3)
Readmission within 30 days		
Weight Loss >10%	Yes	2.7 (1.5, 5.0)
Surgery Time	61-90 min	1.0 (0.7, 1.6)
	91-120 min	1.0 (0.6, 1.7)
	>120 min	1.8 (1.2, 2.6)
Bleeding Disorder	Yes	1.9 (1.1, 3.6)
Reoperation within 30 days		
Surgery Time	61-90 min	1.3 (0.7, 2.3)
	91-120 min	2.2 (1.1, 4.1)
	>120 min	2.7 (1.6, 4.5)
Bleeding Disorder	Yes	2.6 (1.3, 5.1)
Weight Loss >10%	Yes	2.7 (1.3, 5.7)
Mortality within 30 days		
Age	-	1.1 (1.0, 1.1)
Bleeding Disorder	Yes	4.5 (1.4, 14.5)
Functional Status	Partially/Totally Dependent	5.2 (1.3, 20.0)
Steroid Use	Yes	4.8 (1.2, 18.9)

S8

BOWEL PREPARATION IS ASSOCIATED WITH REDUCED MORBIDITY IN ELDERLY PATIENTS UNDERGOING ELECTIVE COLON RESECTION.

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Purpose: The impact of bowel preparation in colorectal surgery has been a topic of considerable debate. In elderly patients, the potential benefits associated with bowel preparation may be reduced or eliminated due physiologic derangements related to the prep itself. Our objective is to determine the impact of preoperative bowel preparation on post-operative outcomes in elderly patients undergoing elective colectomy.

Methods: An analysis of the 2012 and 2013 Colectomy-Targeted American College of Surgeons National Surgical Quality Improvement Program was performed. Patients age 75 and older who underwent colectomy with anastomosis without proximal diversion were included. Exclusion criteria were urgent/emergent operations, preoperative wound infection, preoperative sepsis, preoperative mechanical ventilation, and patients with ASA class of 5. Patients were grouped into no bowel preparation, mechanical bowel prep (MBP) only, or MBP and oral antibiotic bowel preparation (MBP/OABP). Patients were also stratified based on location of colectomy (right sided vs left sided). Bivariate data analysis was performed and logistic regression modeling was conducted to calculate risk-adjusted 30-day outcomes.

Results: 2851 elderly patients underwent elective colectomy and were included. 29.5% had no bowel prep, 41.9% had MBP, and 28.6% had MBP/OABP. Bowel prep was performed in 62.8% of patients undergoing a right colectomy versus 74.0% of patients undergoing a left colectomy (P<0.01) Overall morbidity was 27.9% in no bowel prep, 24.5% in MBP, and 18.9% in MBP/OABP groups (P<0.01). Mortality was 2.4% in no bowel prep, 1.7% in MBP, and 0.7% in MBP/OABP groups (P=0.03). The MBP/OABP group, compared with no bowel prep, was associated with reduced risk of anastomotic leak, ileus, superficial surgical site infection (SSI), organ space infection, pneumonia, and respiratory compromise (table). There was no difference in the rates of renal failure or insufficiency in patients receiving MBP (1.2%) or MBP/OABP (0.5%) vs no bowel preparation (0.7%) (P=0.23). Length of stay was shorter in the MBP/OABP group compared with the no bowel prep (table).

Conclusions: In a nationwide sample of elderly patients undergoing elective colectomy, MBP/OABP in combination was associated with reduced morbidity, mortality, anastomotic leak, SSI rate, and length of stay compared with no bowel preparation. In contrast, MBP alone was not associated with any differences in outcomes compared with no bowel preparation. Bowel preparation of any kind was not associated with clinically significant renal dysfunction, ileus, or prolonged length of stay. The use of MBP/OABP is safe and effective in elderly patients undergoing elective colectomy.

	No Bowel Prep N=841	MBP N=1194 OR (95% CI)	MBP/OABP N=816 OR (95% CI)	P-value:
Morbidity	Ref	0.9 (0.7-1.1)	0.6 (0.5-0.8)	<0.01
Mortality	Ref	0.7 (0.4-1.3)	0.3 (0.1-0.8)	0.04
Anastomotic Leak	Ref	0.7 (0.5-1.1)	0.4 (0.2-0.7)	<0.01
Ileus	Ref	0.8 (0.6-1.0)	0.5 (0.4-0.7)	<0.01
Superficial SSI	Ref	0.7 (0.5-1.0)	0.3 (0.1-0.5)	<0.01
Organ Space SSI	Ref	0.7 (0.4-1.2)	0.5 (0.3-1.0)	0.13
Pneumonia	Ref	0.8 (0.5-1.4)	0.3 (0.1-0.6)	<0.01
Respiratory Compromise	Ref	0.9 (0.6-1.3)	0.4 (0.2-0.7)	<0.01
Renal Insufficiency	Ref	1.6 (0.4-6.4)	1.0 (0.2-5.1)	0.69
Acute Renal Failure	Ref	1.7 (0.4-6.7)	0.3 (0.0-3.3)	0.28
Length of Stay(d)	7.4 ± 0.3	6.6 ± 0.2	6.0 ± 0.2	<0.01

S9

LIPOSOMAL BUPIVACAINE USE IN TRANSVERSUS ABDOMINIS PLANE BLOCKS REDUCES PAIN AND POSTOPERATIVE INTRAVENOUS OPIOID REQUIREMENTS AFTER COLORECTAL SURGERY.

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Purpose: Enhanced recovery protocols have emerged to improve postoperative outcomes and decrease length of stay in colorectal surgery patients. Integral to this effort is minimizing use of opioids perioperatively. Our objective was to evaluate the effect of transversus abdominis plane (TAP) blocks using liposomal bupivacaine, which can offer a near 10-fold increase in terminal half-life compared to its non-liposomal counterpart, on postoperative pain scores and opioid use in patients undergoing colorectal surgery.

Methods: Patients undergoing TAP blocks for colorectal procedures were abstracted from a prospectively maintained database from 2013 to 2015. Patients were stratified by administration of either liposomal bupivacaine (group "LB," 20 mL of a 1.3% solution) or a non-liposomal anesthetic (group "NLA," either 0.25% bupivacaine or a 0.25-0.5% ropivacaine solution). Opioid dosages were converted to equivalents of morphine and oxycodone for intravenous and oral routes, respectively. Demographic, pathologic, and procedure-related variables were stratified by local anesthetic formulation compared using chi-square and Student's t-tests as appropriate. Average postoperative pain scores, doses of opioid- and non-opioid analgesics, length of stay, and costs were similarly compared over the admission.

Results: Between patients receiving LB (n=303) and those receiving NLA (n=104), no significant differences were noted in age, sex, race, surgical approach (open vs. laparoscopic vs. robotic) or type of surgery. Patients receiving LB had significantly lower pain scores for the first 48 hours postoperatively, after which point the scores converged (Table 1). Use of intravenous opioids decreased by over one-third over the course of the admission (99.1 mg vs. 64.5 mg, p=0.040), as did the use of ketorolac (49.0 mg vs. 18.3 mg, p<0.0001), in the LB group. No significant differences were noted in use of oral opioids (35.6 mg vs. 47.4 mg, p=0.449), acetaminophen (4726 mg vs. 5957 mg, p=0.219), or ibuprofen (187 vs. 209 mg, p=0.809). Postoperative length of stay was decreased in the liposomal bupivacaine group, but this result was not significant (6.3 vs. 5.6 days, p=0.274). Total costs did not differ between groups ($23,505.79 vs. $20,721.35, p=0.384).

Conclusions: The use of liposomal bupivacaine in TAP blocks resulted in persistently decreased postoperative pain scores for 48 hours compared to standard local anesthetics. These attenuated pain scores were associated with significantly lower intravenous opioid requirements and ketorolac use during the index admission, as well as a trend towards decreased length of stay, at no additional cost.

Table 1. Postoperative Outcomes

Variable	Non-Liposomal Anesthetic (n=104)	Liposomal Bupivacaine (n=303)	p-value
Pain Score (Scale 0-10)			
PACU High	5.6	4.7	0.057
Mean Hours 0-12	5.3	4.4	0.004
Mean Hours 12-24	5.3	4.0	<0.001
Mean Hours 24-36	4.9	3.9	0.001
Mean Hours 36-48	4.5	3.7	0.020
Mean Hours 48-60	3.1	3.3	0.408
Mean Hours 60-72	2.7	3.0	0.385
Medications			
Total IV Opioids (mg)	99.1	64.6	0.040
Total PO Opioids (mg)	35.6	47.4	0.449
Total Acetaminophen (mg)	4726	5957	0.219
Total Ketorolac (mg)	49	18.3	<0.001
Total Ibuprofen (mg)	187	209	0.809
Postoperative Length of Stay (Days)	6.3	5.6	0.274
Total Cost	$23,505.79	$20,721.35	0.384

S10

DOES HOSPITAL TRANSFER IMPACT OUTCOMES AFTER COLORECTAL SURGERY?

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Purpose: With increasing public reporting of outcomes and bundled payments, hospitals and providers are scrutinized for morbidity and mortality. The impact of patient transfer prior to colorectal surgery has not been well characterized in a risk-adjusted fashion. We hypothesized that transfer would independently predict morbidity and mortality not captured by traditional predictor variables.

Methods: We identified 158,446 patients who underwent colorectal surgery in the 2009-2013 ACS-NSQIP. Exclusion criteria included transfer from a chronic care facility and unknown transfer status. Baseline characteristics were compared by transfer status. The impact of hospital-to-hospital transfer on major complications and mortality was examined using multivariate logistic regression, adjusting for demographics, comorbidities, preoperative labs, procedure type and surgical indication.

Results: 7259 operations (4.6%) were performed after transfer. Operative indications for transferred patients included cancer (24%), colon perforation or peritonitis (22%), diverticulitis (17%), ischemia (12%), inflammatory bowel disease (7.5%), and obstruction (8.7%). In contrast, the vast majority of patients who were not transferred underwent operations for cancer (46%), diverticulitis (24%) or IBD (5.5%). Transferred patients were less likely to be functionally independent at the time of surgery (79% vs 95%, p<0.0001), had higher ASA scores, were more likely to be on chronic

steroids (16% vs 8%, p<0.0001), have congestive heart failure (5% vs 1%, p<0.0001), acute renal failure (3.8% vs 0.7%, p<0.0001), underlying bleeding disorder (16% vs 4.7%, p<0.0001) and receive recent blood product transfusion (11% vs 2.6%, p<0.0001). Transferred patients had higher rates of complications compared to non-transferred patients (all p<0.0001): unplanned reintubation (8.5% vs 2.3%), bleeding (30% vs 10%), organ space SSI (8.1% vs 4.5%), wound dehiscence (3.6% vs 1.5%), postoperative sepsis (19.2% vs 6.9%), cardiac arrest requiring CPR (3.2% vs 0.7%), DVT (4% vs 1.5%), and MI (1.9% vs 0.8%). Transferred patients also had longer hospital stays (9 vs 6 days, p<0.0001) and higher risk of death (13.2% vs 2.6%, <0.0001). On multivariate analysis, transferred patients had a higher mortality despite adjustment (OR 1.12, 95% CI 1.01-1.25, p=0.026). They were also more likely to have a major complication (OR 1.14, 95% CI 1.07-1.21, p<0.001). Transfer status impacted complications for non-emergent cases (OR 1.19, 95% CI 1.09-1.30, p=0.0001) but did not affect emergency cases or mortality (TABLE).

Conclusions: Hospital-to-hospital transfer independently contributed to patient morbidity and mortality in patients who underwent colorectal surgery. The impact of hospital transfer must be considered when evaluating surgeon and hospital performance, as the increased risk of major complications or death is not fully accounted for by traditional methods.

	Transferred vs Not Transferred	P-Value	Model C-Statistic
30 Day Mortality			
All Cases	OR 1.12 (1.01-1.25)	0.026	0.923
Emergency	OR 1.05 (0.93-1.19)	0.402	0.877
Non Emergency	OR 1.10 (0.91-1.34)	0.321	0.885
Major Complications			
All Cases	OR 1.14 (1.07-1.21)	<0.0001	0.735
Emergency	OR 1.04 (0.96-1.13)	0.338	0.738
Non Emergency	OR 1.19 (1.09-1.30)	0.0001	0.693

Adjusted for demographics, comorbidities, preoperative labs, procedure type and surgical indication.

S11

IDENTIFYING PREDICTORS OF SUCCESS OF THE LIFT PROCEDURE IN THE TREATMENT OF FISTULA-IN-ANO: DOES LOCATION MATTER?

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Purpose: The objective of this study was to identify predictors of success in patients treated with the ligation of the intersphincteric fistula tract (LIFT) procedure.

Methods: A retrospective review of a prospectively maintained, IRB-approved database was performed to identify all patients without inflammatory bowel disease undergoing a LIFT procedure for anal fistula between 2010 and 2015. For comparison, patients treated in the same time period with an endorectal advancement flap (ERAF) were simultaneously collected. Risk factors were proposed a priori and collected. The primary outcome was predefined as complete healing of both the external opening and intersphincteric incision with resolution of symptoms, without additional interventions. Inadequate follow-up was supplemented with telephone interview for patients with <90 days of follow-up. A multivariate model was created to adjust for predefined risk factors of failure.

Results: 107 LIFT procedures (64% male) were performed in patients with a mean age of 46 ±13 years and an average BMI of 28±5 Kg/m^2. 36% of procedures were performed in patients with a history of a previous intervention. Complete follow up was available in 95% of patients with a median follow up of 107 days. Overall healing rate for all LIFT procedures was 54%. On univariate comparison of patients with a persistent vs. healed fistula, there was no significant difference in demographic variables including smoking status and fistula complexity (simple vs. complex). There was no difference in success rates in patients who had undergone previous attempted repair with fibrin glue, collagen plug, LIFT, or ERAF. Furthermore, no difference in the outcome was noted in patients undergoing a fistula tract shortening procedure or receiving post-operative antibiotics. Posterior fistula location was significantly associated with failure of LIFT procedure (p=0.001) **(Figure 1).** On multivariate regression, a posterior fistula location was the only predictor of failure of the LIFT procedure (OR 3.5, 1.3-9.2, p=0.01). In comparing the outcomes of posterior fistulas treated by LIFT to those of ERAF during the same time period, higher healing rates were identified with ERAF (61% vs 26%, p=0.007). Moreover, posterior fistulas required reoperation in 45% of cases following a LIFT procedure.

Conclusions: Success rates of the LIFT procedure in this series appear to be similar to that of the published literature. LIFT procedures may not be well suited for the treatment of posterior transsphincteric fistulas. Improved results were also seen when posterior fistulas were treated with an ERAF.

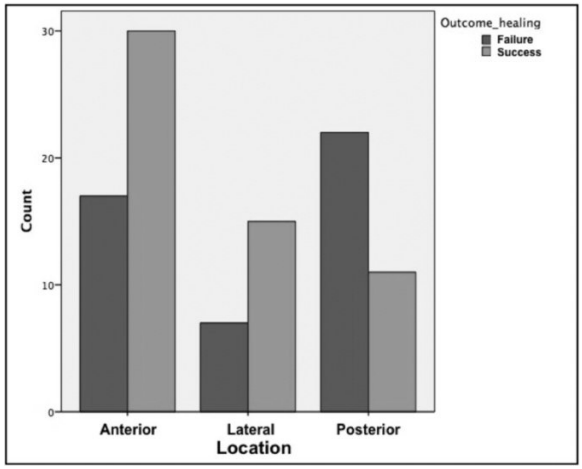

Figure 1. Success rates of the LIFT procedure in anal fistulas of varying location

S12

NEW-ONSET BENIGN ANORECTAL DISORDERS AFTER BARIATRIC SURGERY: IMPORTANCE OF BOWEL HABIT.

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Purpose: Benign anorectal disorders are common after bariatric surgery. Nevertheless, the true incidence and risk factors for these problems have been poorly studied. A cohort of patients submitted to bariatric surgery was studied to describe the risk factors and the kind of anorectal disorders that they developed after this surgery.

Methods: 196 patients submitted to bariatric surgery between 2000 and 2008 were included. A Gastric Bypass (GBP) or Long Alimentary Limb Biliopancreatic Diversion (BPD) was performed. Information about weight loss, bowel movements and anorectal disorders was achieved by a telephone interview. Cuantitative variables were expressed as Mean (95% Confidence Interval) and cualitative ones as Number of Patients (Percentage, 95% CI). 95% CI of the diference of means or percentages was used as statistical test.

Results: 150 (76.5%, 70.0-82.0%) women and 46 (23.5%, 18.0-30.0%) men were included. Mean age and preoperative BMI were 43.2 (41.6-44.8) years-old and 48.8 (47,8-49.8) kg/m^2. A GBP and a BPD was performed in 99 (50.5%, 43.5-57.5%) and 97 (49.5%, 42.5-56.5%) patients respectively. After a mean follow-up of 88.2 (85.4-91.0) months, 33 (16.8%, 12.2-22.8%) patients couldnot be reached and were considered lost. An abnormal bowel habit (diarrhea or constipation) was seen in 55 (32.7%, 26.0-40.3%) patients. 51 (37.2%, 29.5-45.7%) patients without anorectal disorder before the bariatric surgery developed it after the operation and 14 (27.5%, 16.7-41.7%) of them were submitted to surgery because of this problem. Haemorrhoids (43 patients, 55.8%, 44.4-66.7%) and fissure-in-ano (16 patients,

20.8%, 13.0-31.5%) were the most common anorectal disorders. A statistically significant relation was not found between new-onset anorectal disorder (NOAD) and gender, preoperative BMI, diabetes or weight loss. Patients with NOAD had a longer follow-up time (92.5 vs. 85.1 months, difference 7.4 months, 95% CI 0.9-13.8, p=0.025) and number of bowel movements per day (2.7 vs. 2.0, difference 0.67, 95% CI 0.01-1.34, p=0.047). NOAD was more frequently seen in patients with diarrhea or constipation compared to patients with normal bowel habit (54.5% vs. 28.3%, difference 26.3%, 95% CI 8.9-43.6%, p=0.003). Patients submitted to BPD had a higher incidence of NOAD (52.9% in BPD and 21.7% in GBP, difference 31.2%, 95% CI 15.9-46.5%, p<0.001), probably because of disturbances in the bowel habit (patients with diarrhea or constipation 40.3% in BPD group and 24.6% in GBP group, difference 15.7%, 95% CI 0.13-31.2%, p=0.051)

Conclusions: NOAD are frequent after bariatric surgery. A high percentage of patients with NOAD needed a surgical procedure to treat it. Bowel habit was the most important risk factor for NOAD, and could explain the higher incidence of these disorders after BPD. Nevertheless other factors, such as composition of the stools, should be studied in the future.

S13

PERCUTANEOUS NERVE EVALUATION VERSUS STAGED SACRAL NERVE STIMULATION FOR FECAL INCONTINENCE.

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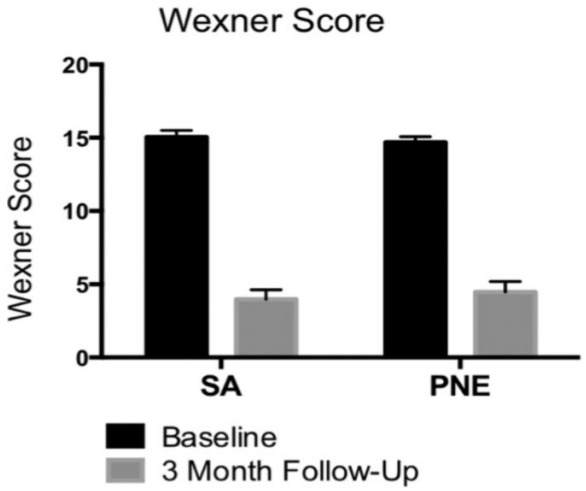
Purpose: Sacral nerve stimulation (SNS) using a two-staged approach (SA) is an established therapy for fecal incontinence (FI). Office-based percutaneous nerve evaluation (PNE) is a less invasive alternative to the stage 1 procedure, but is seldom used in the evaluation of patients with FI. It involves placing a percutaneous test lead under local anesthesia in the office, and a one-week test period as opposed to the two-week test period of the SA. This study aims to determine the clinical success of PNE versus SA.

Methods: This was a retrospective review of a prospectively maintained single institution database of patients treated with SNS for FI. Patient demographics included age, gender, medical comorbidities, presence of a sphincter defect, and history of prior sphincter repair. The Wexner score was used to assess FI severity. The primary outcome was the proportion of patients progressing to complete implantation, based upon >50% improvement in baseline number of incontinence episodes in the testing phase, following PNE vs. SA. The selection of patients for SA vs. PNE represented a change in our practice. Our first 41 patients were treated with SA, at which point, we changed our practice to use PNE because we thought it would be a less invasive alternative. The secondary outcomes were 3-month Wexner score in patients tested with PNE vs. SA, and infection rate, defined as the incidence of surgical site infection occurring at any phase of the implantation (test implant or pulse generator implantation).

Results: A PNE trial was performed in 42 patients while 41 patients underwent SA. No significant differences between the two groups were observed in patient demographics, except for gender. Four males underwent PNE while none received testing via SA. The mean baseline Wexner scores did not differ (SA 15.0 vs. PNE 14.7, p=0.55). Of patients who underwent SA, there was a 90.2% success rate (>50% improvement in baseline number of incontinence episodes in the testing phase) while those who underwent PNE had an 85.2% success rate (p=0.53). Six patients failed initial PNE testing. Two of these patients subsequently underwent SA and had successful implantation. The remaining four elected not to undergo SNS. The mean three-month Wexner score was not significantly different between testing methods (SA 4.1 vs. PNE 4.5, p=0.68). Additionally, there was a significantly higher rate of infection following SA as compared to PNE (10.5% vs. 0.0%, respectively, p<0.05).

Conclusions: PNE offers a viable alternative to SA in the evaluation of patients for SNS in the setting of FI. Not only is the success rate of the initial PNE testing similar to that of SA, but it also has the benefit of limiting patients to one operating room visit and has lower rates of infection as compared to the traditional SA for SNS. Patients who fail the PNE evaluation can be subsequently tested using the SA, but this is seldom necessary.



S14

SACRAL NERVE STIMULATION FOR TREATMENT OF FECAL INCONTINENCE FOLLOWING PROCTECTOMY.

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Purpose: This study assessed the effectiveness of sacral nerve stimulation (SNS) for fecal incontinence (FI) following proctectomy and colorectal or coloanal anastomosis.

Methods: A prospectively maintained IRB-approved database was queried for patients treated for FI following proctectomy (SNS-P) for benign or malignant disease over a 10-year period. Patients were 1:1 matched by pre-operative Cleveland Clinic Florida Fecal Incontinence Score (CCF-FIS) with FI patients with native rectum in situ (SNS-NP). In both groups, SNS was only offered to patients who failed conservative treatment, and in the study group only to patients with no evidence of residual/recurrent cancer. Primary outcome was change in CCF-FIS. Secondary outcomes were SNS explantation rates and complications. Paired within group analyses were performed with paired Wilcoxon ranked sum test. To perform a paired assessment of the change in CCF-FIS between groups, an Analysis of Covariance (ANCOVA) was performed. All tests were 2-tailed with significance at p<0.05.

Results: The 24 patients included 12 (7 females) in the SNS-P group and 12 (all females) in the SNS-NP group. Age, pre-operative CCF-FIS, and follow up were similar between groups. In the SNS-P group, 6 patients underwent proctectomy for low rectal cancer; 5 were after neoadjuvant chemoradiation. 4/6 patients had a handsewn while 2 underwent a stapled coloanal anastomosis. 1 patient failed the 2-week SNS percutaneous trial resulting in lead explantation. 6 patients underwent proctectomy for benign conditions: rectal prolapse (3), Turnbull-Cutait procedure for complex perianal fistula (1), ileal pouch-anal anastomosis for ulcerative colitis (1), and proctectomy at Hartmann's reversal (1). Within group analyses revealed significant CCF-FIS improvement in SNS-P patients (18 to 14; p=0.02). Improvement was more profound in patients after proctectomy for benign disease (14.5 to 8.5) than for rectal cancer (19.5 to 15). SNS explantation rate was 66% (4/6) and 33% (2/6) after proctectomy for malignant and benign conditions, respectively. 5/12 patients (41%) in the SNS-NP group had prior overlapping sphincteroplasty for FI, and 1 had prior chemoradiation for anal cancer. Within group analysis for the SNS-NP group showed significant CCF-FIS improvement (17.5 to 4; p=0.003). A statistically significant improve-

ment was seen in CCF-FIS for patients who did not undergo previous proctectomy (mean delta CCF-FIS: 11.1 vs. 4.7; p=0.011). ANCOVA analysis of this difference reaffirmed controls out-performing proctectomy patients (p=0.006).

Conclusions: SNS for FI after proctectomy appears to be less effective and has high rates of device explantation, particularly in patients who underwent neoadjuvant chemoradiation and proctectomy for low rectal cancer. Additional trials with larger cohorts are required to further determine SNS efficacy after proctectomy in non-irradiated and irradiated patients.

S15

REPAIR OF TRAUMATIC CLOACA.

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Purpose: This video presents a repair of a traumatic cloaca in a 42 y.o. female. The cloaca resulted from the sexual assault.

Methods: An anatomical deconstruction of the involved perineum was performed involving the vagina, rectum, rectovaginal septum, levators, sphincter and the scar. Repair of the vagina and rectum followed. Levatorplasty and sphincter reconstruction was performed. Finally the perineal body was reconstructed.

Results: All details of the operation are shown. The patient healed her repair.

Conclusions: Repair of the traumatic fistula is safe and feasible. Levatorplasty is a helpful maneuver in perineal body reconstruction.

S16

EFFICACY AND COST-EFFECTIVENESS OF IN-OFFICE PERIPHERAL NERVE EVALUATION VERSUS OUTPATIENT ADVANCED NERVE EVALUATION FOR FECAL INCONTINENCE.

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Purpose: Sacral nerve neuromodulation has proven effectiveness for fecal incontinence (FI). Two options exist to evaluate sacral nerves, prior to implantation of a permanant electrode and pacemaker (Stage-2). These are: Peripheral Nerve Evaluation (PNE), performed in the office under local anesthesia versus Advanced Testing (Stage 1), performed as an out-patient surgical procedure, under sedation and with flouroscopic guidance, The purpose of the study was to compare the efficacy and global costs of in-office PNE versus Stage 1 as a ambulatory surgery. Potential advantages of in-office PNE include reduced costs and patient convenience.

Methods: A retrospective review of sacral nerve stimulation for FI was performed. The number of patients undergoing in-office PNE from 2013-2015 was determined. We defined success of PNE as patients who successfully underwent in-office PNE electrode placement, had appropriate neurosensory response, and underwent a successful Stage-2 implant. We defined failure of PNE as patients who underwent attempted in-office PNE, but was unsucessful due to absent neuro-sensory response, or who were unable to tolerate the procedure due to anxiety. These patients susequently required a Stage-1 procedure as an out-patient under flouroscopic guidance and subsequently proceeded to a Stage 2 implant. The global cost of successful PNE (using National allowable Medicare rates) was compared to the global cost of successful Stage1 (Stage-1 device, operating room, flouoscopy, anesthesia and surgeon charges).

Results: Forty-one patients undergoing in-office PNE were analysed. Of these 41 patients, 38 (93%) had good sensori-motor responses and underwent sucessful Stage 2 implantion in the next 1-2 weeks. Of the original 41 patients, three (7%) failed in-office PNE, either because of failure to elicit an adequate sensori-motor response (2 patients) or pre-existing anxiety, and failure to tolerate even local anesthesia (1 patient). Failure to localize S3 and to elicit an adequate sensorimotor response was due to obesity in one patient and a previous sacral fracture in the second. Of these three PNE failures, all underwent subsequent Stage 1 procedures as out-patients and under flouroscopic gioudance and had good sensori-motor responses, and proceeded to sucessful Stage 2 implantation. Global costs for PNE were $1638 and global costs for Stage 1 were $9392, 5.7 times higher

Conclusions: In-office PNE is feasible, safe and cost-effective. Sucess rates in this series were 93%. If in-office PNE fails, these patient may proceed to a Stage 1 and subsequent Stage 2 implantation. Global costs for PNE were $1638, and global costs of Stage 1 procedures $9392, or 5.7 times higher. Patient selection is important. Patients with underlying anxiety, obesity or sacral fractures may not be candidates for PNE, and offered a Stage 1 procedure.

Overall Success Rate of In-Office PNE

	Successful PNE	Failed PNE	Total
PNE (no. of patients)	38	3	41
PNE (% of patients)	93%	7%	100%

S17

MAGNETIC ANAL SPHINCTER AUGMENTATION IN PATIENTS WITH SEVERE FECAL INCONTINENCE–RESULTS AFTER 28 IMPLANTATIONS AND A FOLLOW-UP OF 4 YEARS.

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Purpose: Fecal incontinence (FI) is a common and distressing condition that can lead to complete social isolation. If conservative treatment is unsuccessful only a few surgical treatment possibilities offer a last option. The present study examines the results of the magnetic anal sphincter (MAS) in patients with severe FI.

Methods: This study was a single-center, prospective, nonrandomized investigation. The cohort included all patients with magnetic sphincter augmentation between January 2012 and October 2015. The implantation was performed with a single perineal incision. After tunneling and determining the size of the device, the MAS was placed around the anal canal and closed. Data were collected with primary focus on reduction of CCIS and quality of life (FIQL).

Results: Between January 2012 and October 2015 28 patients received an MAS. Patient characteristics: 23 female, 5 male, age 68±14, follow-up 843±521 days, prior peripheral nerve evaluation test in 13 (43%) patients and 1 (3,5%) prior implantation of an artificial bowel sphincter (ABS). Mean CCIS was 17.5±2.7. In all patients the implantation was performed without intraoperative complications. The mean number of beats used for the implantation was 18±1. Adverse events: 5 (18%) patients had pain and 5 (18%) patients had swelling and erythema in both gluteal regions within the second and third week after the implantation. By conservative treatment both dropped completely during further follow-up. Vaginal bleeding, that stopped spontaneously, was noticed in 1 (5%) patient. 3 (11%) explantations were performed during the follow-up, one as consequence of transection of the device during abdominal rectal prolapse surgery, one because of infection and one because of erosion of the MAS. CCIS and FIQL: CCIS decreased to 7.8±4.4 and FIQL improved in all 4 domains. Fluoroscopy: In 15 patients (53%), who had completed their 3 years follow-up, fluoroscopy showed normal expansion and flexibility of the MAS.

Conclusions: The magnetic anal sphincter shows good results for the treatment of severe FI in this patient group with a success rate of nearly 90%. Previously reported early positive results remain constant over a time period of 4 years.

S18

BILATERAL POSTERIOR TIBIAL NERVE STIMULATION IN TREATMENT OF OBSTRUCTED DEFECATION.

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Purpose: Tibial nerve stimulation influences both motor and sensory pathways as well as the central nervous system. Stimulation of tibial nerve roots (L4- S3) could improve stool evacuation through S3 and/or S2 stimulation. This study aimed to assess the efficacy of tibial nerve stimulation in obstructed defecation (OD).

Methods: Patients with obstructed defecation were recruited consecutively. Conservative and biofeedback therapy had failed to improve symptoms in all. Thirty minutes of daily bilateral transcutaneous posterior tibial nerve stimulation was administered to each patient for six weeks. The primary endpoint was the changes in modified obstructed-defecation patient questionnaire (MODS). Successful outcome was diagnosed when there was significant reduction in MODS after 6 weeks. Secondary endpoints were change in rectal sensitivity volumes (urge to defecate volume and maximal tolerable volume), using manometry and quality of life using the patient-assessment of constipation quality of life questionnaire (PAC-QOL).

Results: Thirty six patients (25 Females) completed the trial. The mean age of patients was 57.2 years ± 14.4. No adverse events were reported. Successful outcome was reported in 17 patients (47%) (MODS decreased from mean of 13.6±4.1 to 4.3±3.2; 95% CI 10.3 to 12.4; p<0.0001). Seven patients (19.4%) reported complete cure. Patients with successful outcome had significantly lower preoperative MODS compared to patients with unsuccessful outcome (13.6±4.1 vs. 18.5 ± 4.7; p=0.04). In the successful group, there were significant improvement in both PAC-QOL score (from 41.2±8.9 to 23.2 ± 10.6 ; p <0.01) and rectal sensitivity (significant reductions in urge to defecate volume and maximal tolerable volume, table 1). No significant change in PAC-QOL or rectal sensitivity in patients with unsuccessful outcome.

Conclusions: Bilateral percutaneous posterior tibial nerve stimulation appears to be effective in almost half of patients with OD. Carefully selected patients with less severe disease may benefit more from the procedure. Further studies are needed to discover the predictive factors for success.

Rectal sensitivity pressure changes after successful bilateral posterior tibial nerve stimulation

	Preoperative	After 6 weeks	P value*
Urge to defecate volume	211.1 ± 35.5	180.5 ± 29.3	0.04
Maximal tolerable volume	290.4 ± 51.6	261.3 ± 46.2	0.03

P value significant when ≤ 0.05

S19

ADVANTAGE OF STAPLED TRANSANAL RECTAL RESECTION FOR TREATMENT OF RECTOCELE ASSOCIATED WITH OBSTRUCTED DEFECATION SYNDROM: A LONG-TERM FOLLOW-UP.

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Purpose: This prospective study was designed to evaluate the clinical and functional results of stapled transanal rectal resection performed in the treatment of rectocele associated with obstructed defaecation syndrome (ODS)

Methods: From January 2007 to December 2014 a total of 247 female consecutive patients, median age 53,72 referred to our colorectal center. All patients had a rectocele with ODS. Preoperatively, all underwent clinical examination, anorectal manometry, proctoscopy and perineography. ODS was assessed using the Wexner score. During follow-up patients were investigated with Wexner score.

Results: The median follow up period was 56 months. No postoperative mortality. The overall complication rate was 24.69% including four major complications (1.61%): one recto-vaginal fistula (0.4%), one retro-rectal haematoma (0.4%), one leakage of the anterior resection (0.4%), one iatrogenic lesion of the posterior rectal wall (0.4%). We reported also 27 temporary urgency (10.93%), 18 acute urinary retention (7.28%), 12 post-operative bleeding (4.85%) and 10 recurrences (4.04%). Compared to baseline evaluation, stapled transanal rectal resection determined a significant reduction of Wexner score (from 18,78 to 8,92 p< 0.001). As regards the long-term follow-up, an overall satisfactory rate of 92% was achieved

Conclusions: Stapled transanal resection is a valid option in the treatment of rectocele associated with ODS. This technique is safe and effective with a low recurrence rate and a low morbidity rate. However we believe that it should be performed only by a well trained surgeons in selected patients, as serious complications may occur

S20

ROBOTIC VENTRAL RECTOPEXY.

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Purpose: To show the key technical components of a robotic ventral rectopexy.

Methods: A video of the key technical components of a robotic ventral rectopexy was created. The key steps include pelvic dissection, placement of lightweight polypropylene mesh and reperitonealization of the pelvis.

Results: Video submission of a robotic ventral rectopexy was created and hightlights the key technical steps of this surgery.

Conclusions: Robotic ventral rectopexy involves pelvic dissection, placement of lightweight polypropylene mesh and reperitonealization of the pelvis.

Podium Presentations

S22

MIR-1247 SUPPRESSES TUMOR GROWTH IN METHYLATOR PHENOTYPE COLORECTAL CANCERS.

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Purpose: Methylator colorectal cancers (CRC) are a subset of CRCs characterized by DNA hympermethylaton, right-sided location, and poor prognosis. The underlying causes of these tumors are incompletely defined. microRNAs (miRNAs) are small non-coding RNAs that serve multiple cellular functions and some have been implicated as tumor suppressors in various cancers. Through global screening techniques, we previously identified miR-1247 as methylated and down-regulated in methylator CRC compared to non-methylator CRC. In this study, we characterize miR-1247 as a tumor suppressor in methylator CRC.

Methods: mRNA was isolated from 20 methylator and non-methylator patient CRC as well as CRC lines and miR-1247 was measured by real time quantitative-PCR (qRT-PCR). miR-1247 was overexpressed or blocked using transient transfection of miR-1247 mimic or inhibitor using RNAimax (Life technologies) in cancer cells. Cell viability and apoptosis were determined using CellTiter-Glo luminescent assay and Annexin and PI, respectively. Cell migration was examined in Transwell chambers. Methylator colon cancer cells infected with control or miR-1247 overexpressing lentivirus and controls were subcutaneously injected into athymic BALB/c nude mice and xenograft growth was monitored by an *in vivo* imaging system. Tumors were extracted after 4 weeks.

Results: TaqMan qRT-PCR confirmed differential miR-1247 expression between methylator and non-methylator CRC. Transfection of miR-1247 methylator (RKO) cells yielded an 8-fold reduction in cellular proliferation; transfection of non-methylator (SW480) cancer cells yielded a 1-fold reduction. miR-1247 overexpression also reduced cell motility by 60% in RKO cells and 25% in SW480 cells. Decreased miR-1247 also significantly induced apoptosis. Furthermore, genetic overexpression of miR-1247 significantly attenuated colon cancer formation and growth in a xenograft model. The average weight of the control tumors was 424.48 mg, while the miR-1247 overexpressed tumors weighed 73.26 mg, i.e. 82% loss of tumor mass ($p<0.05$).

Conclusions: We have characterized miR-1247 with tumor suppressor function in methylator colorectal cancer cells in both in vitro and in vivo models. Further characterization of it mechanism of action and both upstream and downstream effects are underway.

S23

THE ROLE OF PHARMACOLOGIC MODULATION OF AUTOPHAGY ON ANAL CANCER DEVELOPMENT IN AN HPV MOUSE MODEL OF CARCINOGENESIS.

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Purpose: Autophagy is an intracellular catabolic process that occurs in all cells and is important in cellular health. There is evidence in various cancers (e.g. pancreatic cancer and melanoma) that autophagic dysfunction is important in carcinogenesis. We have investigated the temporal nature of the autophagic response throughout anal cancer development in a mouse model of anal cancer development. We have previously demonstrated evidence of decreased autophagic flux (increased LC3 and p62 protein levels along with decreased formation of late autophagosomes) in association with the development of low-grade dysplasia and increased autophagic flux (increased LC3 levels with decreased p62 levels and the development of late autophagosomes) with the development of high-grade dysplasia and cancer. This proposal examines the clinical response of pharmacologic modulation of autophagy in an established mouse model for anal carcinogenesis.

Methods: Human papilloma virus-associated anal carcinogenesis model mice (K14E6/E7) are treated topically with the chemical carcinogen, DMBA. Mice were assessed on a weekly basis for evidence of tumor development and tumor size. The control mice included K14E6/E7 mice with and without DMBA treatments. Chloroquine, a late autophagic inhibitor of autophagy was administered IP daily 5 days per week to K14E6/E7 mice with and without DMBA. BEZ235, an inhibitor of mTOR and therefore an inducer of autophagy, was administered via oral gavage daily 5 days per week with and without DMBA. There are 6 mice per arm (36 mice total). Time of onset of disease was determined with pharmacologic modulation.

Results: All K14E6/E7 mice treated with DMBA alone-developed anal cancers by 20 weeks of treatment. Without carcinogen (DMBA) treatment, none of the mice developed tumors regardless if they were K14E6/E7 controls or given drug treatment. With pharmacologic inhibition of autophagy with chloroquine during DMBA treatments there was a significant decrease in time to the onset of tumor development (range11-15 weeks) (p value 0.004) compared to K14E6/E7 treated with DMBA alone (range 15-20 weeks), while with autophagic induction with BEZ235 there was no evidence of tumor development by 20 weeks (p value <0.0001).

Conclusions: Autophagic flux inhibition is seen in early stages of anal carcinogenesis, while increased autophagic flux is seen in the later stages. With pharmacologic modulation of autophagy one may either promote or inhibit anal carcinogenesis.

S24

CHEMOTHERAPEUTIC ACTION OF SYNTHETIC CURCUMIN ANALOGS IN COLORECTAL CANCER.

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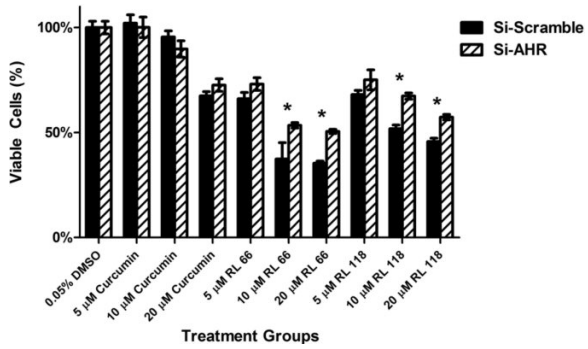
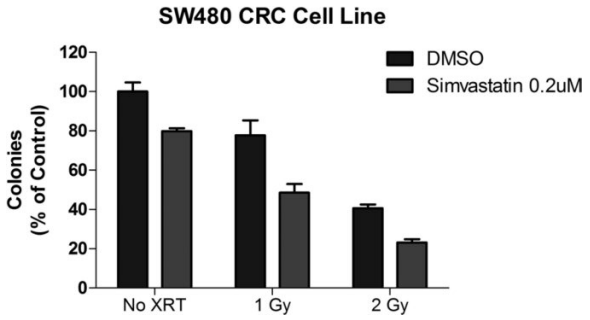
Purpose: The natural polyphenol curcumin has long been identified as a potent antitumor agent in the colorectum in various preclinical models. Curcumin and structurally similar compounds have been identified as ligands of the aryl hydrocarbon receptor (AHR), which we have previously shown to negatively contribute to tumorigenesis in a mouse model of inflammatory colon cancer. Even more, we have established that other natural dietary chemicals exert their *in vitro* antitumor effects via activation of the AHR. Here we hypothesize that synthetic derivatives of natural curcumin will induce colorectal cancer cell death in an AHR dependent fashion.

Methods: HCT116 and DLD1 colon cancer cells were propagated *in vitro*. Small interfering RNA (siRNA) transfection was used to create a stable "knock down" AHR expression cell line with a HCT116 colon carcinoma background as well as a RNA scramble control. AHR -luciferase reporter construct transfection was conducted in DLD1 cells according to a lab-established protocol. Cells were treated with natural curcumin, the synthetic curcumin derivatives RL 66 and RL 118, or vehicle (DMSO). The cell viability, cytotoxic lysis, and apoptosis assays were conducted with CellTiter-Fluor, MultiTox-Fluor, and Caspase-Glo 3/7, respectively (Promega, Madison, WI). Statistical significance was set at $p<0.05$ and was detected using the Wilcoxon rank sum test for continuous variables.

Results: Following AHR-LUC transfection in DLD1 cells, both RL66 (1.9-fold) and RL118 (5.8-fold) were found to activate the AHR, though only RL66 was significant ($p<0.05$). Interestingly, natural curcumin was not found to activate the AHR any more so than the vehicle (DMSO). All three compounds exhibited a dose and time-dependent decrease in cell viability in both cell lines (2.5-20μM, 6-48 hours), though both RL66 and RL118 proved more potent than curcumin in all assays ($p<0.05$). The si-AHR cell lines showed a significant resistance to both the decrease in cell viability (10μM RL66: si-AHR 53% vs. si-Scramble 37%, 10 μM RL118: si-AHR 67% vs. si-Scramble 51%) and induction of apoptotic activity (5μM RL66: si-AHR 2.3-fold increase vs. si-Scramble 3.9-fold, 5 μM RL118 si-AHR 3.3 fold vs. si-Scramble 4.6 fold) caused by treatment with RL66 and RL118 ($p<0.05$). These features were not observed following treatment with natural curcumin.

Conclusions: We have established that synthetic derivatives of curcumin exert a portion of their antitumor effects via the AHR. We have further found that cell death mediated by RL66 and RL118 activation of AHR is mediated via an apoptotic pathway. However, the mechanism by which AHR contributes to apoptosis and cell death remains unknown. Our current work is focused on trying to better understand how AHR regulates these death pathways. This knowledge may allow us to develop newer derivatives that have improved toxic profiles while increasing efficiency of colon cancer cell death.





S25

SIMVASTATIN ENHANCES RADIATION SENSITIVITY OF COLORECTAL CANCER CELLS BY TARGETING THE EGFR-RAS-ERK AXIS.

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Purpose: Preoperative chemoradiation is recommended for locally advanced rectal cancer. However, response is variable among patients, and greater response is associated with improved survival and reduced local recurrence rates. We have shown that taking HMG-CoA reductase inhibitors, commonly known as statins, during chemoradiation is associated with improved response, suggesting a potential radiation-sensitizing role for these drugs. The purpose of this study was to investigate the effects of simvastatin on colorectal (CRC) cancer cells *in vitro* and explore the underlying mechanisms.

Methods: The sensitivity of CRC cell lines HRT18 and SW480 to simvastatin, radiation or combination therapy was assessed using colony formation and ATP-based cell viability assays. To test the dependence of any effects on isoprenylation pathways downstream of HMG-CoA, a rescue arm was added wherein the isoprenoid geranylgeranyl diphospate (GGPP) was included in the media. Protein lysates were obtained and tested for expression and phosphorylation status of proteins downstream of Epidermal Growth Factor Receptor (AKT, RAS, MEK, ERK1/2), since these have been reported as a potential target of statins. The effects of simvastatin were also tested on patient-derived CRC stem cells established from surgical specimens, a subpopulation of tumor cells characterized by radiation resistance.

Results: CRC cells lines (HRT18 and SW480) were sensitive to clinically relevant doses of simvastatin (Inhibitory Concentration [IC] 50: 1.8 μM and 2 μM, respectively). The combination of radiation and simvastatin yielded decreased cell growth and viability compared to either treatment alone in both lines, in effect halving the radiation dose necessary to achieve comparable inhibition (Figure). These effects of simvastatin on cell growth were rescued by the addition of GGPP to the media, suggesting its depletion drives these effects. Protein analysis of cells treated with simvastatin compared to control cells demonstrated a significant decrease in ERK1/2 phosphorylation, while AKT phosphorylation levels remained constant. Two different patient-derived CRC stem cell lines were radiation-resistant at baseline, but resistance was overcome by simvastatin treatment (IC50: 0.06-0.2uM), and by combination treatment of simvastatin and radiation.

Conclusions: In accordance with our prior clinical observations, treatment with simvastatin enhanced the sensitivity of CRC cells to radiation *in vitro*. The dependence of these effects on GGPP depletion and the associated decrease in ERK1/2 phosphorylation suggest a prominent role for the EGFR-RAS-ERK1/2 axis. In addition, simvastatin effectively targets and kills the radioresistant subpopulation of CRC stem cells which are known to contribute to tumor resistance and recurrence. Mechanistic and *in vivo* studies are under development, laying the foundation for the ultimate goal of a clinical trial.

S26

REGENERATING THE ANAL SPHINCTER: CYTOKINES, STEM CELLS OR BOTH?

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Purpose: Healing of an anal sphincter defect at a time **remote** from injury is a challenge. In order to initiate a repair at the site of a previous injury, cytokines need to be expressed to allow **innate or exogenous** mesenchymal stem cells (MSC) to be directed to the target site. We have reported that Stromal cell-derived factor 1 SDF-1) improves the homing and/or retention of MSC after an acute anal sphincter injury. We aimed to investigate if **reestablishing stem cell homing** at the site of an anal sphincter defect using a non-viral plasmid engineered to express SDF-1 (pSDF-1) with/without MSC can affect anatomical and functional outcome at a time **remote from anal sphincter injury**.

Methods: 32 female age/weight-matched Sprague Dawley rats underwent an excision of 50% of the circumference anal sphincter complex ventrally. **3 weeks after injury**, animals were randomly allocated to four groups(n=8) based on different treatment methods: injury without any intervention(IA); 100μg pSDF-1 injected at the site of the defect(pSDF-1); both pSDF-1 and 800,000 MSC injected at the site of the defect (pSDF-1 +MSC); pSDF-1 injected at the site of the defect with injection of a gelatin scaffold mixed with MSC(pSDF-1 +S&MSC). **Difference in resting pressure before and 4 weeks after intervention** was used for functional analysis, when the anal tissue was harvested for histology/morphometry by Image Pro7. One-way ANOVA followed by Tukey post-hoc test were used for analysis of pressure and histology (mean±SEM), respectively. $p<0.05$ was regarded as significant.

Results: Compared to the IA group (-2.6±1.47cmH_2O), a **significantly higher change in resting pressure** was found in **all three intervention groups** (pSDF-1:5.3±1.8 cmH_2O, p=0.009; pSDF-1 +MSC:3.7±1.65 cmH_2O, p=0.047; pSDF-1+S&MSC:5.3±1.50cmH_2O, p=0.009). On histology the pSDF-1+MSC group showed **more organization** of the architecture which was similar to normal muscle than both pSDF-1 and pSDF-1+S&MSC groups, while the IA group had the least muscle ratio with a disorganized architecture at the site of the defect (Figure). Histological quantification revealed significantly more muscle at the site of injury in all three treatment groups compared to the IA group (IA: 66.1%±3.39%; pSDF-1:105.9% ± 3.80%, p<0.0001; pSDF-1+MSC:105.0% ±2.55%, p<0.0001; pSDF-1+S&MSC:91.1%±5.05%, p=0.002). No significant differences were noted in the quantification of connective tissue. There was no significant difference in either the manometry or histological quantification among the groups which received pSDF-1 with or without local delivery of MSC (with or without scaffold).

Conclusions: At a midterm follow up, **local delivery of a cytokine (SDF-1 plasmid) with or without local MSC** enhances anal sphincter muscle regeneration following a chronic injury thereby improving functional outcome. This indicates that **innate stem cells** can be chemoattracted

using a cytokine to effectively mediate repair of a chronic anal sphincter injury.

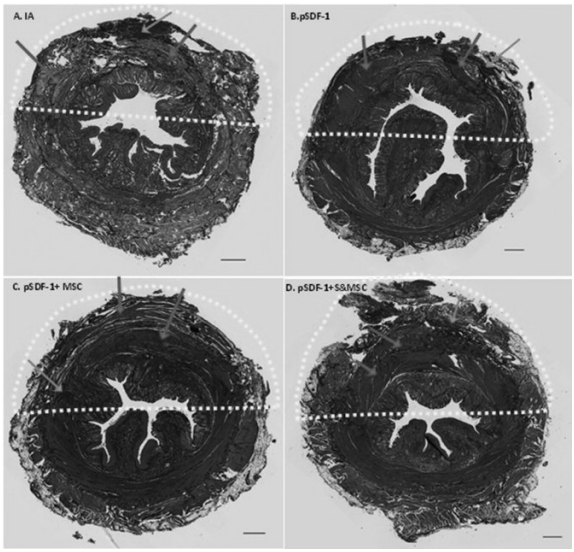

Figure. Transverse sections of rat anal canal stained by Masson's Trichrome 4 weeks after 50% anal sphincter excision following different interventions. A: injury without treatment (IA). B: pSDF-1 local injection at the site of the defect (pSDF-1). C: pSDF-1 and MSC injected at the site of the defect (pSDF-1 +MSC). D. pSDF-1 injected at the site of the defect with insertion of a gelatin scaffold mixed with MSC (pSDF-1+S&MSC). In the area of the defect (circled by yellow oval), muscle is indicated by red arrow, connective tissue is indicated by blue arrow. Scale bar= 500μm.

S27

LONG-TERM RESTORATION OF FECAL CONTINENCE AFTER AUTOLOGOUS BIOSPHINCTER IMPLANTATION IN A LARGE ANIMAL MODEL OF PASSIVE FECAL INCONTINENCE.

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Purpose: The Internal Anal Sphincter (IAS) is primarily responsible for maintaining anorectal resting tone. IAS dysfunction can lead to fecal incontinence (FI). In the present study, we bioengineered **autologous,** innervated IAS BioSphincters. The objective of this study was to demonstrate sustained restoration of fecal continence using manometric recordings in a rabbit model of passive fecal incontinence after implantation of the BioSphincter.

Methods: (1) New Zealand female white rabbits underwent IAS injury with hemi-circumferential IAS sphincterectomy. During the same surgery, jejunal biopsies were obtained as a source of enteric neural progenitor cells. (2) BioSphincters were engineered using autologous IAS smooth muscle and enteric neural progenitor cells. Rabbits were randomized to 2 groups: Control untreated group and BioSphincter treated group. In the control group, the rabbits were left untreated following sphincterectomy for the entire duration of the study. In the treated group, 4 autologous engineered BioSphincters were implanted 6-8 weeks following the sphincterectomy surgery. (3) Anorectal manometry was used to measure resting anal pressure and recto-anal inhibitory reflex (RAIR) at baseline, 6 weeks post-sphincterectomy, and at 3 months and 6 months after BioSphincter implantation.

Results: (1) Anorectal manometry was obtained at baseline on all 14 rabbits prior to and 6 weeks after sphincterectomy. In the control untreated group, a deterioration in fecal hygiene, decreased resting tone (from 38 ± 3 mmHg to 23 ± 1 mmHg, $p<0.05$) and loss of RAIR (from 53.1 ± 4.2% to 28.2 ± 3.3%, $p<0.05$) were observed post sphincterectomy in all rabbits. (2) Quality control testing of the engineered BioSphincters prior to implantation demonstrated presence of contractile smooth muscle, mature neuronal populations and intrinsic myogenic tone. (3) Autologous BioSphincters were successfully implanted into the donor rabbits without complications. Survival rate was 100%. In the BioSphincter treated group (n = 8), there was restoration of basal tone (37 ± 3 mmHg, $p>0.05$) and RAIR (60 ± 4%, $p>0.05$) at 3 months following BioSphincter implantation compared to baseline. This effect was sustained in 5 rabbits for 6 months after BioSphincter implantation (Basal tone, 34.3 ± 3.7 mmHg, $p>0.05$) (RAIR, 56.4 ± 5.1%, $p>0.05$) compared to baseline.

Conclusions: This study provides proof of concept of safety and efficacy of BioSphincters and restoration of IAS integrity and function and fecal continence in a large animal model. A regenerative medicine approach to restore impaired IAS function offers a safe and long-term treatment for passive fecal incontinence.

S28

5-HT4 RECEPTORS AS A TARGET FOR TREATING COLITIS.

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Purpose: 5-HT4 receptor (5-HT4R) agonists are an effective prokinetic treatment for constipation, and they were thought to act on enteric nerve terminals to increase transmitter release. We recently demonstrated that colonic epithelial cells express 5-HT4Rs, and that stimulation of these receptors elicits serotonin (5-HT) release from enterochromaffin cells, degranulation of mucus from goblet cells, and Cl^- secretion from enterocytes, as well as an increase in the rate of propulsive motility. The purpose of this study is to test whether 5-HT4R stimulation has a protective effect in colitis, and if so, to determine the mechanisms responsible.

Methods: Colitis was induced in CD1 male mice with either dextran sodium sulfate (DSS; 4% in drinking water) or trinitrobenzene sulfonic acid (TNBS; 7.5 mg/ml in a 100 μl 50% ETOH solution). Tegaserod, a 5-HT4R agonist (1 mg/Kg), GR-11038 (1 mg/Kg), a 5-HT4R antagonist or both were administered by enema. Disease activity index (DAI) and histological damage scores (HDS) were assessed, and Ki-67 immunoreactivity was assessed to evaluate epithelial proliferation. Caco-2 cells were grown to confluence and treated for 48 hours. Scratch assay tests were conducted to evaluate wound healing. Additionally, Caco-2 cell culture treated with 5-HT4R agonist and/or antagonist underwent RT-PCR testing to evaluate tight junction protein expression.

Results: DSS colitis in mice treated with Tegaserod at the onset of the study was significantly attenuated compared to control (DAI, $p<0.05$; HDS, $p<0.001$) and this effect was blocked by the 5-HT4 antagonist. DAI was improved in the TNBS model ($p<0.05$). Colitis already established in both the DSS and TNBS models healed more extensively in mice treated with Tegaserod beginning on day 6 (DSS: DAI, $p<0.0001$; HDS, $p<0.0001$; TNBS: DAI, $p<0.0001$; HDS, $p<0.01$), and this effect was blocked by the 5-HT4 antagonist. Mice with DSS colitis that were treated with Tegaserod exhibited significantly more Ki-67 positive epithelial cells ($p<0.05$), and this effect was blocked by the 5-HT4 antagonist. Scratches in Caco-2 cell monolayers healed significantly faster in cultures treated with Tegaserod ($p<0.001$), and this effect was blocked by the antagonist. mRNA levels for the tight junction proteins Zonulin, Occludin and Claudin 1-4 were not altered by Tegaserod treatment.

Conclusions: In summary, these findings demonstrate that 5-HT4R stimulation has a protective effect in mouse models of colitis and that activation of these receptors accelerates healing from colitis. Furthermore, our data suggest that increases in epithelial cell proliferation and migration contribute to the protective actions that were observed. In conclusion, 5-HT4Rs could provide a novel therapeutic target for the treatment of inflammatory bowel disease.

S29

SHOULD ELECTIVE COLECTOMY BE PERFORMED FOLLOWING AN ACUTE DIVERTICULAR ABSCESS?

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Purpose: Studies examining long-term outcomes following resolution of an acute diverticular abscess have been limited to small, single-institution chart reviews. This study compares outcomes between elective colectomy and non-operative management following initial admission for an acute diverticular abscess using a large, population-based dataset.

Methods: The Statewide Planning & Research Cooperative System (SPARCS) was queried for patients admitted non-electively with an initial acute diverticular abscess from 2003-2010 in NY State. Patients who underwent colectomy or stoma creation within the first 2 days of admission were excluded, and those who died during the index admission or underwent surgical intervention during the index admission or within 30 days of discharge were characterized as failing initial non-operative management. Each patient was then followed longitudinally in the database up to 3 years from the index diverticular abscess admission, and patients were characterized as undergoing elective colectomy if they had a scheduled colon resection within 6 months of the original admission. Stoma rates and healthcare utilization were compared between those who underwent elective resection and those observed non-operatively. Cox proportional hazards analysis was also performed assessing factors associated with time to admission with diverticulitis recurrence within 3 years of the index admission for the observation group.

Results: Among 9,375 patients who met inclusion criteria, 2,931 (31%) failed initial non-operative management. Of the remaining 6,444 patients, 1,462 (23%) had percutaneous drainage of the abscess during the index admission, 1,462 (23%) underwent elective colectomy within 6 months, and 4,982 (77%) were managed non-operatively without initial elective resection. Of those managed conservatively, 1,066 (21%) were admitted with a diverticulitis recurrence within 3 years (median time=203 days, IQR=82-486 days). Overall, elective colectomy following an admission for a diverticular abscess was associated with higher stoma rates (9.2% vs. 4.2%, p<0.001), mean number of inpatient hospital days for diverticulitis-related admissions (7.9 vs. 3.5 days, p<0.001), and downstream diverticulitis-related cost ($19,020 vs. $7,839, p<0.001) compared to non-operative observation. Furthermore, the overall risk of diverticulitis recurrence fell from 21% to 7% for those without a diverticulitis-related admission within 1 year of the original attack. Factors independently associated with diverticulitis recurrence are presented in the table.

Conclusions: A large proportion of patients fail initial non-operative management of an acute diverticular abscess within 30 days. However, close observation without elective colectomy appears to be a reasonable choice for those who do not have a recurrence within 1 year given the higher overall stoma rates and healthcare utilization associated with elective resection.

Table: Cox Proportional-Hazards Analysis of Factors Associated with Diverticulitis Recurrence within 3 Years Following Non-Operative Management of an Acute Diverticular Abscess

	Hazard Ratio (95% CI)	P-Value
Age		
51-65	Reference	
≤ 50	1.25 (1.07, 1.47)	0.006
> 65	1.24 (1.06, 1.46)	0.008
Sex		
Male	Reference	
Female	1.18 (1.03, 1.34)	0.02
Race		
White	Reference	
Black	1.23 (1.03, 1.47)	0.02
Other	1.13 (0.93, 1.36)	0.22
Unknown	1.14 (0.77, 1.62)	0.49
Medicaid Insurance	1.22 (1.05, 1.43)	0.01
Comorbidities		
HTN	1.15 (1.00, 1.32)	0.05
CHF	1.13 (0.88, 1.43)	0.32
DM	0.98 (0.82, 1.17)	0.85
COPD	1.25 (1.06, 1.46)	0.007
Renal Failure	1.44 (1.10, 1.86)	0.006
Obesity	1.20 (0.97, 1.48)	0.08
Previous Admission for Diverticulitis	2.02 (1.73, 2.35)	<0.001
Percutaneous Drainage	1.25 (1.08, 1.44)	0.002

S31

TARGETING LATE, RATHER THAN EARLY, READMISSION AFTER COLORECTAL RESECTION IS THE MORE EFFECTIVE STRATEGY.

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Purpose: Hospital readmission is considered a quality indicator in evaluating health care services. Current focus has centered around identifying readmissions that occur early, and may have been inevitable and hence potentially preventable, from those that occur remotely and may not be controllable. The aim of this study is to identify the most effective strategy to reduce readmission after colorectal resection by identifying specific factors associated with this complication.

Methods: Patients who were readmitted following elective colorectal resection were identified from the American College of Surgeon (ACS) National Surgical Quality Improvement Program (NSQIP) Participant User File (PUF) and Colectomy-targeted datasets (2012–2013). The included cases were classified according to hospital readmission timing into early (day 0–5 post-discharge) and late (≥ day 6 post-discharge). The two groups were compared for patient demographics, co-morbidity, diagnosis, type of surgical resection and postoperative complications.

Results: Of 69,222 elective colorectal procedures, 7476 patients were readmitted to hospital within 30 days (10.8%). Patients were assigned to early (median 3 days) vs late readmission (median 11 days) groups respectively 3278 (43.8%) and 4198 (56.2%). Except for gender, patient demographics were similar between groups. Neurological comorbidity, wound disruption, postoperative anastomotic leak and ileus, and neurological, cardiovascular and pulmonary complications were significantly higher in the early readmission group while stoma creation, proctectomy rather than colectomy, sepsis and renal complications were significantly higher in the late readmission group. Total length of stay was comparable between groups. On multivariable analysis, early readmission was significantly associated with male gender [OR=1.105,CI=(1.005–1.215), p=0.0382], wound disruption [OR=1.383,CI=(1.074–1.779),p=0.0118], postoperative sepsis or septic shock[OR=1.205,CI=(1.057–1.374),p= 0.0052), reoperation [OR=1.204,CI=(1.061–1.367),p=0.0041],reintubation [OR=1.800,CI=(1.325-2.445),p= 0.0002] and postoperative neurological adverse events [OR= 2.035,CI=(1.174-3.527), p= 0.0114]. Patients with disseminated malignancy, ostomy creation and postoperative renal dysfunction or infection were at significant risk for delayed readmission.

Conclusions: Differing factors are associated with early versus late readmission after colorectal resection. Contrary to current practice that

attempts to minimize early readmission, these data suggest that early readmission is intricately related to patient and operative complexity and intrahospital outcomes and may be inevitable. Rerouting currently deployed resources for process measures aimed at minimizing all readmission so as to instead primarily target patients at risk for delayed readmission is likely the most cost-effective and maximally efficient initial strategy.

Multivariable analysis of factors associated with early rather than late readmission after colorectal resection

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Male gender	1.105	1.005 - 1.215	0.0382
Wound disruption	1.383	1.074 - 1.779	0.0118
Sepsis or septic shock	1.205	1.057 - 1.374	0.0052
Reoperation	1.204	1.061 - 1.367	0.0041
Reintubation	1.800	1.325 - 2.445	0.0002
Neurological complication	2.035	1.174 - 3.527	0.0114
Disseminated cancer	0.754	0.632 - 0.900	0.0018
Stoma construction	0.815	0.730 - 0.910	0.0003
Renal or urological complication	0.825	0.692 - 0.983	0.0317

S32

COMBINED ENDOLAPAROSCOPIC SURGERY IS LESS COSTLY THAN TRADITIONAL SURGERY FOR LARGE BENIGN POLYPS.

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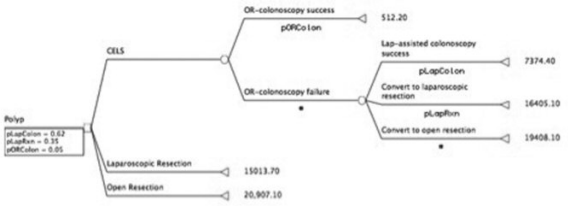
Purpose: Despite the asserted patient benefits of Combined Endo-Laparoscopic Surgery (CELS) – also known as 'rendezvous' procedures - for the treatment of large colorectal polyps, its economic impact remains ambiguous. CELS procedures utilise colonoscopic lesion removal (with laparoscopic extramural assistance) that avoids intestinal resection thus decreasing hospital stay. Published cost estimates for individual procedures vary widely and typically report institutional costs derived from gross-costing methods e.g. coding.

Methods: We undertook a cost analysis of CELS compared to laparoscopic assisted and open segmental resection. A prospective database of 102 patients with large or endoscopically unremovable colon polyps that underwent CELS at a major urban academic medical center between 2003-2014 was used. Using institutional and micro-costing data from the literature a non-recursive decision tree was designed and interrogated to determine intention to treat (ITT) costing estimates for CELS versus laparoscopic/open resection approaches. Costs were adjusted using medical consumer price index to 2014 USD.

Results: The estimated cost for CELS was $10,377 compared to segmental resection at $15031 (laparoscopic assisted) and $20907 (open). LOS was the largest factor contributing to the decreased hospital costs seen with CELS (2 days versus 5 laparoscopic and 6 open). Cost equivalence was only achieved when the probability of laparoscopic conversion reached 81%. 62% of cases were successfully completed as CELS. Risk of complications was significantly higher in the converted to resection group (28%) versus the CELS group (2%) (p<0.0005). The post-operative colonoscopic surveillance requirement was not different between the open/laparoscopic groups versus the CELS group. Paris classification was the single significant predictor of laparoscopic conversion (OR 1.51, 95%CI 1.06,2.15, p=0.023). CELS patients did not require significantly more follow-up appointments or colonoscopies within the 3-year follow-up period.

Conclusions: CELS is less costly – providing up to an estimated 50% cost-saving compared to laparoscopic and open surgery. Given this analysis showed favourable 3-year outcomes compared to current "gold-standard" methods, these data should inform relevant policy makers to consider novel minimally invasive surgical procedures such as CELS, as a cost savings benchmark.



S33

ROBOTIC PARASTOMAL HERNIA REPAIR WITH OVERLAY BIOLOGIC MESH.

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Purpose: To repair the parastomal hernia in a 77 year old male who previously underwent a proctocolectomy with end ileostomy. Biologic mesh was chosen to prevent erosion into the terminal ileum.

Methods: DaVinci Si robot was used to repair the parastomal hernia with a Cook Biodesign absorbable mesh.

Results: Patient developed a postoperative ileum, but was able to tolerate a diet and have good stoma output by post-operative day seven. He was subsequently discharged. Follow up at one year shows no recurrence of the hernia and he is pleased with the results.

Conclusions: DaVinci robot repair of parastomal hernia with biologic mesh overlay is a safe and effective management for parastomal hernias.

S34

C. DIFFICILE INFECTION IS ASSOCIATED WITH LOWER INPATIENT MORTALITY WHEN MANAGED BY GASTROINTESTINAL SURGEONS.

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Purpose: Patients admitted to the hospital with *C. difficile* infection (CDI) are frequently managed by non-surgical services, with surgical consultation occurring for select patients. Patients with CDI can rapidly deteriorate, thus mandating vigilant care. The present study sought to evaluate whether outcomes for patients admitted with CDI differed between medical and surgical services.

Methods: After IRB approval, patients with a positive *Clostridium difficile* nucleic acid amplification test within 24 hours of a hospital admission were identified (2005-2015) using an institutional database. Data collected included chronic co-morbidities, time to administration of *difficile*-directed antibiotics, and length of stay (LOS). Severity of CDI was evaluated by the highest white blood cell (WBC) count and serum creatinine during hospitalization, and by the need for vasopressors. Patients were stratified by admission to either a medical (MS) or a general/colorectal surgical service (GSS). The primary study outcome was inpatient mortality. Propensity score matching was used to validate the effect of admitting service on mortality between comparable patients.

Results: Of the 1175 CDI patients identified, 985 (83%) were admitted to MS while 190 (17%) were admitted to GSS. MS patients were slightly older (63.9 vs. 58.9 years, p=0.001), but did not differ in gender or race. On average, MS patients had 2.6 comorbidities per patient, while GSS patients had 1.9 (p<0.001). The cohorts did not differ in need for vasopressors or peak WBC counts, nor in terms of ICU admissions; peak creatinine levels were slightly higher in the MS group (1.9 vs. 1.6 mg/dL; p=0.01). Incidence of inpatient mortality was lower in the GSS group (6.8% vs. 2.6%; p=0.028), with logistic regression demonstrating lower odds of mortality (OR 0.19; p=0.006). After propensity score matching based on age, comorbidities and severity of CDI, higher mortality with MS persisted (2.6% vs 8.0%; p=0.01). Colectomy rates were higher in the GSS group (14.1% vs. 0.4%, p<0.001),

and time between admission and surgery was significantly shorter (median 0.3 vs. 2.8 days, p=0.04). The time between CDI test order and first dose of metronidazole was also shorter for GSS patients (20.1 hours vs. 28.9 hours, p=0.002).

Conclusions: Mortality rates for CDI patients were consistently higher for patients admitted to medical services compared to surgical services, even when matched for comorbidities and severity. Earlier administration of *difficile*-directed antibiotics and earlier surgical intervention when appropriate may account for this difference. These findings may suggest that similar to other "surgical" infections, such as diverticulitis, CDI may be a disease best managed by surgeons.

S35

ESTIMATING THE SIZE OF COLORECTAL POLYPS ENDOSCOPICALLY. ACCURACY AND IMPORTANCE.

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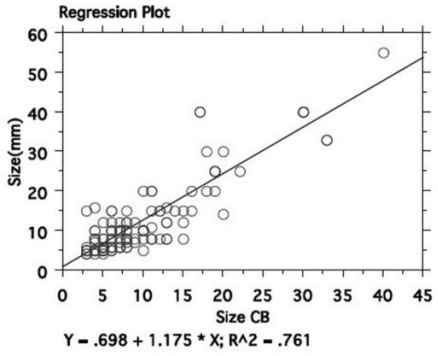
Purpose: The size of colorectal polyps is important as it reflects the potential for malignant change. It is written into the criteria for defining advanced lesions both adenomatous and serrated, and therefore helps determine subsequent endoscopic surveillance. There have been many studies measuring the ability of endoscopists to estimate polyp size accurately and all show significant variation in this ability. Because it makes a difference in the interpretation of polyp studies we have measured the relationship between the endoscopic estimate of polyp size and the size measured in the pathology laboratory.

Methods: Polyp data were retrieved from a single enodscopist database where they had been recorded prospectively since 1995. Eligible polyps were pedunculated adenomas removed completely by snare in one piece, and fixed in formalin immediately. The endoscopic estimate of maximum diameter (mm) was compared to that on the pathology report (mm). Continuous variables were expressed as mean +/- standard deviation and regression analysis was performed to determine the relationship between endoscopic and pathological estimates of polyp size.

Results: There were 126 polyps in 126 patients, 85 men and 41 women. Mean age was 63.2 ± 12.9 years. The mean endoscopic size was 12.2 ± 9.3mm and mean pathology size was 9.3 ±6.9 mm. Endoscopically, 21 polyps were ≤5mm, 62 were from 6 to 10mm, 21 were from 11 to 15 mm, and 27 were from 16 to 55 mm. 29 polyps were right sided, 86 were left and 11 were rectal. Figure one shows regression of endoscopic size against pathology size. Using the regression formula of endoscopic size = 0.7 + 1.175 x pathology size an endoscopic estimate of 10mm (=advanced adenoma) means a pathologic size of 8mm. For a pathologic size of 10 mm, an endoscopic estimate of 12mm is needed. This means that15 tubular adenomas measuring 10 or 11 mm endoscopically and classified as "advanced" because of their size should be reclassified as "not advanced". A large polyp is defined as one ≥ 20mm; for this endoscopist a 20mm polyp is really 16.4mm.

Conclusions: This endoscopist predictably overestimates polyp size although some of the difference may be due to shrinkage of the specimen after removal. Incidence of advanced adenomas and large polyps defined by endoscopic size need to be viewed in this light.



Graph 1. regression of endoscopic size (mm) against pathology size (mm)

S37

PREOPERATIVE CHEMOTHERAPY IS ASSOCIATED WITH IMPROVED SURVIVAL FOR LARGE ANORECTAL GIST: A NATIONAL ASSESSMENT OF 333 CASES.

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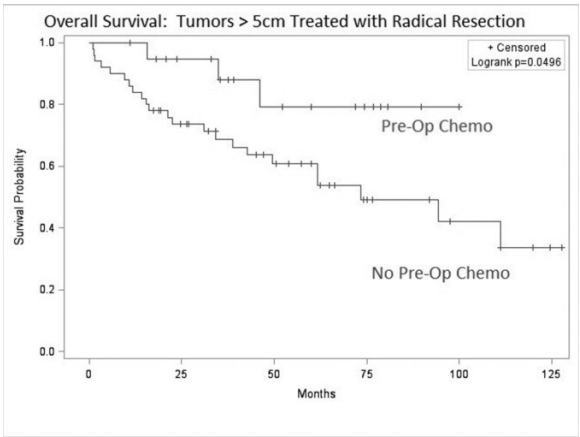
Purpose: Anorectal gastrointestinal stroma tumors (GIST) are exceedingly rare. Appropriate management remains controversial, and treatment options include transanal resection, radical resection, and the use of chemotherapeutic agents such as imatinib. The National Cancer Database (NCDB) was analyzed for impact of size, benefits of the neoadjuvant use of imatinib, and surgical approach.

Methods: The NCDB was queried from 1998 to 2012 for all cases of GIST resection in the rectum or anus. Patient demographics, type of surgery (local resection (LR) vs radical excision (RE)), short-term outcomes and survival were analyzed. Preoperative chemotherapy was recorded following the FDA approval of imatinib in 2002. Overall survival was compared using a multivariable Cox proportional hazard model.

Results: 333 patients with resection of anorectal GIST were included. The mean age at presentation was 62.3 (range 22-90). Median size was 4.0 cm (IQR 2.2-7.0), 46.9% of patients had a high-grade tumor and six (1.9%) presented with metastatic disease. 5 year overall survival for all patients was 77.6%. In a multivariable survival analysis, only age (HR 2.41; 95% CI 1.78-3.25; P< 0.001) and tumor size greater than 5cm (HR 2.48; 95% CI 1.50-4.01; P= 0.004) were associated with increased mortality. In examining the role of imatinib, 59 patients (17.7%) received preoperative chemotherapy. For patients undergoing radical resection with tumors greater than 5cm, there was decreased mortality in a group who received preoperative chemotherapy (5 year survival- preop chemo: 76.7% vs non preop chemo: 50.4%; P=0.04; Figure). However, in this same group, chemotherapy did not improve the rate of margin negative resection (preop chemo: 80.0% vs non preop chemo: 78.6%; P=0.88). Examining surgical approach, 163 (49.0%) patients underwent local resection compared to 158 (47.4%) who underwent radical excision. Local resection was associated with lower rates of pre-operative chemotherapy (LR: 9.2% vs RE: 25.3%; P=.0001), smaller median tumor size (LR: 2.5cm vs RE: 6.2 cm; P<.0001) and shorter length of stay (LR:0 vs RE: 7 days; P=<.001). For tumors smaller than 5cm, there was no difference in 5-year survival by surgical approach (LR: 82.3% vs RE: 82.6%; P=0.71).

Conclusions: This series represents the largest description of anorectal GISTs and their treatment. Size is the most important determinant in survival following resection. Preoperative chemotherapy appears to result in improved survival for large tumors treated with radical resection. Surgeons should consider preoperative imatinib prior to resection of large anorectal GIST. Local excision is common with resection evenly split between local

excision and radical resection. For smaller tumors, local resection appears to be adequate therapy.



S38

BENEFIT OF POST-RESECTION ADJUVANT CHEMOTHERAPY FOR STAGE III COLON CANCER IN OCTOGENARIANS: ANALYSIS OF THE NATIONAL CANCER DATABASE.

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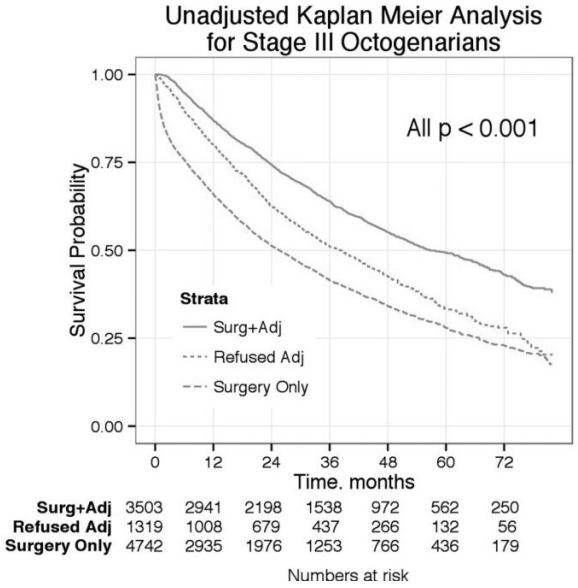
Purpose: Post-resection chemotherapy has been shown to convey survival benefit to patients with stage III colon cancer. It is unclear whether this benefit can be extrapolated to the elderly, who are typically under-enrolled in clinical trials. Our aim was to determine whether post-resection chemotherapy benefits octogenarians with stage III colon cancer.

Methods: The National Cancer Database (NCDB) was queried for patients 80-89 years old undergoing curative intent surgery for Stage III colon cancer from 2006-2011. In an effort to reduce selection bias on the basis of comorbidity and/or age, patients with Charlson-Deyo comorbidity score of 2 or greater and those 90 and older were excluded. Patients who received neoadjuvant chemotherapy or had missing data on adjuvant therapy administration were excluded. The primary outcome was overall survival. Univariate group comparisons, unadjusted Kaplan-Meier and multivariable Cox proportional hazards modeling survival analyses were performed. To further understand the impact of provider selection bias, subgroup analysis of those who refused post-resection adjuvant therapy was conducted.

Results: We identified 9565 octogenarians with stage III colon cancer. 3504 (37%) received post-resection chemotherapy and 6061 (63%) underwent surgery alone. Patients receiving chemotherapy were younger (82.9 vs. 84.1 years, p<0.001), healthier (73.1% vs. 69.9% with no comorbidities, p=0.001), and were more likely to have N2 vs. N1 status (40% vs. 33%, p<0.001). Other demographic and pathologic characteristics were similar between groups. Overall survival was improved in patients receiving adjuvant chemotherapy (median 56.7 vs. 28.3 months, p<0.001, Figure). Subgroup analysis of patients who were offered chemotherapy but refused (N=1319 or 22% of those receiving surgery alone) showed that their overall survival remained worse than those receiving adjuvant chemotherapy (median 38.2 vs. 56.7 months, p<0.001, Figure). Multivariable analysis controlling for tumor- and patient-specific confounders showed that therapy with surgery alone independently predicted increased mortality hazard (HR 1.96, 95% CI 1.84-2.09 p<0.001). Subgroup analysis of only those patients who voluntarily refused post-resection adjuvant chemotherapy showed that the negative survival effect of non-receipt of chemotherapy persisted in that population (HR 1.49, 95% CI 1.36-1.63, p<0.001).

Conclusions: In octogenarians with Stage III colon cancer, post-resection adjuvant chemotherapy appears to convey superior overall survival. This survival benefit persists after controlling for patient selection due to comorbidity, age, and voluntary refusal of therapy. However, only 37% of patients received this recommended therapy. The survival benefit conferred by post-resection adjuvant chemotherapy should be discussed when counseling octogenarians with Stage III colon cancer.



S39

BIOMARKER-BASED SCORING SYSTEM FOR PREDICTION OF TUMOR RESPONSE AFTER PREOPERATIVE CHEMORADIOTHERAPY IN RECAL CANCER BY REVERSE TRANSCRIPTASE POLYMERASE CHAIN REACTION ANALYSIS.

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Purpose: Numerous molecular markers have been investigated as potential predictors of tumor responses to preoperative chemoradiotherapy (preCRT) for rectal cancer. The aim of this study is to evaluate the predictive value of biomarkers and develop the biomarker-based scoring system for prediction of tumor response after preoperative chemoradioherapy for rectal cancer.

Methods: This is a prospective analysis of tumor specimens collected prior to preCRT from 80 patients who underwent curative resection for primary rectal adenocarcinoma between November 2011 and April 2014. Using reverse transcriptase polymerase chain reaction analysis, mRNA expression levels of seven candidate biomarkers (p53, p21, Ki-67, VEGF, CD133, CD24, CD44) were evaluated from fresh tumor samples collected before preCRT. The correlation between biomarker expression levels and the pathologic tumor response to preCRT was assessed based on histopathological staging (ypTNM) and tumor regression grade (TRG).

Results: The median age of patients was 60 years, consisted of 50 male and 30 female. The mRNA expression levels of four biomarkers (p53, p21, Ki67, CD133) significantly correlated with ypTNM stage, T downstaging, TRG response and pathologic complete response (pCR). Patients showing low expression of p53 and/or high expression of p21, Ki67, CD133 exhibited a significantly greater pCR rate. A scoring system devised so that one point was given for each biomarker whose expression level correlated with pCR (score range: 0-4) showed that 5 of 55 patients with scores of 0-2 achieved

pCR, whereas 19 of 20 patients with scores of 3-4 achieved pCR (8.3% vs. 95.0%, $p < 0.001$). For prediction of pCR, the scoring system showed 79.2% sensitivity, 98.2% specificity, a 95.0% positive predictive value, and a 91.7% negative predictive value.

Conclusions: The pretreatment mRNA expression levels of four biomarkers correlated with pathologic tumor response after preCRT in rectal cancer. Furthermore, the scoring system combining values of biomarker expression might have predictive power with high positive and negative predictive value.

Table 1. Biomarker expression in tumor tissue by RT-PCR for assessment of TRG and pCR

		TRG		p	pCR		p
		TRG1-2(n=40)	TRG3-4(n=40)		Yes(n=24)	No(n=56)	
p53	High(n=52)	18(34.6)	34(65.4)	<0.001	8(15.4)	44(84.6)	<0.001
	Low(n=28)	22(78.6)	6(21.4)		16(57.1)	12(42.9)	
p21	High(n=27)	18(66.7)	9(33.3)	0.033	17(63.0)	10(37.0)	<0.001
	Low(n=53)	22(41.5)	31(58.5)		7(13.2)	46(86.8)	
Ki67	High(n-=27)	24(88.9)	3(11.1)	<0.001	17(63.0)	10(37.0)	<0.001
	Low(n=53)	16(30.2)	37(69.8)		7(13.2)	46(86.8)	
CD133	High(n=30)	23(76.7)	7(23.3)	<0.001	18(60.0)	12(40.0)	<0.001
	Low(n=50)	17(34.0)	33(66.0)		6(12.0)	44(88.0)	

TRG, tumor regression grade; pCR, pathologic complete response. Unless indicated otherwise, numbers in parenthesis are percentages.

S40

DOWNSTAGING EFFECTS OF NEOADJUVANT CHEMOTHERAPY IN LOCALLY ADVANCED COLON CANCER.

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Purpose: Neoadjuvant chemotherapy is already widely established as accurate treatment protocol to achieve downsizing and downstaging of the primary tumor in gastric, oesophageal and rectal cancer. Recent studies demonstrate that there might be a role for this treatment in locally advanced colon tumors as well. This nationwide study aims to review the frequency of neoadjuvant chemotherapy for stage II and III colon cancer in the Netherlands, and to assess its safety and feasibility.

Methods: The Dutch Cancer Registry was used to extract all patients who were diagnosed with stage II or III colon cancer and underwent surgery between 2008 and 2012. Patients who received neoadjuvant chemotherapy were compared to a control group who received adjuvant treatment. Demographic data, complications and surgical as well as oncological outcomes were analyzed. Comparisons were made using the Chi-squared test. To assess downsizing of the tumor, clinical and pathological T-stage in the neoadjuvant group was compared. Overall survival was calculated using Kaplan Meier curves and a comparison was made using the Log-rank test.

Results: 5,972 patients were identified with locally advanced colon cancer. (Defined as clinical T4 and pathological T3 or T4.) Eighty-five patients (0.36%) received neoadjuvant systemic therapy and 2216 patients (37%) were treated with adjuvant chemotherapy. There were no statistical differences in age, gender, location, differentiation grade, morphology, clinical T- and N-stage. Clinical T-stage in the neoadjuvant group was cT4 90% (n=63), cT3 9% (n=6), cT2 1% (n=1), cTx n=15. Thirty-one of the 63 T4 tumors (49.2%) showed downsizing after neoadjuvant therapy: 25 were staged ypT3 after therapy, three regressed into ypT2 and three showed a complete response to ypT0. N-stage also showed downstaging in 50% (34 cN+ regressed in to 17 ypN0). No significant difference in major complications (anastomotic leakage and/or abscess formation) was demonstrated between the two groups; 9% in the neoadjuvant group, versus 8% in the control group, p =0.93. Patients in the neoadjuvant group were less likely to undergo emergency surgery (2.4 vs 12.7%. p<0.001). In 86% of patients (n=75) R0 resection was achieved, five patients had an R1 resection (6.3%) and six patients had R2 resections (7.6%) in the neoadjuvant group. The 30-day mortality was zero in both groups. Two-year survival was 83% in the neoadjuvant group versus 81% in the adjuvant group (p=0.50).

Conclusions: Treatment with neoadjuvant chemotherapy leads to significant downstaging in a selected group of patients. It seems safe and feasible, with no more major complications and similar survival rates compared to adjuvant chemotherapy. Patients with locally advanced colon cancer without evidence of distant metastases may benefit from this treatment and in clearly unresectable tumors, patients should start with this treatment.

S41

ROBOTIC SURGERY FOR RECTAL CANCER AND LATERAL LYMPH NODE DISSECTION.

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Purpose: Advantages of robotic surgery over conventional laparoscopic surgery such as enhanced dexterity, three-dimensional field of vision, and more intuitive instrument manipulation seem to benefit when applied in the surgery for rectal cancers. In rectal cancer surgery, we need to preserve fine network of nervous system to prevent postoperative urinary and/or sexual dysfunction. For anal function, meticulous procedure in dividing between internal and external sphincter muscle is essential when ultra-low anterior resection or intersphicteric resection is performed. Another possible application of robotic surgery may be for lateral lymph node dissection. In Japan, the standard procedure for the treatment of lower rectal cancer is mesorectal excision plus lateral node dissection (LND)(D3 dissection). In LND, increased freedom of instrument movements and enhanced dexterity of robotic surgery may help to complete thorough lymphadenectomy. Therefore, we have introduced robotic surgery in the treatment of rectal cancer. We aimed to clarify the short-term outcome of robotic surgery for rectal cancer with LND.

Methods: We examined a consecutive series of 123 colorectal cancer patients who underwent robotic surgery. We used 6 ports and dual docking method. All pelvic procedures were performed in robotic surgery. After mesorectal excision was done, LND was performed. First, the ureter was mobilized and taped and the hypogastric nerve was also taped to preserve the pelvic plexus. First, the obturator lymph nodes between internal iliac vessels and the pelvic wall were dissected. During the procedure, obturator nerves were preserved, and the obturator artery and vein were dissected. Next the internal iliac lymph nodes between the internal iliac artery and the pelvic plexus were dissected.

Results: All patients underwent anterior resections including seven cases with intersphincteric resection. There were 70 male patients and 53 female patients. The median operative time was 383 min, the median set-up time 11 minutes, the median console time 229 minutes and the median blood loss 36 gram. Lateral lymph node dissection was performed in 38 cases, in which nine cases (24%) showed lateral node metastases. In all cases, robotic procedures were completed without conversion to laparoscopic or open procedure. Morbidity rate was 12% (15/123). Five cases developed dysuria, two cases peripheral neuropathy and three cases bowel obstruction. No case developed anastomotic leak. Margin clearance was obtained in all patients.

Conclusions: The short-term outcome of robotic surgery was acceptable. Robotic approach allowed better ergonomics and lateral lymph node dissection to be performed more easily as compared to laparoscopic approach. The long-term outcomes need to be assessed in further analysis.

S42

OMISSION OF ADJUVANT CHEMOTHERAPY INCREASES MORTALITY IN T3N0 COLON CANCER PATIENTS WITH INADEQUATE LYMPH NODE HARVEST.

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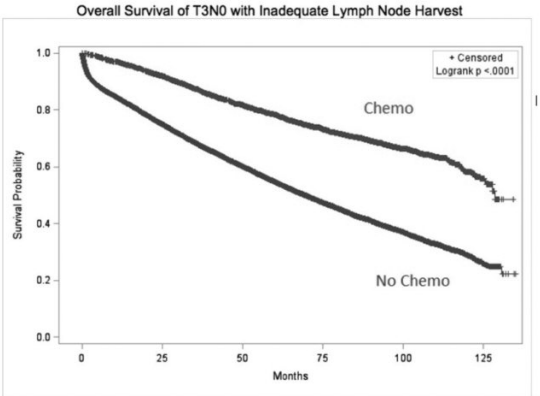
Purpose: Adjuvant chemotherapy for T3N0 colon cancer is controversial. National guidelines support the consideration of its use in high-risk patients, however this recommendation is based on indirect data for a heterogeneous group of stage II patients. Specifically, lymph node harvest (LNH) of <12 is considered a high risk feature. We hypothesize that the use of adjuvant chemotherapy in T3N0 patients with inadequate LNH is beneficial.

Methods: This is a population-based study of patients with resected T3N0 adenocarcinoma of the colon from the NCDB (2003-2012). Patient demographics, number of lymph nodes harvested, use of chemotherapy, short-term outcomes and overall survival were evaluated. A multivariable analysis was performed to evaluate factors associated with omission of chemotherapy. Overall survival was compared using a multivariable Cox proportional hazard model.

Results: 134,567 patients with T3N0 colon cancer were included in this analysis. An inadequate LNH was observed in 23.3% of patients and this rate decreased over the study period from 43.3% in 2003 to 9.5% in 2012 (p< 0.0001). Overall 5 year survival for all T3N0 patients was 66.8%. Inadequate LNH among these patients was associated with lower overall 5 year survival (58.7% vs 69.8%, p<0.001). The use of adjuvant chemotherapy among T3N0 patients following inadequate LNH was only 16.7%. In a multivariable analysis, factors associated with failure to receive chemotherapy included advanced age (OR 0.44; 95% CI 0.43-0.45), increased comorbidities (OR 0.7; 95% CI 0.66-0.76), and postoperative readmission (OR 0.78; 95%CI 0.67-0.91). Patients with inadequate LNH who received adjuvant chemotherapy had improved 5 year survival (chemotherapy 78.4% vs no chemotherapy 54.7%, p<0.001). Even when controlling for age and comorbidities, the administration of chemotherapy remained a predictor of improved survival (HR 0.57; 95% CI 0.54-0.6; p<0.001).

Conclusions: We demonstrate that T3N0 colon cancer patients with inadequate LNH who receive adjuvant chemotherapy have increased overall survival. Despite this survival benefit, only a fraction of these patients receive adjuvant chemotherapy. Barriers to chemotherapy are multifactorial and include advanced age and postoperative complications. These findings emphasize the importance of referral of T3N0 patients with inadequate LNH for consideration of adjuvant therapy.



S43

A PROSPECTIVE STUDY OF CIRCULATING TUMOR CELLS IN PATIENTS WITH LOCALLY ADVANCED RECTAL CANCER.

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Purpose: The identification of circulating tumor cells (CTCs) has been shown to correlate with metastatic disease progression and has implications for treatment response monitoring. This prospective study aimed to define the rates of CTC detection in patients with locally advanced rectal cancer (LARC), and to quantify CTC changes associated with neoadjuvant therapy (NT).

Methods: A prospective longitudinal protocol enrolled 90 evaluable patients with LARC (cT3-4N0 or cTanyN+). Peripheral blood was collected at baseline (treatment-naïve, t0). At the time of surgical resection (t1), blood was collected via peripheral and/or inferior mesenteric venipuncture prior to tumor manipulation. CTCs were enumerated using the CellSearch platform within 72 hours of collection. CTC results are available in 84 (93.3%) patients from t0, and 62 (86%) of the 72 patients from t1 (18 patients have not reached resection). The primary endpoint was the proportion of patients with single detectable CTC at t0 and t1. Paired CTC from t0 and t1 are available in 56 patients. The secondary endpoint was changes in CTC with NT.

Results: The median age at diagnosis was 55.1 years (interquartile range [IQR]: 47.7-62.4). Tumors were at a median of 7.5cm (IQR: 5-10) from the anal verge. Majority (80, 88.9%) were cN+. At least one CTC was detected in 29.8% at baseline (t0), with a median of 1 [IQR: 1-2] CTCs. The CTC positivity rate was 40.3% at resection (t1), with a median of 2 [IQR:1-2] CTCs. In 56 patients with paired CTCs data, 42 (75%) underwent neoadjuvant chemoradiation (NCRT) or chemotherapy (NCT) and 14 (25%) did not (Table). Despite pathologic downstaging and complete response (pCR) to NCRT, CTC persisted in 47.2% at t1, and declined in only 11.1% of the downstaged and none of the pCR patients. Downstaging response to NCT was associated with decreased CTC positivity at t1 vs. t0 in 75% of the patients (Table).

Conclusions: Nearly one in three patients with LARC harbor detectable peripheral CTC at baseline. The rate of detectable CTC was not significantly altered by NCRT, but the response to NCT may differ. Changes in CTC quantitation did not correlate with pathologic response to NCRT, suggesting that monitoring of CTCs may not be informative for identifying patients who achieve pCR after NCRT. However, its clinical significance in assessing the risk for distant relapse and poor survival awaits continued longitudinal follow-up.

Quantitation of Circulating Tumor Cells (CTCs) in 56 Patients With Paired Data At t0 (Baseline) and t1 (Surgical Resection)

	No. of patients (%)	CTC detected at t0 (Treatment-naïve)	CTC detected at t1 (Surgical resection)	Pathologic downstage	Proportion of downstaged patients with decreased CTC t1 vs. t0	Pathologic complete response (pCR)	Proportion of pCR patients with decreased CTC t1 vs. t0
Overall	56	17 (30)	22 (39)				
Neoadjuvant chemoradiation (NCRT)	36 (64)	11 (31)	17 (47)	18 (50)	2 / 18 (11)	6 (17)	0 / 6 (0)
Neoadjuvant chemotherapy (NCT)	6 (11)	4 (67)	2 (33)	4 (67)	3 / 4 (75)	0 (0)	0 / 0 (0)
No neoadjuvant therapy	14 (25)	2 (14)	3 (21)	NA	NA	NA	NA

NCRT = Long-course pelvic XRT with 5-FU based radio-sensitizing agent
NCT = Systemic chemotherapy (FOLFOX: 5-FU, oxaliplatin, leucovorin)

S44

ANASTOMOTIC LEAKS AFTER LEFT HEMI-COLECTOMY: STOMA CREATION OR WASHOUT AND DRAINAGE?

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Purpose: Anastomotic leak is the most dreaded complication following colon resection and management depends on the severity of the leak. Surgeons are often tempted to avoid stoma creation when re-operating on a patient with an anastomotic leak. Our aim was to study the impact of performing fecal diversion in patients who develop anastomotic leaks following left hemi-colectomy.

Methods: The American College of Surgeons National Surgical Quality Improvement Program colectomy targeted database for the years 2012 - 2013 was interrogated. Patients undergoing unplanned reoperation for anastomotic leak after a primary left hemi-colectomy were identified. Patients were stratified into two groups: those who had a stoma creation at re-operation vs. those who underwent washout and drainage procedures without stoma creation. Postoperative outcomes were compared between the two groups using chi-squared test.

Results: 25,638 patients underwent left hemi-colectomies during this time period. Of those, 494 patients were classified as having an anastomotic leak that required surgical intervention. Mean age was 60.2 ± 15.0 years. 305 (61.7%) were male. 255 (51.6%) patients were treated with stoma creation while 239 (48.4%) patients were treated with washout and drainage. There was no difference in the incidence of superficial surgical site infection, deep surgical site infection, organ space infection, wound dehiscence, deep vein thrombosis, pulmonary embolism, sepsis, and septic shock between the two groups (Table 1). However, patients who underwent stoma creation had less incidence of pneumonia (22 (8.6%) vs 36 (15.1%), p<0.026), and were less likely to require prolonged ventilation (49 (19.2%) vs 69 (28.9%), p<0.012). Furthermore, mortality rate was lower among patients who underwent stoma creation when compared to patients who underwent washout and drainage (8 (3.1%) vs 25 (10.5%); p=0.001). Among 140 (28.3%) patients who developed septic shock following anastomotic leak, avoidance of stoma was associated with a nearly five-fold increase in mortality (20/72 (27.8%) vs 4/68 (5.9%); p=0.001).

Conclusions: Stoma creation as a treatment of anastomotic leak after left hemi-colectomy significantly reduced postoperative mortality. Septic shock develops in up to a third of these patients and in this population the impact on survival is even more substantial. Patients who suffer an anastomotic leak following left hemi-colectomy necessitating a take back should have a stoma created irrespective of operative findings.

Table 1: Comparison of Postoperative Outcomes in Patients who Underwent Stoma Creation versus Washout and Drainage

Outcome	Stoma 225 (51.6%)	Washout and drainage 239 (48.4%)	p-value
Superficial surgical site infection	26 (10.2)	22 (9.2)	0.71
Deep surgical site infection	20 (7.8)	16 (6.7)	0.62
Organ space infection	185 (72.5)	160 (66.9)	0.18
Wound dehiscence	20 (7.8)	19 (7.9)	0.97
Deep vein thrombosis	12 (4.7)	12 (5.0)	0.87
Pulmonary embolism	7 (2.7)	10 (4.2)	0.38
Sepsis	98 (38.4)	87 (36.4)	0.64
Septic shock	68 (26.7)	72 (30.1)	0.39

S45

THE VALUE OF MRI IN CLINICAL DECISION MAKING AND DETERMINING R0 IN PATIENTS WITH LOCALLY RECURRENT RECTAL CANCER.

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Purpose: Magnetic resonance imaging (MRI) is the gold standard imaging modality for patients with locally recurrent rectal cancer (LRRC) in determining the extent of local disease and therefore guides surgical decision making about the extent of surgery as well as local resectability. Few studies to date however has validated the accuracy of MRI in determining resectability.

Methods: This is a retrospective validity study at a single quaternary centre. All patients with LRRC referred for consideration of pelvic exenteration between 2009 and 2013, and where the MRI is available for review were included in the study. All MRIs were re-reported by a specialist pelvic MR radiologist using a purpose designed synoptic reporting template which included all pelvic structures. This was correlated with surgical and histology findings which were collected independently using the same reporting template. Pelvic structures were then grouped into clinically meaningful groups using a compartmental approach (anterior, central, lateral and posterior compartments) and anatomical approach (eg high sacrum vs low sacrum, sacral nerve roots, iliac vessels). Positive predictive value, negative predictive value were calculated. Associations between MRI and R0 (clear resection margins) was determined using Fisher exact test. Agreement between MRI findings and surgery as well as histological findings were determined using Kappa.

Results: There were 63 patients with 41 men (65%). The average age at the time of surgery was 60. The median time interval between primary surgery and recurrence surgery, and between recurrence surgery and re-reporting of MRI were 34 (range 19-54) months and 25 (15-40) months respectively. Overall, the specificity of MRI was high for posterior and lateral compartment involvement 0.89-0.98 and 0.83-0.85 respectively. Involvement of upper sacral segments (S1 and S2) (p=0.016), sciatic nerve roots (<0.001), iliac vessels (p=0.007), piriformis muscle (p=0.017) predicted for inability to achieve an R0 resection margin. Conversely, central visceral involvement predicted for an ability to achieve R0 resection (p=0.028).

Conclusions: The findings of this study supports the use of MRI in LRRC. It guides surgical decision making in that a structure not involved on MRI is highly unlikely to be involved clinically. Further, it confirms current practice and recommendations that patients with central recurrence should be considered for pelvic exenteration as R0 is likely and that patients with high sacral, extensive pelvic side wall involvement should be counselled appropriately as R0 resection is less likely.

Podium Presentations

S47

PREDICTIVE FACTORS FOR POSTOPERATIVE MORTALITY IN STAGE IV COLORECTAL CANCER: A MULTICENTER RETROSPECTIVE CASE-CONTROL STUDY.

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Purpose: There is increasing evidence that palliative resection of the primary tumour is associated with improved overall survival in patients with stage IV colorectal cancer (CRC). However, postoperative mortality is significantly higher in stage IV CRC compared to stage I-III CRC. The aim of this case-control study was to identify preoperative predictors of 30-day mortality after resection of the primary tumour.

Methods: Data from all patients with stage IV CRC who underwent resection of the primary tumour in seven Dutch hospitals between 2008 and 2013 were retrospectively reviewed. All patients who died within 30 days after surgery were identified, and randomly matched 1:2 to a control group of patients from the same hospitals who survived beyond 30 days. Differences in preoperative patient characteristics, tumour load and biochemical markers between the two groups were compared using the chi square test. Independent predictors for postoperative mortality were identified with a multivariable logistic regression analysis.

Results: Between 2008 and 2013, 897 stage IV CRC patients who underwent resection of the primary tumour were identified. The 30-day mortality rate was 6% (n=55). Multivariable logistic analysis showed that younger age (age <60 years versus 60-75 years: OR 0.12 [95% Confidence Intervals (CI) 0.02-0.93]) and a primary rectal tumour (OR 0.08 [95%CI 0.01-0.41]) were significantly associated with a higher chance of surviving the first 30 days after surgery. On the other hand, increased BMI (respectively BMI 25-30 kg/m^2 and >30 kg/m^2 versus 20-25 kg/m^2: OR 3.94 [95%CI 1.15-13.54] and OR 12.44 [95%CI 1.68-92.04]), elevated LDH (OR 3.53 [95%CI 1.02-12.24]) and decreased albumin (OR 5.97 [95%CI 1.20-29.63]) were independent predictive factors of postoperative mortality.

Conclusions: This multicentre case-control study showed that increased age, increased BMI, a colonic primary and abnormal LDH and albumin levels were independent predictors of 30-day mortality, and might be good selection criteria to identify patients suitable for palliation resection of the primary tumour.

S48

TAILORED STRATEGY FOR LOCALLY=ADVANCED RECTAL CARCINOMA: PRELIMINARY RESULTS OF A PHASE II MULTICENTER TRIAL (GRECCAR 4).

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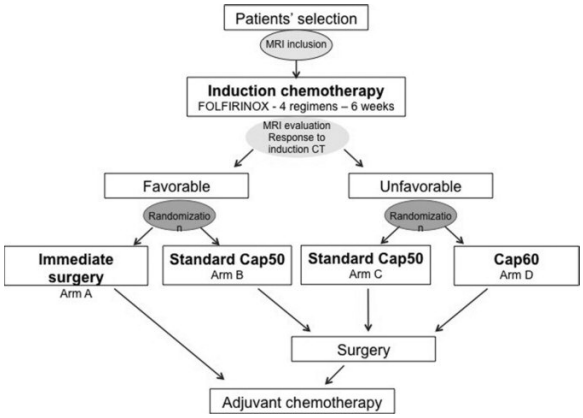
Purpose: Locally-advanced rectal carcinomas (LARC) raise the issues of oncologic control and therapeutic morbidity. Preoperative chemoradiotherapy (CRT) followed by total mesorectal excision has become the standard in LARC treatment. We designed a multicenter randomized trial to evaluate the feasibility of a tailored management of LARC according to the early tumor response to a short and intensive induction trichemotherapy (TCT), respecting a minimal 90% R0 resection rate in all arms.

Methods: Tumor response after induction TCT (FOLFIRINOX) was evaluated using magnetic resonance imaging. Good responders had a ≥75% reduction of tumor volume and were randomized between immediate surgery (arm A) *versus* standard CRT (Cap 50) plus surgery (arm B). Poor responders had a predictive CRM≤1 or a volumetric response <75%, and were randomized in CRT (Cap50) (arm C) *versus* intensive CRT (Cap 60) (arm D) both followed by surgery.

Results: 206 patients with LARC (T3≥c, T4, predictive CRM≤1) were included between 05.11 and 10.14 in 16 French centers. Compliance to TCT was generally good (6 pts stopped CT). After TCT, 194 patients were evaluated, 30 (15%) were good responders and 164 (85%) showed unfavorable response. Once the required number of patients was reached in unfavorable stratum, randomization was stopped for this stratum but recruitment continued in favorable stratum. The trial was stopped before the required number of patients was reached in favorable stratum. Distribution of the population was: 16, 14, 113 and 51 in arms A, B, C and D. 133 Patients were analyzed according to the treatment received and the planned number in the unfavorable stratum: 11 arm A, 19 arm B, 52 arm C and 51 arm D. Good responders presented lower tumors (p<0.001) while poor responders were bulky (23cm^3/45cm^3;p<0.001). Among poor responders, 23% had a volumetric reduction <50% and 65% had a reduction between 50-75%. The surgical procedure was similar between the 4 groups regarding hospitalization length, conversion rate, abdomino-perinal resection rate, postoperative morbidity and re-intervention. The R0 resection rates [IC95%] were 90% [61-99], 100% [85-100], 83% [71-90], and 88% [77-95] in arms A, B, C and D, respectively. Mesorectum resection was complete (grade III) for 78%, 81%, 78%, 76% patients in arms A, B, C and D, respectively. Patients had positive CRM≤1 in 11%, 0%, 14% and 7%, and positive distal margins in 0%, 0%, 6%, 2%, respectively.

Conclusions: Early response to induction CT (4 cycles of FOLFIRINOX) enables to adapt preoperative radiotherapy for LARC. A tailored strategy seems feasible in terms of safety and pathologic results for bad responders; despite a poor accrual, this strategy seems promising for good responders. Long-term clinical results are needed to confirm the efficacy of such a tailored strategy. Acknowledgements We thank the CRAs and datamanagers; INCa for funding.



S49

HOSPITAL VARIABILITY IN USE OF ADJUVANT CHEMOTHERAPY FOR PATIENTS WITH STAGE 2 AND 3 COLON CANCER.

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Purpose: Following oncologic resection, adjuvant chemotherapy is associated with decreased recurrence and improved survival in patients with stage 3 colon cancer, while its benefit in stage 2 disease is less clear. Although there is controversy regarding the use of postoperative chemotherapy in stage 2 colon cancer with high-risk features [tumor depth T4, poorly differentiated histologic grade, positive margin status (R1 or R2), and/or inadequate lymph node retrieval (<12 nodes)], NCCN guidelines do not recommend adjuvant chemotherapy for patients in the absence of these high-risk features (low-risk stage 2). Our primary aim was to examine hospital characteristics associated with poor risk-adjusted NCCN stage-specific guideline compliance for the use of adjuvant chemotherapy in stage 3 and low-risk stage 2 colon cancer.

Methods: Patients within the 2004-2010 National Cancer Data Base treated with oncologic resection for stage 2-3 colon cancer were identified. Stage 2 patients with at least one high-risk feature listed above were excluded and only low-risk stage 2 patients were included in the remainder of our analysis. Stepwise logistic regression was used to identify patient and hospital factors associated with administration of adjuvant chemotherapy for each stage of colon cancer. Hierarchical regression models were used to calculate risk and reliability adjusted rates of chemotherapy use and observed-to-expected (O/E) ratios for administration of adjuvant chemotherapy in each hospital's stage 2 low-risk and stage 3 patients. Hospitals with O/E ratios below the 10th percentile were identified as low outliers whereas hospitals with ratios above the 90th percentile were deemed high outliers for each stage. Hospital volume was calculated based upon the total number of colon cancer cases treated at each institution.

Results: A total of 220,155 patients were identified at 1,395 hospitals. The mean overall risk-adjusted adjuvant chemotherapy rate was 65.3% for stage 3 disease and 15.2% for low-risk stage 2. Substantial variation in hos-

pital use of adjuvant chemotherapy was seen in both stages (figure 1). Analysis of risk-adjusted O/E ratios of low outlier hospitals for stage 3 colon cancer, where adjuvant chemotherapy was underutilized, demonstrated that 62.8% were low volume centers and 51.4% were community centers. Additionally, 87.2% of high outlier hospitals for Stage 2 low-risk disease, where adjuvant chemotherapy was overutilized, were low volume hospitals and 67.2% of those high outliers were community centers.

Conclusions: After oncologic resection for colon cancer, administration of adjuvant chemotherapy for low-risk stage 2 and stage 3 disease varies substantially among hospitals in the United States. Outlier hospitals were most likely to be low volume, community centers. Quality improvement efforts are needed to ensure uniform application of guidelines where appropriate.

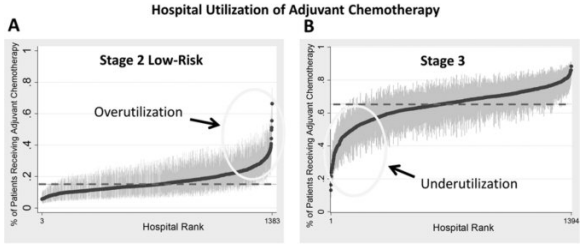

Figure 1. A) Stage 2 low-risk colon cancer. Dashed line illustrates mean overall risk-adjusted adjuvant chemotherapy rate of 15.2%. Overutilization depicted as hospitals above the 90th percentile. B) Stage 3 colon cancer. Dashed line illustrates mean overall risk-adjusted adjuvant chemotherapy rate of 65.3%. Underutilization depicted as hospitals below the 10th percentile.

S50

ASSESSING THE QUALITY OF RECTAL CANCER SURGERY IN THE NATIONAL SURGICAL ADJUVANT BREAST AND BOWEL PROJECT PROTOCOL R-04: A COMPARISON BY SURGEON SPECIALTY.

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Purpose: Surgical treatment for rectal cancer is complex due to tumor location, constraints of operating in the pelvis, and the importance of high quality surgery due to the issue of local recurrence. Rectal cancer surgery is performed by surgeons with different types of training and previous research has suggested a relationship between surgeon specialty and outcomes after rectal cancer surgery. The purpose of this study is to evaluate adherence to technical measures of quality for rectal cancer surgery between specialty and non-specialty surgeons participating in the National Surgical Adjuvant Breast and Bowel Project (NSABP) Protocol R-04 Trial, a randomized trial of four different neoadjuvant chemoradiation regimens for locally advanced (stage II-III) rectal cancer.

Methods: Patients were accrued from July 2004 to August 2010. Technical measures of quality for rectal cancer surgery were identified through review of published literature, other resources (e.g., ASCRS Rectal Cancer Checklist), and structured interviews with thought leaders. Operative notes were abstracted for data elements to determine adherence to the technical measures of quality. Adherence was defined as a dichotomous variable: 1 = measure performed and 0 = measure not performed (or not documented). Surgeon specialty was determined via internet search and ASCRS membership and surgeons were categorized into two groups: specialty surgeons (e.g. colorectal surgeons, surgical oncologists) and general surgeons. Adherence to each of the technical measures of quality was stratified by surgeon specialty. Differences in adherence between groups were assessed using chi-squared test.

Results: 822 operative notes were reviewed for 19 measures of technical quality. The operations were performed by 474 surgeons in 313 hospitals. 62% of patients underwent sphincter sparing surgery (66% by specialty surgeons, 48% by general surgeons; p value <0.001). Specialty surgeons had significantly increased adherence to eight technical measures, and decreased adherence to two, as presented in the table below. There was no difference between the two groups for eight technical measures (e.g., exploration for metastatic disease, en bloc resection, type of reconstruction and rationale, performing a leak test). In addition there were three measures with significant room for improvement by both specialty and general surgeons (overall adherence <10%): documentation of completeness of resection, whether or not iatrogenic perforation occurred, and gross distal margin.

Conclusions: There are statistically significant differences in adherence to technical measures of quality by surgical specialty. Further work is needed to determine if higher adherence is associated with pathology review (e.g., intactness of mesorectum, margin status) as well as oncologic and quality of life outcomes.

Adherence to technical measures of quality for rectal cancer surgery by surgeon specialty

Technical measure	Specialty surgeon adherence	General surgeon adherence	p value
	All cases (n=592)	All cases (n=230)	
Total mesorectal excision	92.9	87.8	0.019
Integrity of pelvic nerves assessed	31.3	13.0	<0.001
High vessel ligation	77.0	48.4	<0.001
Identification/integrity of right ureter	40.0	60.4	<0.001
Identification/integrity of left ureter	90.9	83.1	0.001
Splenic flexure mobilization	45.6	23.0	<0.001
	APR cases (n=194)	APR cases (n=116)	
If APR, flipped to prone for perineal portion	4.4	1.7	0.001
	Reconstructive cases (n=396)	Reconstructive cases (n=110)	
Distal resection margin and relationship to tumor considered prior to rectal transection	14.1	24.5	0.009
Location of final anastomosis	64.1	36.4	<0.001
Diverting loop ileostomy considered in cases for preoperative radiation or intraoperative TME	81.1	50.0	<0.001
APR=abdominoperineal resection; TME= total mesorectal excision			

Support: NCI U10-CA180868, -180822, -189867; RSGPB-05-236-01-CPPB, Am Cancer Soc; Sanofi-Synthelabo Inc.; UCLA Jonsson Comprehensive Cancer Center; Conquer Cancer Foundation of the American Society of Clinical Oncology

S51

ROBOTIC COMPLETE MESOCOLIC EXCISION FOR LEFT COLON CANCER.

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Purpose: Robotic (da Vinci Surgical System, Intuitive Surgical, Sunnyvale, CA, USA) surgery, with its enhanced dexterity and increased range of motion is being increasingly utilized in colorectal cancer surgery. In rectal cancer surgery, where anatomical limitations may challenge the surgeons during laparoscopic approach could be overcome by the help of robotic technology. In addition to/besides the rectal approaches, where laparoscopic limitations are overcome by robotics' dexterity and vision, colon cancer procedures could also be performed with robotic systems with/for the hope of better functional and oncologic outcomes. Herein, we present our case of robotic left colectomy with CME for splenic flexure

Methods: A 58-year old male patient, with adenocarcinoma in the splenic flexure underwent robotic left colectomy with CME. Four 8-mm robotic trocars and one 5-mm assistant trocar for bed-side surgeon were used during the procedure. The peritoneum is incised at the sacral promontorium and the aortomesenteric window is opened, preserving the left ureter, gonadal vessels and autonomic nerves. After inferior mesenteric artery identification, the left colic artery was isolated and transected at its origin preserving the superior rectal artery. Then, followed by high ligation of the inferior mesenteric vein at the lower part of the pancreas. Left meso-

colon was dissected from the Toldt's and Gerota's fascia, from medial to lateral. Dissection of splenocolic and gastrocolic ligaments completed the splenic flexure mobilization. The middle colic artery and vein was ligated and divided. The greater omentum was divided using scissors and bipolar cautery and its adherent part was removed en bloc with the left colon. Forth robotic trocar located on the suprapubic area was replaced with 12-mm trocar providing entrance for the endoscopic linear stapling device. The transverse colon and descending colon were transected by endocopic linear staple. A side-to-side colocolonic anastomosis with linear staple was performed. The defects of staple entry sites on large bowels were closed with V-lock suture. The specimen was extracted in a 15-mm endobag through a suprapubic incision by enlarging of the suprapubic trocar site.

Results: The docking and operative times were 6 min and 210 min, respectively. The blood loss was 20ml. Histopathological examination revealed a T3 mucinous adenocarcinoma. The total number of harvested lymph node was 30 and none of them was metastatic. There was no peri/postoperative complication. Patient was discharged on postoperative day 4. The postoperative course was uneventful.

Conclusions: Robotic left colectomy with CME is feasible and also provides oncologically sound resection.

S52

INSURANCE STATUS IS LINKED WITH VARIATION IN SURVIVAL AND METASTATIC SITE RESECTION IN PATIENTS WITH ADVANCED COLORECTAL CANCER.

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Purpose: Despite substantially improved survival with with metastatic site resection in colorectal cancers, uptake of aggressive surgical approaches remains low among certain patients. It is unknown whether financial determinants of care, such as insurance status, play a role in this treatment gap. Therefore, we sought to evaluate the effect of insurance status on overall survival, and utilization of lung and/or liver metastectomy in patients with advanced colorectal cancer.

Methods: Using the 2010-2011 National Cancer Data Base Participant User File, incident cases of colorectal cancer metastatic to the lung and/or liver were identified. Controlling for patient sociodemographic and tumor characteristics, Cox proportional hazards regression modeling was used to examine the association between insurance type and survival. Multivariable logistic regression was used to examine associations between insurance type and different surgical treatments (primary tumor resection and/or metastatic site resection).

Results: We identified 24,938 patients with colorectal cancer metastatic to the lung and/or liver. Mean age of the patient cohort was 65 years. Fifty-four percent of patients were male and 80% of patients were white. Of this cohort, 72% of patients had a primary tumor site in the colon, 9% in the rectosigmoid, and 19% located in the rectum. Primary tumor resection occurred in 55% of patients and 19% of patients underwent metastatic site resection. Compared to patients with private insurance, Medicare insurance was associated with greater adjusted mortality (HR = 1.12, 95% CI 1.07 – 1.17), followed by Medicaid (HR = 1.33, 95% CI 1.25 – 1.42) and no insurance coverage (HR = 1.37, 95% CI 1.27 – 1.48). Compared to those with private insurance, the adjusted odds of undergoing metastatic site resection were significantly lower for patients with Medicare (OR 0.89, 95% CI 0.81 – 0.97), Medicaid (OR 0.72, 95% CI 0.64 – 0.82) and no insurance (OR 0.49, 95% CI 0.42 – 0.58).

Conclusions: Differences in insurance status are associated with both differences in rates of non-primary site resection and overall survival in patients with colorectal cancer that is metastatic to the lung and/or liver. There is a need for improved access to metastatic site resection for patients with non-private insurance. Strategies for this could include improved reimbursement from government-sponsored insurance programs for this procedure, selective referral to centers that perform mestastectomy or broader coverage policies.

S53

PATIENT, SURGEON, PATHOLOGIST, AND HOSPITAL-LEVEL VARIATION IN SUBOPTIMAL LYMPH NODE YIELD AFTER COLECTOMY: COMPARTMENTALIZING QUALITY IMPROVEMENT STRATEGIES.

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Purpose: Wide variability exists in the rates of suboptimal lymphadenectomy after resection, with some cases still not meeting the metric of having at least twelve lymph nodes examined by the pathologist. However, less is known about the types of factors that contribute to the inadequate assessment. The purpose of this study was to quantify the extent to which patient, surgeon, pathologist, and hospital-level factors explain variability in the rates of suboptimal lymphadenectomy.

Methods: The New York State Cancer Registry, Medicare Database, and Statewide Planning & Research Cooperative System (SPARCS) were used to select stage I-III colon cancer patients with a documented surgical resection from 2004-2010 in NY State. Mixed-effects multivariable logistic regression models were used to assess the proportional effect of patient, surgeon, pathologist, and hospital-level factors on rates of suboptimal lymph yield (<12 lymph nodes examined). Subsequently, a mixed-effects multivariable Cox proportional hazards model was used to examine the effect of suboptimal lymph node yield on 5-year overall survival and disease specific survival.

Results: Results: Among 6,258 patients who underwent colon cancer resection, 2,196 of the cases (34%) had a suboptimal lymphadenectomy. The rates of suboptimal lymph node yield decreased over time. Despite this, several factors were independently associated with the odds of suboptimal lymph node yield including sex, race, oncologic stage, procedure type, surgeon volume, surgeon type, and hospital volume (See table). After controlling for all factors, there still remained substantial surgeon, pathologist, and hospital variation. Of the remaining unexplained variation, 68%, 22%, and 10% is attributed to factors relating to the hospital, pathologist, and surgeon respectively. Suboptimal lymph node yield was associated with worse overall survival (HR = 1.54, 95%CI=1.46, 1.62) and disease specific survival (HR = 1.39, 95%CI= 1.32, 1.46) after controlling for stage and other pertinent confounders.

Conclusions: Variation in suboptimal lymphadenectomy is associated with worse disease specific survival and is thus a concern in the care of colon cancer patients. The remaining variation exists at the surgeon, pathologist, and hospital levels of the management team. Given that 90% of this variation is explained by factors relating to the hospital and pathologist, future quality improvement initiatives should focus on identifying and addressing practice patterns revolving around the pathologist and hospital that lead to suboptimal lymphadenectomy.

	Odds Ratio (95% CI)	P-Value
RACE		
White	Reference	
Black	1.08 (1.02, 1.14)	0.02
Other	1.19 (1.07, 1.31)	0.002
Unknown	1.02 (0.93, 1.09)	0.17
AJCC STAGE		
III	Reference	
II	1.21 (1.17, 1.25)	<0.0001
I	1.94 (1.89, 1.99)	<0.0001
PROCEDURE TYPE		
Right Colectomy	Reference	
Left Colectomy	1.87 (1.69, 2.05)	<0.0001
Total Colectomy	0.96 (0.88, 1.04)	0.45
Colectomy, NOS	1.54 (1.44, 1.64)	<0.0001
BOARD-CERTIFICATION		
Colorectal Surgery	Reference	
General Surgery	1.55 (1.49 1.62)	0.008
SURGEON VOLUME		
<5 cases	Reference	
5-15 cases	0.94 (0.89, 0.99)	0.04
>15 cases	0.72 (0.63, 0.81)	0.007
HOSPITAL VOLUME		
<28 cases	Reference	
28-78 cases	0.87 (0.81, 0.93)	0.02
>79 cases	0.68 (0.60, 0.76)	<0.0001

* After controlling for all factors, there still remained variation relating to the hospital (68%), pathologist (22%), and surgeon (10%)

S54

TRANSANAL VERSUS ROBOTIC TOTAL MESORECTAL EXCISION FOR RECTAL CARCINOMA: A COMPARATIVE ANALYSIS.

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Purpose: Transanal total mesorectal excision (TaTME) is a new approach for performing curative-intent rectal cancer surgery. Limited comparative outcome data exists contrasting TaTME to laparoscopic TME, and no data currently exists comparing robotic TME (RTME) to TaTME. The current study aims to compare RTME with TaTME.

Methods: Data on the first 40 consecutive patients undergoing low anterior resection by TaTME was recorded in a prospectively maintained database and compared to the first 40 consecutive RTME cases performed for rectal cancer at a single institution. Kaplan-Meier analysis and a Log-rank test were used to compare operative outcomes and survival between the two groups.

Results: There was no significant difference in age at the time of surgery, sex distribution or BMI but TaTME patients had a higher ASA score (P=0.027), lower tumor distance from the anal verge (4.5±0.3 Vs 8.7±0.5cm, P<0.001) and received neoadjuvant radiotherapy more frequently (90.0 Vs 50.0%, P<0.001). TaTME cases more frequently had an inter-sphincteric resection (32.5 Vs 7.5%, P=0.010), had a hand-sewn anastomosis (80.0 Vs 5%, P<0.001), longer operating time (279.0±12.6 Vs 207.1±8.4min, P<0.001) and had a transanal specimen extraction (32.5 Vs 5.0%, P=0.003). There was no difference in conversion rate. There was no difference in overall or major (Clavien-Dindo>3b) post-operative morbidity (10 Vs 12.5%, P=1.000) or post-operative length of stay (4.8±0.4 Vs 4.5±0.6, P=0.181) between RTME and TaTME. RTME cases had larger mean tumor sizes (3.6±0.3 Vs 2.6±0.2cm, P=0.033), a longer distal margin (22.7±1.9 Vs 13.2±2.1, P=0.001) and a greater lymph node harvest (26.6±2.0 Vs 20.4±1.7, P=0.009) but no difference in circumferential resection margin positivity rate (5 Vs 2.5%, P=1.000) or TME quality (P=0.491) was observed when compared to TaTME. At a mean follow-up for 24 months there was no difference in local recurrence rates (P=0.835) but systemic recurrence was increased in patients undergoing TaTME relative to RTME (P=0.008).

Conclusions: When compared to RTME, TaTME was found to have similar TME quality and local recurrence rates. However, distant recurrence was higher with TaTME. While these differences may be accounted for by tumor level and biology, further studies are necessary to evaluate the oncological outcomes of TaTME.

S55

INDETERMINATE COLITIS PRECISION INTO CROHN'S COLITIS AND ULCERATIVE COLITIS USING MOLECULAR BIOMETRICS.

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Purpose: To date, there is no **gold standard diagnostic tool** for inflammatory bowel disease (IBD). The current diagnostic classification system, a combination of clinical, endoscopy, radiology, and histopathology findings, fails to differentiate between ulcerative colitis (UC) and Crohn's colitis (CC) in one third of patients with predominantly colonic IBD, leading to cases labeled as "indeterminate colitis" (IC). Currently, little is known about the molecular differences distinguishing the UC and CC phenotypes. Using surgical pathology colectomy samples, we investigated molecular biometric markers that might delineate UC from CC.

Methods: We performed whole genome transcriptome (Affymetrix cDNA microarray) analysis using RNA extracted from colon samples from patients with moderate UC and CC. Three samples were extracted per group, and RNA was pooled. The experiments were initially performed as a training test set and repeated as an independent test set using different patients with the same diagnosis and disease activity.

Results: A total of 546 genes were up- or down-regulated ≥2-fold between the two diseases**.** Human alpha-defensin 5 **(**HD5) was increased the most: 31-fold in CC compared to UC. A related molecule, HD6, was increased 16-fold in CC relative to UC. Further, an independent test set analysis by PCR array confirmed that HD5 was increased 118-fold while HD6 was increased by 16-fold in CC compared to UC. In order to validate the microarray data, we first used real-time RT-PCR to measure the transcript levels of HD5 using RNA extracted from three human colon biopsy samples from moderate UC and moderate CC, and three diverticulitis samples as a non-IBD control using pre-designed TaqMan probes (Life Technologies). This analysis showed that the HD5 transcript is expressed nearly 10-fold in CC as compared to UC samples. Additionally, we also determined that the HD5 protein concentration was significantly increased (*p<0.0001*) as shown in **Fig. 1** in the moderate CC *vs.* all stages of UC and control tissues (n=10 for all).

Conclusions: Taken together these findings suggest that defensins, and HD5 in particular, *may be diagnostic biomarkers to efficiently distinguish CC from UC as a gold standard tool in IBD phenotyping.* These studies could lend mechanistic insights into the role of HD5 in IBD and its potential as a biomarker for IBD. This information will be invaluable for developing and improving diagnostic accuracy, prognosis and precise treatment tools to help clinicians manage IBD in the clinical setting.

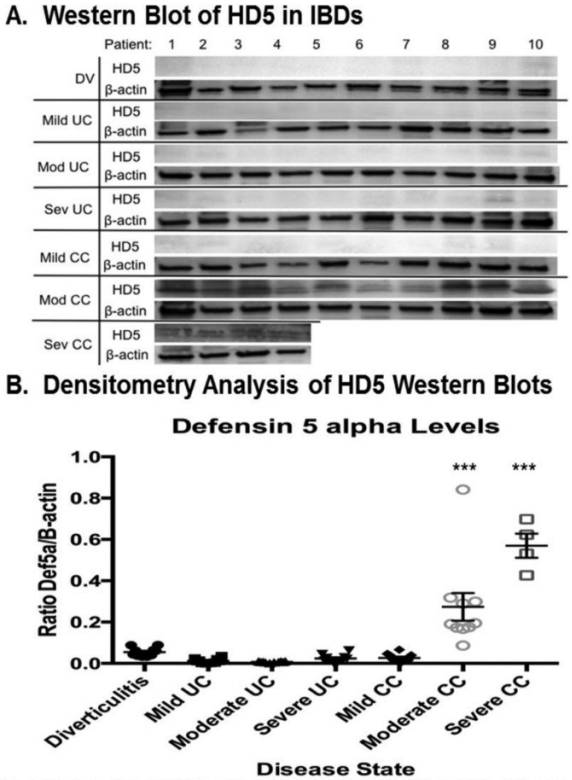

Fig. 1. Western blot of HD5 in mild, moderate and severe UC and CC. A) Images of western blots. Only 4 severe CC samples could be analyzed due to very high background on remainder of blot. B) Graphical representation (densitometry) of HD5 levels. Band intensities were measured and graphed as a ratio of β-actin. Moderate and severe CC are both significantly higher than all other disease states (***$p< 0.0001$).

S56

DIVERTED VERSUS UNDIVERTED RESTORATIVE PROCTOCOLECTOMY: AN ANALYSIS OF LONG-TERM OUTCOMES AFTER LEAK.

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Purpose: There is considerable debate regarding the safety of undiverted restorative proctocolectomies (RPC). In patients who suffer anastomotic leaks from the pouch anastomosis, it is unclear if diversion offers any benefit. This study compares long-term outcomes after pouch leak in patients undergoing diverted and undiverted RPC.

Methods: All patients undergoing RPC from 1987-2015 by a single surgical practice were reviewed. Demographic, clinical, operative and postoperative data were collected from a prospectively maintained registry. Both one-stage RPC or staged procedures in which a subtotal colectomy was performed followed by the creation of an undiverted ileal pouch were considered undiverted RPC; all others were considered diverted RPC. The outcomes of interest were pouch excision and pouch failure (the presence of an ileostomy until the last date of follow-up). Differences in outcomes by diversion status were compared using log-rank test. Two Cox proportional-hazards models were created for each outcome: one, adjusting for pouch leak within 30 days of surgery, and the other, adjusting for pouch leak at anytime. Additional predictors in these models included nutritional status, preoperative medications, hematocrit, albumin, pathology (Ulcerative Colitis, Familial Polyposis, Crohn's Disease), and duration of disease before surgery. Statistical significance was set as p <0.05.

Results: A total of 1261 patients were included. The mean age at RPC was 37 years and the mean duration of disease before surgery was 9.6 years. There were 496 (39.3%) diverted and 765 (60.7%) undiverted pouches. Patients in these groups were similar with respect to age, sex, pathologic diagnosis, duration of disease, preoperative immunomodulator use and hematocrit. They differed with respect to nutritional status, preoperative albumin level and steroid use. Median follow-up time was longer in the diverted group (21.3 vs. 15.3 years, p<0.05). The overall rate of pouch leak within 30 days was 4.6%, and this was different between diverted and undiverted patients (2 vs. 6.3%, p<0.05). The groups had similar rates of pouch leak at anytime (12.8 vs. 14.5%, p=0.38). Univariate analyses showed that patients with diverted pouches were more likely to have pouch failure and pouch excision. Multivariable models controlling for clinical factors and either pouch leak within 30 days or pouch leak at anytime showed that diverted patients were more likely to have pouch excision and pouch failure (HR 1.75- 2.65, p<0.05) (Table 1).

Conclusions: Our data show that diversion does not prevent pouch excision or failure after anastomotic leaks; in fact, undiverted patients faired better in both endpoints. Though the factors that prompted diversion during the surgery can only be fully controlled for in a randomized setting, the findings of this study suggest that undiverted RPC is a safe procedure in appropriately selected patients.

Outcome: Pouch Excision	HR	95% CI	p Value
Diverted vs Undiverted Pouch (adjusting for 30d Leak)	2.65	1.5-4.8	0.001
Diverted vs Undiverted Pouch (adjusting for Anytime Leak)	2.49	1.4-4.5	0.003
Outcome: Pouch Failure			
Diverted vs Undiverted Pouch (adjusting for 30d Leak)	1.99	1.2-3.3	0.008
Diverted vs Undiverted Pouch (adjusting for Anytime Leak)	1.75	1.1-2.9	0.03

S57

IMPACT OF BODY MASS INDEX ON ABILITY TO SUCCESSFULLY CREATE AN ILEAL POUCH-ANAL ANASTOMOSIS.

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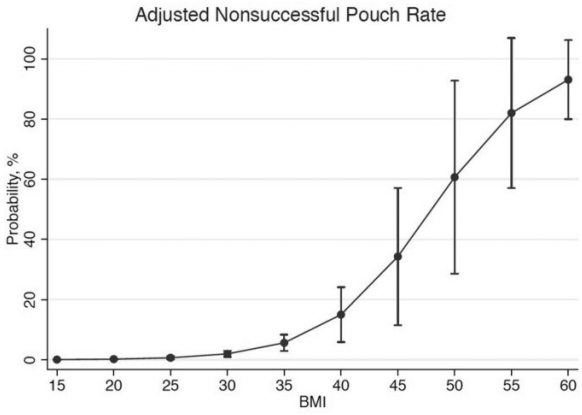
Purpose: Ileal pouch anal anastomosis (IPAA) is the surgical treatment of choice for patients with ulcerative colitis (UC). Limited data exists on how obesity impacts the surgeon's ability to successfully create an IPAA at the time of surgery. We aimed to determine how BMI affects the ability to successfully perform IPAA.

Methods: This is a retrospective cohort study of all patients undergoing an IPAA for UC between January 2002 and August 2013. We used logistic regression modeling to estimate the association between BMI and unsuccessful pouch attempts and to calculate adjusted rates of an unsuccessful pouch across BMI increments.

Results: A total of 1196 patients underwent proctocolectomy for UC during the study period. One hundred twenty-nine patients were not offered IPAA (reasons included patient preference n=53, advanced age/comorbidity n=28, obesity n=23, incontinence n=8, suspicion of Crohn's disease n=8, rectal cancer n=3, and other n=6). IPAA was planned in 1,067 patients. Thirty-six patients had concurrent cancer diagnosis, and 7 had a polyposis syndrome. Of the 1067 offered IPAA, 18 (2%) could not be technically completed at the time of surgery. Increasing BMI was associated with a higher risk of not being able to technically perform IPAA (Odds ratio 1.24; CI 1.15-1.33). For example, the chance of an unsuccessful pouch rises from 2% at a BMI of 30 to 5.7% at a BMI of 35 and 15% at a BMI of 40 (p<0.001 between BMI 30 and 35; p=0.004 between BMI 30 and 40; and p=0.007 between BMI 35 and 40) Figure 1. The area under the receiver operator characteristics curve is 0.8. BMI explained 18% of the variation in pouch success rate (pseudo-R^2 0.18).

Conclusions: There is a strong association between increasing BMI and ability to technically perform IPAA. Obese patients should be counseled to lose weight preoperatively in order to increase the probability of successful IPAA creation at the time of operation.



S58

LAPAROSCOPIC DE-TORSION OF AN ILEAL POUCH AND POUCH PEXY.

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Purpose: This procedure was recorded to demonstrate the laparoscopic repair of the rare complication of ileal pouch anal anastomosis torsion in a patient with ulcerative colitis.

Methods: Following flexible pouchoscopy to de-torse the ileal pouch, a rectal tube was placed for decompression. The patient was taken to the operating room and underwent laparoscopic pouch pexy for ileal pouch torsion.

Results: Laparoscopic de-torsion and pouch pexy was performed successfully. The patient has been without complications for 3 years.

Conclusions: Laparoscopic pouch pexy can be completed safely with good long-term outcomes

S59

POSTOPERATIVE VENOUS THROMBOEMBOLISM IN PATIENTS UNDERGOING ABDOMINAL SURGERY FOR INFLAMMATORY BOWEL DISEASE (IBD): A COMMON BUT RARELY ADDRESSED PROBLEM.

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Purpose: Venous Thromboembolism (VTE) after abdominal surgery occurs in 2-3% of patients with Crohn's disease and Ulcerative Colitis (UC). However, no evidence-based guidelines currently exist to guide post-discharge prophylactic anticoagulation. We sought to determine the current use of post-discharge anticoagulation, the rate of VTE and factors associated with 90-day VTE in a national cohort of patients.

Methods: All patients ≥18 years old with Crohn's disease or UC who underwent abdominal surgery between January 2004 and December 2013 were identified in the OptumLabs™ Data Warehouse, a large administrative database containing claims on privately insured and Medicare Advantage enrollees. Patients with a diagnosis of VTE and patients who were on anticoagulation prior to surgery were excluded. The use of anticoagulation in the immediate post-discharge period (1-7 days after discharge) and the rate of VTE occurring within 90 days after discharge were identified. Logistic regression analysis was used to determine risk factors of VTE.

Results: A total of 8,737 patients (Crohn's: 6,286; UC: 2,551) were included in the study; 278 patients (3.18%) developed a post-discharge VTE. Only 18 patients (0.2%) were prescribed anticoagulation in the immediate post-discharge period. VTE occurred more frequently in UC patients than Crohn's patients (5.8% vs 2.1%; p<0.0001). An increased rate of VTE was also seen in Crohn's and UC patients undergoing colectomy or proctectomy with simultaneous stoma creation compared with colectomy or proctectomy alone (5.3% vs. 1.9%; p<0.0001). The highest rate of VTE occurred in UC patients undergoing J-pouch reconstruction (7.1%, n=1,030). Among patients who developed a VTE, the majority (Crohn's: 67%, UC: 72%) developed a VTE within the first 30 days post-discharge. However, 31% of VTEs occurred 31-90 days post-discharge. Adjusting for age, gender, comorbidities, operative approach and length of stay, the strongest predictors of post-discharge VTE were stoma creation (AOR = 2.18, 95% CI = 1.47 to 3.23) and J-pouch reconstruction (AOR = 3.00, 95% CI = 1.87 to 4.84). Laparoscopic surgery (AOR = 1.38, 95% CI = 1.07 to 1.78) and being in the highest quartile of length of stay (AOR = 1.69, 95% CI = 1.29, 2.22) were also significantly associated with 90-day VTE.

Conclusions: We found that the use of post-discharge prophylactic anticoagulation was infrequent, despite the relatively high rates of post-discharge VTE among IBD patients in our sample. Development of evidence-based guidelines, particularly for patients with high-risk operations, should be considered to improve the outcomes of IBD patients undergoing abdominal surgery.

S60

A NATIONWIDE ANALYSIS OF POSTOPERATIVE VENOUS THROMBOEMBOLISM IN CHRONIC ULCERATIVE COLITIS PATIENTS: IS IT THE DISEASE OR THE OPERATION?

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Purpose: To risk stratify 30 day postoperative venous thromboembolism (VTE) risk in patients with chronic ulcerative colitis (CUC) based upon operative stage and to determine if the risk for postoperative VTE is related to the underlying diagnosis, operative procedure, or both.

Methods: The National Surgical Quality Improvement Program (NSQIP) database was queried for patients undergoing colorectal resection for CUC and other non-inflammatory bowel disease (non-IBD) diagnosis from 2005 to 2013. CUC patients and the non-IBD patients were divided into three risk stratified categories: high, intermediate, and low based upon surgical CPT codes modeled after the three stages used for the surgical management of CUC patients. The high risk group included the following laparoscopic and open procedures: total proctocolectomy (TPC) with end ileostomy, TPC with ileal pouch anal anastomosis (IPAA), and total abdominal colectomy (TAC) with end ileostomy or ileorectostomy. The intermediate risk group included proctectomy with IPAA. While the low risk group included closure of enterostomy with or without resection and anastomosis. Multivariable logistic regression was performed to quantify risk factors for VTE.

Results: 18,833 patients met inclusion criteria with an overall rate of VTE of 3.8%. The VTE rates for high risk CUC and non-IBD procedures were 4.7% and 4.3% respectively. The VTE rate for intermediate risk CUC and non-IBD procedures were 2.0% and 1.1% respectively, while the VTE rate for low risk CUC and non-IBD procedures were 0.7% and 0.6% respectively. A significant number of patients were diagnosed with VTE after index hospital discharge (30.4%). The most important risk factors identified for VTE include (all p<0.05) high risk procedure group (adjusted odds ratio (AOR) 4.44; 95% CI: 2.63-7.48), intermediate risk procedure group (AOR 2.31; 95% CI: 1.18-4.51), emergent case (AOR 1.57; 95% CI: 1.23-2.01), chronic steroid use (AOR 1.55; 95% CI: 1.28-1.87), and preoperative albumin < 3.5 mg/dL (AOR 1.45; 95% CI: 1.17-1.80). The underlying diagnosis CUC vs non-IBD was not an independently statistically significant factor in the rate of VTE (p=0.269).

Conclusions: We found no significant difference in the rate of VTE between IBD and non IBD patients undergoing similar operative procedures. In CUC patients therefore, the risk of postoperative VTE is primarily driven by surgical procedure rather than underlying diagnosis. Additional perioperative risk factors associated with VTE include: emergent case, chronic steroid use, and pre-operative albumin < 3.5 mg/dL. Use of extended postoperative VTE prophylaxis in CUC patients should be based upon the procedure and not the underlying diagnosis. These findings also

have implications for other, non-IBD patients undergoing high-risk colorectal procedures.

S61

PATIENTS ON VEDOLIZUMAB HAVE A HIGH RATE OF POSTOPERATIVE COMPLICATIONS.

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Purpose: Identify rate of postoperative complications and types of complications experienced in patients with Inflammatory Bowel Disease (IBD) who have undergone an operation following treatment with vedolizumab.

Methods: We identified patients with IBD who underwent intra-abdominal or anorectal surgery at our institution following treatment with vedolizumab. Preoperative, perioperative, and postoperative data was collected. Categorical variables were analyzed using Fisher's exact test or Chi-square test and continuous variables were analyzed using t-test for independent means.

Results: Thirty-six operations were performed on 26 patients. Twenty-seven operations (75%) were intra-abdominal and 9 (25%) were anorectal. Out of 26 patients, 17 (65%) experienced a Clavien-Dindo grade 2 or greater complication following 19 operations. A complication occurred after 53% of all operations and 63% of intra-abdominal operations. A total of 26 complications occurred following these 19 operations. Infectious complications were most common, and accounted for 53% of complications. Overall rate of infectious complications following any operation was 44%. Anastomotic leak rate was 15% (2 of 13). Two patients died from culture negative sepsis following abdominal surgery, for overall mortality rate of 7.7%. There were 23 visits to the Emergency Department following surgery, with 10 readmissions. The only preoperative characteristics that were significantly different between patients who experienced complications and those who did not were Hemoglobin (10.6 v 11.9 g/dl, p=0.02) and Platelet count (349 v 287 K/mm^3, p=0.025). There was no significant difference in type of IBD, ASA class, steroid use, BMI, albumin, or doses or timing of vedolizumab prior to surgery. There was no difference in complication rate based on the number of biologic medications the patient failed prior to vedolizumab therapy (p=0.718). Patients with complications were more likely to have undergone intra-abdominal surgery (17 v 10, p=0.034), require post-operative transfusion (4 v 0, p=0.045), and have an ED visit (19 v 4, p<0.001) and hospital readmission (10 v 0, p<0.001). The number of emergent cases, length of operation, and blood loss did not differ significantly between groups.

Conclusions: To date, there are no published surgical outcomes of patients receiving vedolizumab. Our institution observed a high complication rate in these patients. Literature cites complication rates following infliximab therapy as 5% for anastomotic leak in Crohns Disease, 30% for any complication in Ulcerative Colitis, and 20% rate of infectious complications. Despite a small patient sample, we demonstrated a much higher rate of septic complications. It is unclear whether this high rate is due to the severity of IBD, in patients who have failed other therapies, or a risk inherent to the medication itself. However, caution should be exercised when operating on these patients.

S62

SAFETY AND EFFICACY OF THE PERIOPERATIVE USE OF VEDOLIZUMAB IN MEDICALLY REFRACTORY IBD PATIENTS. DOES "GUT-SPECIFICITY" IMPACT SURGICAL MORBIDITY?

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Purpose: Biologics targeting tumor necrosis factor (anti-TNF) have revolutionized the medical management of severe inflammatory bowel disease (IBD). The unfavorable side effect profile of anti-TNFs has led to the development of molecules directed towards integrins. Vedolizumab is a recently introduced biologic agent directed to gut-specific $\alpha4\beta7$ integrins. As anti-TNFs have been associated with morbidity after major colorectal surgery, the aim of this study was to evaluate post-operative morbidity in patients with severe IBD on vedolizumab prior to colorectal surgery.

Methods: A chart review of medically refractory IBD patients on vedolizumab requiring colorectal surgery over a 12-month period ending August 2015 was performed. Patients with preoperative perforation, enterocutaneous fistula, or perianal disease were excluded. Perioperative data including 30-day complications were recorded.

Results: Fifteen patients (6 males; median age 29 (range, 15-58) years) necessitating surgery after failing a trial of vedolizumab therapy were identified. Preoperative diagnoses included Crohn's disease (CD) (n=8; 53%), ulcerative colitis (n=6; 40%) and inflammatory bowel of diagnosis unclassified (n=1; 7%). Median number of preoperative vedolizumab doses was 4 (range, 1-6) with the median time from the last dose of infusion therapy to surgery being 30 (range, 3-144) days. Surgical procedures included total abdominal colectomy with end ileostomy (n=4; 27%), laparoscopic ileocecal resection (n=5; 33%), laparoscopic ileal pouch-anal anastomosis (IPAA) with diverting ileostomy (n=5;33%), and abdominoperineal resection (n=1; 7%). Median length of hospital stay was 5 (range, 3-7) days with tolerance of a low residue diet occurring at a median of 3 (range, 1-4) days. 30-day postoperative complications occurred in only two patients (wound stitch abscess (n=1) and readmission for ileus (n=1)).

Conclusions: Our initial single tertiary institution results demonstrate a promising safety profile for patients on salvage vedolizumab therapy prior to surgery, reinforcing the gut-specific nature of this drug. We can surmise that unlike other biological agents, preoperative therapy with vedolizumab may not compromise surgical outcomes.

S63

LONG-TERM OUTCOMES FOLLOWING CONTINENT ILEOSTOMY CREATION IN PATIENTS WITH CROHN'S DISEASE.

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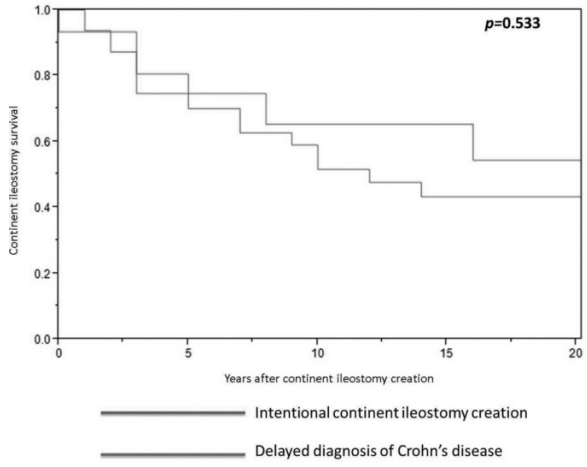
Purpose: Patients with CD have a higher failure rate after restorative proctocolectomy (IPAA) compared to their counterparts with ulcerative colitis. However, risk of IPAA failure can be stratified based on the timing of CD diagnosis. We hypothesized that a similar situation would be found in CI patients with a diagnosis of CD and aimed to assess long-term outcomes of continent ileostomy (CI) in patients with Crohn's disease (CD).

Methods: CD patients who underwent CI surgery from 1978 and 2013 were evaluated. Functional outcomes, postoperative complications, requirement of revision surgery and CI failure were analyzed. CI revisions that required pouchotomy or re-construction following total or partial excision of CI were defined as major; those without bowel resection were defined as minor revisions. CI failure was defined as excision of the pouch and formation of an end ileostomy.

Results: There were 48 patients (14 males) with a median age of 33 years (17-59) and BMI of 23 kg/m^2 (17-31) at the time of CI creation. CD diagnosis was before CI (intentional) in 15, or made in a delayed fashion at median 4 years (1-25) after CI in 33 patients. Median follow-up was 19 years (1-33) after index CI creation. Major and minor revisions were performed in 40 (83%) and 13 patients (27%), respectively. Median times to index major and minor revisions were 4 (1-30) and 2 years (1-21) respectively. Complications were fistula (n=20), pouchitis (n=16), valve slippage (n=15), hernia (n=9), afferent limb stricture (n=9), difficult intubation (n=8), incontinence (n=7), bowel obstruction (n=7), valve stricture (n=5), leakage (n=4), bleeding (n=3) and valve prolapse (n=3). Median Cleveland global quality of life score was 0.8 (0.3-1). CI failure occurred in 22 patients (46%). Based on Kaplan Meier estimates, CI survival was 79 % (CI 95: 68- 88%), 65 % (CI 95: 52-76%) and 48 % (CI 95: 33-63%) at 5,10, and 20 years. CI failure was similar regardless of timing of CD diagnosis (p=0.533).

Conclusions: Outcomes of CI in patients with CD are poor, regardless of the timing of CD diagnosis. While highly-selected CD patients may be

offered IPAA in our institution, CI creation in these patients is contraindicated.



S62a

TRANSANAL HEMORRHOIDAL DEARTERIALIZATION (THD) FOR HEMORRHOIDAL DISEASE: 1000 CONSECUTIVE CASES.

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Purpose: THD has been increasingly used as a minimally invasive alternative to traditional surgical procedures in treating symptomatic hemorrhoids. From its introduction, several modifications of the original technique were described (concerning Doppler-guided hemorrhoidal artery ligation and management of prolapse), leading to an expansion of indications and improvement of symptoms. The aim of this study was to assess the clinical effectiveness of THD, patient's satisfaction, timing and treatment of recurrences.

Methods: THD was performed in patients with hemorrhoidal disease providing dearterialization in all cases and mucopexy in case of prolapse. THD original device was used up to 2008; thereafter, others proctoscopes, with a larger lateral window (THD-Surgy) and also sliding lateral part (THD-Slide), were introduced. During this period, the dearterialization procedure evolved from the higher-level artery ligation to the "distal Doppler-guided dearterialization". After surgery, the treated pts were followed up regularly 15 days, 1, 3, 12 months and once a year. Clinical effectiveness and recurrence rate were assessed. Pts' QoL was evaluated with a VAS scale.

Results: From June 2005 to April 2015, 1000 patients (grade 2: 82 pts; grade 3: 835 pts; grade 4: 84 pts) underwent THD procedure. Mean follow up was 44 months (range: 6-124). Whole symptoms recurrence rate was 9.5% (95 pts). Recurrence of bleeding occurred in 12 pts (1.2%), prolapse in 46 pts (4.6%), bleeding and prolapse in 37 pts (3.7%). Recurrence rate was 8.5% in grade 2 (7/82 pts), 8.8% in grade 3 (74/835 pts), and 16.6% in grade 4 (14/84 pts). Recurrences occurred within 1 year in 71% of pts, 2 years in 19.7%, 3 years in 2.1%, 4 years in 5.2%, 5 years in 1.0%. They were more frequent in the first period of our experience. Re-THD was performed in 31 pts with recurrence (32%), Milligan-Morgan hemorrhoidectomy in 23 pts (23.9%), Ferguson hemorrhoidectomy in 11 pts (11.4%), PPH in 4 pts (4%), while in 26 pts no any additional surgery was required because of low-grade severity of symptoms. Following re-treatment 6 pts (5 after re-THD, 1 after PPH) had a re-recurrence of symptoms, needing another operation. Only these 6 patients referred severe QoL impairment.

Conclusions: Data from this 10-years retrospective study elucidate the clinical efficacy of THD procedure in pts with hemorrhoidal disease, as demonstrated by the low recurrence rate (particularly using the ultimate device model) and significant benefits in QoL. Only few patients suffered of complications specifically related to the procedure, with a low level of severity (never with chronic effects). THD procedure can be used also in advanced cases and in re-treatment.

S63a

PHENOL INJECTION VERSUS LAYING OPEN IN PILONIDAL DISEASE: A PROSPECTIVE RANDOMIZED TRIAL.

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Purpose: Minimal invasive procedures may be an alternative to surgical excision for pilonidal disease. This prospective randomized controlled trial compares phenol injection vs laying open technique for the management of pilonidal disease (ACTRN 12812000868886).

Methods: One hundred and forty patients were randomly assigned to either phenol injection (n = 70) or laying open (n = 70). Patients were followed up at 3 and 6 weeks then at 6, 12, 24, 36, 48 months post surgery. The primary end point was the time (in days) to complete wound healing. Secondary end points were visual analog scale pain score, analgesic useage, time (in days) to resume daily activities and recurrence rate. Short Form- 36 Health Survey (SF-36) and Nottingham Health Profile (NHP) were completed for each patient at the first follow up appointment.

Results: Time to complete wound healing (16.2±8.7 vs 40.1±9.7 days; p $\langle$0.007) was significantly shorter in the phenol injection group. The time to pain free mobilization was shorter after phenol injection (0.8±2.8 vs 9.3±10.0; p$\langle$0.001) as was time to first bowel action (16.2±12.6 vs 22.5±15.1 hours; p$\langle$0.001). No significant difference between the two groups was seen for visual analog scores at 48 hours (0.8±1.4 vs 3.0±2.2), painkiller intake within 48hr (0.5±1.1 vs 3.4±1.4), time period for requiring wound dressing (2.1±3.0 vs 38.1±8.9 days). The median operation time was shorter for phenol injection than for laying open (14.0±3.8 min vs 49.0±24.2 min; p$\langle$0.001). At the mean follow up of 39.2±9.0 months after surgery no significant differences were seen in healing between the two groups (13 recurrences in phenol vs 9 in lay open; p=ns). SF-36 and NHP at 3 weeks after surgery favoured the phenol injection group

Conclusions: This prospective randomized trial shows that phenol injection results in faster healing than laying open does, but there is no difference in healing rate after 3 years. Treatment with phenol injection rather than laying open appears more acceptable to patients and might therefore be considered as the first choice of treatment.

S64

LONG-TERM EXPERIENCE OF MAGNETIC ANAL SPHINCTER AUGMENTATION IN PATIENTS WITH FECAL INCONTINENCE.

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Purpose: Magnetic anal sphincter augmentation (MAS) is a novel technique for treatment of patients with severe fecal incontinence (FI). Previous studies have demonstrated promising short-term results. The current study reports the first long-term effectiveness and safety of this new treatment modality in a prospective multicenter study.

Methods: Patients with severe FI for at least 6 months who had previously failed conservative therapy were offered to participate in this multicenter prospective trial with implantation of a MAS device between 2008-2011 at four clinical sites in Europe and the United States. The MAS device comprises a ring of connected titanium beads, each containing a magnetic

core that is attracted to the adjacent beads. Symptom severity and quality of life were assessed with bowel diaries, Cleveland Clinic Incontinence Scores (CCIS) and Fecal Incontinence Quality of Life scores (FIQOL) preoperatively, at 6 months, and annually thereafter. Treatment success was defined as ≥50% reduction of FI episodes. Adverse events were assessed and documented from the time of implant throughout study participation.

Results: 35 patients (34 females) of mean age of 64 (range, 41-77) years underwent MAS implantation. At ≥3 years of follow-up, there were 8 treatment failures, of which 7 occurred within the first year. The device was explanted in 7 patients without further complications and one patient opted for stoma creation because of constipation (no device removal). Reasons for device explants included infection (3), erosion (3), and lack of efficacy (1). One patient died from unrelated causes and 2 patients were lost to follow-up before 36 months. The remaining 24 patients were followed with a mean length of follow-up of 4.6 (range, 3.1-5.1) years. Overall, treatment success rates were 63% at year 1, 66% at year 3 and 60% at year 4. In patients who retained their MAS, 91% reported treatment success at 3 years and the number of incontinent episodes per week decreased from a mean of 13.9 at baseline to 3.4 (P<0.001). The therapy also improved CCIS and had a positive impact on the quality of life, as evidenced by significant improvements in all 4 scales of the FIQOL (Table).

Conclusions: Despite an early failure rate at 20%, MAS provided excellent outcomes in patients who retained a functioning device at long-term follow-up with relief of incontinence symptoms and improvement in quality of life. The device maintains an acceptable safety profile and can be removed safely if needed. MAS remains a promising new treatment option for select patients with severe FI.

Table: Outcomes in patients with retained MAS

	Preoperative	1 year	3 years	4 years
Treatment success	-	79%	91%	82%
FI episodes per week, Mean (±SD)	13.9±6.6	3.8±5.1	3.4±4.3	2.6±3.9
CCIS, Mean (±SD)	15.7±2.2	7.5±4.2	7.5±5.6	8.0±5.0
FIQOL - Lifestyle, Mean (±SD)	2.5±0.8	3.5±0.6	3.5±0.6	3.4±0.8
FIQOL - Coping/Behavior, Mean (±SD)	1.5±0.6	2.8±1.0	2.9±0.9	2.8±0.9
FIQOL - Depression/Self Perception, Mean (±SD)	2.4±0.7	3.3±0.7	3.2±0.7	3.2±0.7
FIQOL - Embarrassment, Mean (±SD)	1.8±0.7	2.9±1.1	2.9±0.8	3.0±0.8

S65

LAPAROSCOPIC VENTRAL RECTOPEXY VERSUS LAPAROSCOPIC WELLS RECTOPEXY FOR COMPLETE RECTAL PROLPASE IN THE ELDERLY: LONG-TERM RESULTS.

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Purpose: There is no agreement about which laparoscopic rectopexy technique is best for treating elderly patients . To compare functional outcome, the recurrence rate, and quality of life in elderly patients treated with laparoscopic ventral rectopexy (LVR) versus the laparoscopic Wells rectopexy (LWR) for complete rectal prolapse (CRP).

Methods: A retrospective review of a prospectively maintained database of consecutive patients > 70 years of age who presented with CRP. Patients were non-randomly assigned to LVR or LWR according to surgeon preference. Exclusion criteria were previous major abdominal surgery or other colorectal pathology. Patients were assessed preoperatively by clinical examination to evaluate constipation using the Wexner constipation score (WCS), incontinence using the Wexner incontinence score (WIS) and quality of life using the gastrointestinal quality of life index (GIQLI). Anorectal manometry was performed for evaluation of mean resting anal pressure (MRP) and maximum anal squeeze pressure (MSP). The balloon expulsion test was used to measure first constant sensation (FCS), urge to defecate volume (UDV) and maximum tolerable volume (MTV). The primary outcome measure was functional outcome (constipation and continence) after surgery. Secondary outcome parameters were operative time (OT), complications, length of hospital stay (LOS), recurrence, and GIQLI.

Results: A total of 84 elderly patients (mean age : 76years, 68 (81%) females) with CRP had LVR (n= 47) and LWR (n=37). OT was significantly longer in LVR (133 vs 89 minutes; p=0.001). Also LOS was significantly longer in LVR (4.5 vs. 2.7 days; p < 0.001). Recurrences were reported in 2 patients in the LVR group versus 1 patient after LWR (p= 0.11). In LVR, mean WCS decreased from 11.3 to 5.1 postoperatively (p < 0.0001) while in LWR it decreased from 8.9. to 7.4 (p =0.82). Mean WIS decreased in LVR from 5.9 to 3.8; p=0.045. While in LWR it decreased from 6.4 to 2.9; p=0.001. The improvements in the WIS were maintained during the whole follow-up period in both groups (median: 36 months). Overall, there was a significant increase in MSP and UDV in both groups. MTV increased significantly after LWR, however, the increase after LVR was not significant. GIQLI improved from 74.4 to 124.9 in LVR and from 79.3 to 112.6 in LWR. The change was statistically significant (p= 0.0001) in both groups.

Conclusions: Both LVR and LWR successfully corrected the prolapse and avoided recurrence in elderly patients. Both procedures are safe even if the patient has comorbidities and they could be used in the elderly subpopulation normally treated with a perineal approach. OT and LOS were significantly shorter in LWR. LVR appears to be most suitable for patients with a high WCS while LWR appears most suitable for patients with a high WIS.

S66

FLUORESCENT IMAGING IN ANORECTAL ADVANCEMENT FLAPS.

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Purpose: Rectal mucosal advancement procedures are commonly used for perianal fistulas. These procedures can have up to a 30% early complication rate. Flap separation is a common complication likely attributed to poor profusion or technical error. We demonstrate a novel use of fluorescent angiography and near infrared illumination (NIR) imaging for anorectal flap procedures to reduce postoperative flap complications.

Methods: We document a video presentation of a case of a 54 year-old man with a history of recurrent transphincteric anal fistula five months from his last fistula procedure. Previously, he underwent a prior seton placement, drainage procedures, and mucosal advancement flap. Prior colonoscopy and biopsies excluded Crohn's disease. Shown is his second rectal advancement flap with flap profusion confirmed by florescent angiography and NIR imaging.

Results: Fluorescent angiography and NIR imaging confirmed profusion of a mucosal rectal advancement flap in a patient with prior failed fistula treatment. At short term follow-up, there were no flap complications.

Conclusions: Assessment of anorectal microvascular perfusion using florescent angiography and NIR imaging guided our intra-operative decision making to help reduce post-operative anorectal flap complications associated with local ischemia. We advocate the use of florescent angiography and NIR imaging for complex fistula-in-ano and re-operative anorectal procedures.

S67

BIO-THIERSCH AS AN ADJUNCT TO PERINEAL PROCTECTOMY REDUCES THE RATE OF RECURRENT RECTAL PROLAPSE.

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Purpose: Recurrence rates of rectal prolapse after perineal proctectomy (PP) varies widely in the literature, with incidences ranging between 0-50%. The Thiersch procedure, first described in 1891 for the treatment of rectal prolapse, involves encircling the anus with a foreign material with the goal of confining the prolapsing rectum above the anus. The bio-Thiersch procedure (BT) utilizes biological mesh for the anal encirclement and can be used as an adjunct to PP for rectal prolapse. The aim of the current study

was to evaluate the BT procedure as an adjunct to PP and the impact on recurrence rates of rectal prolapse.

Methods: A review of prospectively collected data identified patients who had undergone PP and those who received BT as an adjunct to PP (PP+BT) at a single institution from January 2005 to August 2015. All PP procedures were performed with levatorplasty. Primary outcome is the incidence of recurrent rectal prolapse. Secondary outcomes included demographics, ASA class, length of follow-up, time to recurrence, history of prior prolapse procedure, and type of mesh used. Complications related to the procedures were reported. A two-tailed Fisher's exact test and unpaired t-test were used for analysis.

Results: 62 patients underwent PP (7 had a prior prolapse procedure) and 24 patients underwent PP+BT (11 had a prior prolapse procedure). Patients who underwent PP+BT had a lower rate of recurrent rectal prolapse ($p<0.05$), despite a higher proportion of patients with prior prolapse procedures ($p<0.001$; Table). There were no significant differences in mean age, BMI, ASA class, length of follow up or time to recurrence between the two groups. The type of biological mesh implanted in the BT procedure group included Strattice™ (non cross linked porcine dermis, n=18), Veritas™ (non cross linked bovine pericardium, n=5), and XenMatrix™ (non cross linked porcine collagen, n=1). Complications following PP include 1 patient who died on postoperative day 1 (myocardial infarction), anal stenosis (n=1), retro-rectal abscess (n=1), and c. dificile colitis (n=1). One patient, who underwent BT procedure, had a perianal infection and subsequent mesh (Veritas™) explantation.

Conclusions: Addition of BT as an adjunct to PP appears to be safe in most patients and may reduce the risk for recurrent rectal prolapse. This can be a particularly effective option for challenging patients with a history of prior failed prolapse procedures.

Table. Comparison between PP and PP+BT procedures

Variable	PP (N=62)	PP+BT (N=24)	P value
Age, mean ± SD, y	78 ± 14.1	79 ± 14.0	0.790
Sex, n (%) Female Male	 59 (95.2) 3 (4.8)	 22 (91.7) 2 (8.3)	 -
BMI, kg/m^2, mean ± SD	24.0 ± 5.5	26.6 ± 6.6	0.137
ASA class, n (%) I II III IV	 1 (1.6) 19 (30.6) 38 (61.3) 4 (6.5)	 0 (0) 13 (54.2) 11 (45.8) 0 (0)	 1.000 0.051 0.226 0.572
Recurrent prolapse, n (%)	18 (29.0)	2 (8.3)	*0.049*
Prior prolapse procedure, n (%) Perineal proctectomy, n Resection rectopexy, n Delorme, n Unknown, n	7 (11.2) 3 1 1 2	11 (45.8) 9 2 - -	 *0.001*
Follow up, mean	18.6 (range 1-84) months	13.6 (range 0.5-53) months	0.237
Time to prolapse recurrence, mean	23.9 (range 2-48) months	20.5 (range 2-29) months	0.754

S68

EFFECTS OF HYSTERECTOMY ON PELVIC FLOOR DISORDERS: A LONGITUDINAL STUDY.

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Purpose: Hysterectomy might adversely affect pelvic floor functions and result in many different symptoms, such urinary and anal incontinence (ui, ai), obstructed defecation (od) and constipation (c). The aim of this prospective study was to evaluate the influence of hysterectomy on pelvic floor disorders.

Methods: The study was performed on patients who underwent hysterectomy for benign pathologies. Women were excluded who had a history of previous gastrointestinal, anorectal, or gynaecological surgery. A questionnaire about urinary incontinence (International Continence Society Scoring), anal incontinence, constipation, and obstructed defecation (Rome criterias & Constipation Severity Score) along with an extensive obstetric history was administered preoperatively and postoperatively up to four years. Patients (n=327) who had completed each postoperative follow–up up to 4 years, were included in this study. In order to assess the differences between repeated measures along time, both the Cochran Q test and Friedman test were performed with their posthoc tests. $p<0.05$ was considered as statistically significant.

Results: Analyses were carried on patients who had no previous complaints with the selected symptoms (ui, ai, od, and c). The mean age of the participants was 49 years (range 39 - 90). Compared to the preoperative observations, the percent of each symptom was significantly increased for each disorder over four time periods (table). In addition to this patients who had no preoperative complaint (n=70) for all of the selected symptoms (ui, ai, od, and c), the percentages for the presence of any selected symptoms was 15.8%, 14.3%, 11.4% and 8.6 for the postop 1st, 2nd, 3rd, 4th years, respectively ($p<0.01$ – compared to preop).

Conclusions: Hysterectomy for benign gynaecologic pathologies had a significant negative impact on pelvic floor functions in patients who had no previous symptoms.

Disorder	Postop 1 yr	Postop 2 yr	Postop 3 yr	Postop 4 yr	p value
Constipation (n=245)	7.8%	8.2%	8.6%	5.3%	p<0.001
Constipation severity score (mean)	0.75	0.85	0.75	0.27	p<0.001
Obstructed defecation (n=269)	4.5%	5.2%	4.1%	3.0%	p<0.001
Anal incontinence (n=267)	2.6%	5.2%	5.2%	4.1%	p<0.001
Urinary incontinence (n=99)	12.1%	12.1%	11.1%	13.1%	p<0.001

Number in brackets represents the patients who had no previous complain on selected symptoms

S69

THE CORRELATION BETWEEN PERINEAL DESCENT AND THE ANATOMIC AND FUNCTIONAL ABNORMALTIES OF THE PELVIC FLOOR ASSESSED BY DYNAMIC THREE-DIMENSIONAL ENDOVAGINAL ULTRASONOGRAPHY.

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Purpose: The aim of this study was to describe a novel 3-D dynamic endovaginal ultrasonography technique(EVUS) for assessment of perineal descent(PD), comparing it with echodefecography-EDF (dynamic 3D anorectal ultrasonography) and correlate with the anatomic and functional abnormalities of the pelvic floor.

Methods: A prospective study including 61 women with pelvic floor dysfunctions, all of them with obstructed defecation symptoms, 30 complaining of fecal incontinence(FI) and 12 of urinary incontinence(UI). All patients were submitted to EDF and EVUS and were distributed in two groups according to the presence of PD on EDF. GI-normal PD(measured by the displacement of puborectalis musclesPR ≤2.5cm) and GII-Excessive PD(the displacement of PR >2.5cm). On EVUS, the anorectal junction position-ARJ was measured relative to the lowest margin of the symphysis pubis-SP. The PD was determined according to the AJR position below the SP on Valsalva or the displacement value of the ARJ position between at rest and Valsalva maneuver. The symptoms of FI and/or IU, sphincter and/or levator ani defects, the area of the levator hiatus(LH) were analyzed and correlated with the presence of excessive PD

Results: GI included 29(2 nulliparous and 27 with previous vaginal delivery-VD), mean age 59y. Of them, 27 were identified on EVUS by the displacement of AJR≤1cm, mean 0.6cm (range 0.1-1) and the mean AJR position was 0.6cm (range 0-2.3) above the SP on Valsalva. GII included 32(1 nulliparous and 31 with VD), mean age 62y. Of them, 30 were identified on EVUS: 24 the mean AJR position was 0.4cm(range 0.3-2.4) below the SP and the mean displacement of ARJ was 1.4cm(range 0.4-3.6) and in 6 the displacement of ARJ was >1cm, mean 1.3cm(range 1.2-1.7) and the mean AJR position was 0.4cm (range, 0-0.8) above the SP. The Lee *Kappa* index for normal and Excessive PD were perfect agreement(K=0.86). The distribution of FI and UI symptoms were similar compared GI with GII. As well as anatomic factors like the presence of sphincter muscles and/or levator ani defects

and the similar measurements of LH area, presence of rectocele grade II–II, intussusception and anismus were also similar compared GI with GII (Table).

Conclusions: EVUS showed to be a reliable technique for assessment of PD based on the comparative findings with the EDF technique. It was possible to quantify this dysfunction and determine the excessive PD using EVUS by displacement of the ARJ >1 and/or its position below the SP. There was no correlation between the excessive PD with the presence of FI, UI, sphincter muscles and/or levator ani defects, enlargement of LH area on Valsalva and rectocele, intussusception and anismus.

Data of Normal Perineal Descent compared with Excessive Perineal Descent

Date	Normal Perineal Descent 29 women	Excessive Perineal Descent 32 women	p
Functional factors			1.00
Fecal Incontinence (yes)	14 women	16 women	1.00
Urinary incontinence (yes)	06 women	06 women	
Anatomic factors			
Sphincter defect (yes)	14 women	20 women	0.30
Levator ani defect (yes)	4 women	09 women	0.20
Levator Ani Area (mean)	19 cm	20 cm	0.26
Rectocele (yes)	09 women	13 women	0.59
Intussusception (yes)	11 women	15 women	0.60
Anismus (yes)	12 women	12 women	0.79

S71

LAPAROSCOIC VENTRAL MESH RECTOPEXY (LAP VMR).

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Purpose: Lap VMR is an effective management option for paitnets with external rectal prolapse or obstructed defecation (ODS). the technique needs to be learned properly a there is a risk of complications if not performed correctly.

Methods: We desrcibe a case of Lap VMR for apatient with rcurrent rectocele and intussuception. Port placement, dissection technique and tips are discussed.

Results: N/a

Conclusions: Lap VMR can be a very safe option of management of patients with external prolapse and ODS

E-posters of Distinction

PD1

ANORECTAL MANOMETRY AND ENDOANAL ULTRASOUND IN THE EVALUATION OF FECAL INCONTINENCE: USEFUL ADJUNCTS OR UNNECESSARY TESTING?

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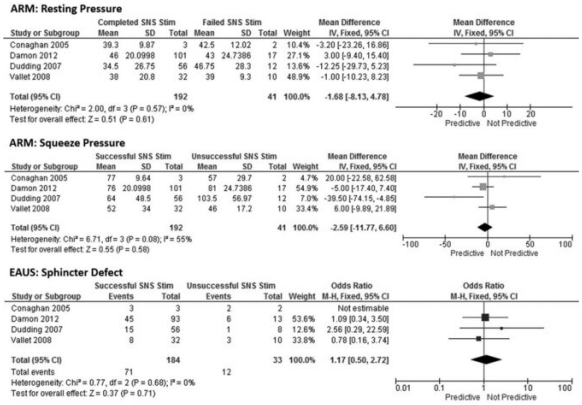
Purpose: Anorectal manometry (ARM) and endoanal ultrasound (EAUS) have traditionally been used to help understand the pathophysiology of fecal incontinence (FI) and guide its clinical management. However, controversy remains over the true utility of these tests due to limited evidence validating their indications, methods, strengths and limitations. The aim of this systematic review and meta-analysis was to evaluate the use of ARM and EAUS in the preoperative workup of FI, and determine if the results of such parameters influence response to sacral nerve stimulator (SNS) testing.

Methods: The PubMed database for the period between 2000 and 2015 was searched for studies involving SNS for the treatment of FI. Studies were in English, focused on adult population, and included preoperative ARM and EAUS test results for all patients. The major endpoint was eligibility for SNS permanent implant based on response during the trial period. ARM and EAUS results were compared between responders and non-responders. Weighted averages of baseline resting pressures and squeeze pressures were calculated for both groups, as well as the proportion of sphincter defects. Inverse Variance meta-analysis was performed on continuous variables (anal pressures), and Mantel-Haenszel analysis was performed on dichotomous sphincter defects.

Results: Only four publications met the inclusion criteria. A total of 233 pooled patients were evaluated for SNS trial. A permanent implant was placed in 192 who responded successfully. There was no significant difference demonstrated between responders and non-responders for any preoperative test. Fig 1 summarizes results.

Conclusions: Baseline ARM and EAUS results of patients who fail SNS trial are not highly reported, thus limiting eligible studies for review. However, our results indicate neither anal resting pressure, squeeze pressure, nor sphincter defect predict response to SNS trial. This concurs with well established findings that ARM and EAUS do not predict clinical outcomes after SNS. Although historically thought to be critical in the evaluation and treatment of fecal incontinence, ARM and EAUS testing may no longer determine clinical management if SNS is considered.



PD2

GUNSIGHT VERSUS PURSESTRING PROCEDURE FOR CLOSING THE WOUND FOLLOWING OSTOMY CLOSURE: A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL.

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Purpose: Both pursestring closure and gunsight skin closure techniques have been reported to reduce surgical site infections and improve cosmetic outcomes in stoma reversal procedures.The purpose of this study was to compare the surgical site infection rate and other postoperative outcomes between the pursestring and gunsight techniques following stoma reversal.

Methods: We designed a prospective, randomized, controlled trial (NCT02053948) to compare pursestring and gunsight techniques for skin closure following stoma reversal. After fascia was closed in a simple continuous pattern using polydioxanone, randomization was performed. In pursestring group, the skin was closed by using pursestring subcuticular continuous suture, leaving an open orifice of 5 mm. In gunsight group, four triangles were made around the wound, and a circumferential subcuticular monofilament suture is placed in the wound edge.The residual wound resembles a gunsight with an open orifice of 5 mm. The primary outcome measured was the surgical site infection rate and healing time. Secondary outcomes included post-operative pain, operative time, length of hospital stay, and cosmetic outcomes.

Results: A total of 59 patients were randomly assigned to undergo gunsight (29 patients) or pursestring (30 patients) technique between June 2013 and March 2015. The patients' characteristics, complications and prognosis were recorded (table 1). The mean age was 60.5 years in gunsight

group versus 60.8 in pursestring group (P=0.82). The mean operating time was 79.8 ± 10.6 min in gunsight group and 77.3 ± 10.6 min in pursestring group (P=0.37). There was also no difference in postoperative pain, postoperative hospital stay or patient satisfaction between groups. One (3.4 %) patient in gunsight group and two (6.7 %) patients in the pursestring group developed wound infection (P = 1.00). Wound healing time was significantly shorter in the gunsight group than in the pursestring group (16 vs 26 days, *P* < 0.001).

Conclusions: Both gunsight and pursestring techniques have low surgical site infection rate following ostomy wound closure. Gunsight technique has the advantage of shorter complete healing time than pursestring technique.

Clinical characteristics grouped by surgical technique

		Pursestring (n = 30)	p value
Age (years)	60.5 ± 9.4	60.8 ± 9.8	.82*
Gender (Male/female)	17/12	20/10	.52†
BMI (kg/m2)	26.8 ± 3.4	25.7 ± 2.3	.25*
COPD	4	2	.64†
Diabetes mellitus	9	5	.20†
Steroid use	1	0	.49†
Smoking	14	18	.52†
Original indication for surgery			.98†
Cancer	27	29	
No cancer	2	1	
Stoma type, n (%)			.96†
Ileostomy	24	26	
Colostomy	5	4	
Timing for stoma, (days)	257.1 ± 60.2	245.9 ± 49.9	.44*
Duration of surgery (min)	79.8 ± 10.6	77.3 ± 10.6	.37*
Estimated blood loss (ml)	34.8 ± 10.2	34.3 ± 9.4	.85*
Postoperative pain (VAS)			
Day 1	3.7 ± 1.3	3.5 ± 1.1	.47*
Day 2	2.9 ± 0.9	2.6 ± 0.9	.20*
Day 3	1.7 ± 0.6	1.8 ± 0.7	.81*
Postoperative hospital stay (days)	7.2 ± 1.1	7.6 ± 1.3	.22*
Surgical site infection (%)	1	2	1.00†
Complete healing time (days)	17.2 ± 5.2	25.9 ± 5.9	< .001*
Overall satisfaction at 6 months (VAS)	8.3 ± 1.4	8.0 ± 1.5	.47*
Cosmesis at 6 months (VAS)	8.4 ± 1.4	8.2 ± 1.7	.72*
Postoperative follow-up (d)	181 ± 4.3	183 ± 7.8	.27*

* t test; † chi-squared analysis; BMI = body mass index; COPD = chronic obstructive pulmonary disease; VAS = visual analogue scale

PD3

INCREASING EXPERIENCE OF LIFT PROCEDURE FOR PATIENTS WITH CROHN'S DISEASE: WHAT HAVE WE LEARNED?

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Purpose: The ligation of the intersphincteric fistula tract (LIFT) procedure is an attractive surgical option in Crohn's disease (CD) patients as it minimizes both perianal wound creation and sphincter injury. Our early reported experience showed that 67% of CD patients were successfully treated with LIFT (Gingold DS, *et al.,* Ann Surg 2014;260:1057-61). The aim of this study was to determine the efficacy of LIFT in CD patients on longer follow-up.

Methods: Prospectively collected data on Crohn's disease patients undergoing LIFT procedure from January 2011 to October 2015 were reviewed. Fistula healing and factors affecting healing rates were assessed. LIFT site healing was defined as surgical site healing without drainage from the initial fistula site, based on surgeon's physical exam. Fisher's exact and Wilcoxon tests were used to compare categorical and continuous data, respectively.

Results: Twenty-three CD patients (12 women; median age = 39 years) were identified. After a median follow up time of 23 months (range 3 – 50), overall LIFT site healing was seen in 48% of the study patients (Table). Patients with healed LIFT had a median follow-up time of 10.5 months, while patients with failed LIFT had a median follow up time of 31 months (p = 0.039). The LIFT site healing for patients with follow-up less than 1 year was 75% compared to 33% for patients with follow-up more than 1 year (p=0.089). The median time to failure was 8 months (range: 1 – 21). Besides length of followup, the only other factor associated with LIFT site healing was disease location. Patients with small bowel CD were significantly more likely to have LIFT site healing (p=0.03), while patients with colorectal disease were significantly more likely to have LIFT site failure (p=0.04). Other factors such as preoperative biologic use, seton presence at operation, prior repair attempts, smoking status, associated perianal disease, fistula position, type of fistula and number of multiple fistula tracts did not appear to influence LIFT healing rates.

Conclusions: CD-associated anal fistulas may be treated with LIFT. However, longer follow-up is associated with an increased LIFT failure. Patients with colorectal CD are more likely to have LIFT failure compared to patients with small bowel CD.

Table

	Study Cohort	LIFT Success	LIFT Failure	P value
Gender (M/F)	11/12	6/5	5/7	0.68
Age, yr	39 (27-70)	34 (27-50)	41.5 (28-70)	0.2
Duration of disease (mo)	168 (18-336)	180 (36-336)	132 (18-324)	0.55
BMI	22.8 (20-37)	22.3 (20-37)	23.1 (21-33)	0.14
Disease location				
Small bowel	7	86%	14%	0.027
Ileocolic	8	63%	37%	0.4
Colorectal	12	25%	75%	0.039
Preop biologic use	8	50%	50%	1
Seton at operation	16	48%	56%	0.67
Duration of seton (mo)	4 (2-15)	5 (3-6)	3.5 (2-15)	0.76
Prior repair attempts	5	40%	60%	1
Smokers				
Current/Prior	5	20%	80%	0.32
Never	18	56%	44%	
Other perianal disease	5	20%	80%	0.32
Fistula position				
Midline	7	57%	43%	0.67
Lateral	16	48%	56%	
Type of fistula				
Anovaginal	6	33%	67%	0.64
Perineal	17	53%	47%	
Multiple fistula tracts	11	55%	45%	0.68
Follow up time (mo)	23 (3-50)	10.5 (3-49)	31 (3-50)	0.039

PD4

A NOMOGRAM TO PREDICT LYMPH NODE POSITIVITY FOLLOWING NEOADJUVANT CHEMORADIATION IN LOCALLY ADVANCED RECTAL CANCER.

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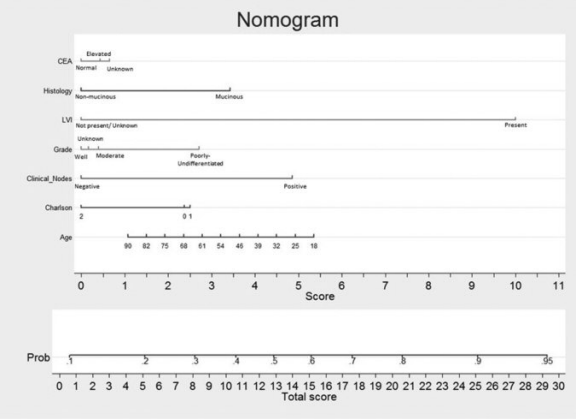
Purpose: Patients with locally advanced rectal cancer typically receive neoadjuvant chemoradiation (nCXRT) followed by total mesorectal excision (TME). Other approaches to treatment, including transanal techniques, alternatives to the use of radiation (chemotherapy alone approach), and even close surveillance are becoming increasingly common. Lack of pathologic lymph node (LN) staging is a major disadvantage. A nomogram to predict the likelihood of locoregional nodal metastases would be useful to help appropriately select and counsel patients regarding each treatment strategy.

Methods: Patients with clinical T3-T4, N0, M0 or Tany, N1-2, M0 rectal adenocarcinoma who underwent nCXRT followed by TME from 2010 to 2012 were identified using the National Cancer Database. Clinicopathologic variables including age, race, gender, Charlson comorbidity, histology, tumor grade, lymphovascular invasion (LVI), carcinoembryonic antigen (CEA), and clinical LN status were obtained. Logistic regression with bootstrap resampling with 500 repetitions was used to create a robust multivariable predictive model from the above-mentioned variables, the results of which were summarized as a nomogram. Model performance was evaluated by the concordance index (c-index) and calibration curves. The sensitivity of the model was calculated at varying predictive probability thresholds.

Results: 8,984 patients were included in our analysis. Younger age, lower Charlson score, mucinous histology, poorly-/un-differentiated tumors,

the presence of LVI, elevated CEA, and clinical LN positivity were significantly predictive of pathologic LN positivity following nCXRT. The nomogram is shown in figure 1. For each patient, the variable category is assigned a point score and the point total for all variables is translated into the predicted probability of LN positivity. For example, a patient who is 55 years old, with a Charlson score of 1, with clinically negative nodes, unknown LVI, elevated CEA, and a poorly differentiated, non-mucinous tumor would have a point total of 9.5 and a predicted LN positivity rate of approximately 35%. The predictive accuracy of the model is 70.9%, with a c index of 0.71. There was minimal deviation between the predicted and observed outcomes.

Conclusions: We have created a nomogram based on preoperatively available clinicopathologic features to predict LN positivity following nCXRT for locally advanced rectal cancer. In this patient population, less-invasive, organ-sparing approaches following nCXRT, as well as alternatives to current chemoradiation paradigms are being increasingly utilized despite lack of definitive nodal staging. This model may serve as a valuable tool, along with imaging, to help inform the discussion between surgeons and their patients regarding choice of treatment.



PD5

PROXIMAL INTERNAL SPHINCTEROTOMY FOR CHRONIC ANAL FISSURE: AN OLD PROBLEM, BUT A NEW SOLUTION.

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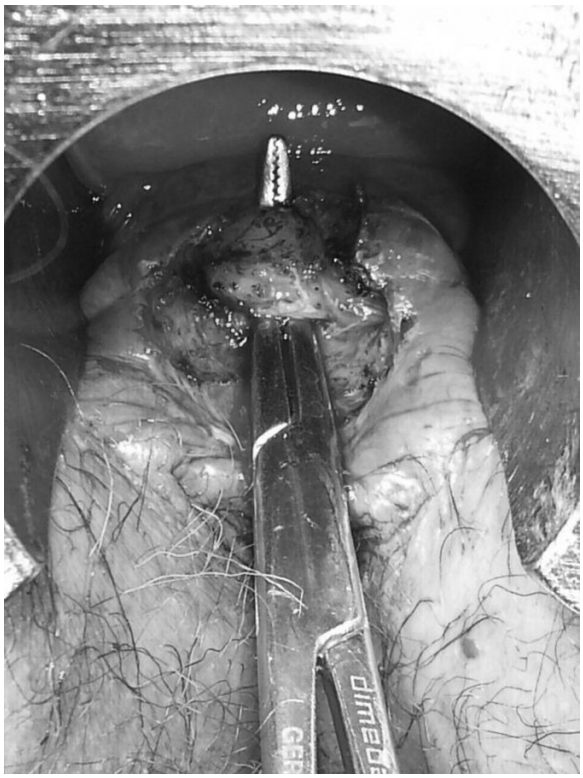
Purpose: Fecal leakage after internal sphincterotomy for anal fissure is common, but less reported. This prospective randomized study designed to compare the results of a new described internal sphincterotomy technique with a classical lateral internal sphincterotomy technique on internal anal sphincter function in patients with chronic anal fissure.

Methods: Fifty patients (32 Male, 18 Female) with chronic anal fissure with high resting anal pressure (>85 mm Hg, Mean: 102±0.4) included this study. Patients with low resting anal pressure, recurrent anal fissure, and fissure located other than posterior anal canal, fissure due to inflammatory bowel or infectious disease excluded from the study. Proximal internal sphincterotomy(PIS):Internal sphincterotomy performed through the base of the posterior fissure. Scissor dissection performed through the submucosal plane up to the level of dentate line. 0.5 centimeters of the bottom portion of the internal anal sphincter preserved as a standard in all patients. The proximal internal sphincter cut from this point up to the level of the dentate line by using cautery. Lateral internal sphincterotomy (LIS): Lateral internal sphincterotomy performed in classically described closed fashion by using scalpel. The length of sphincterotomy was equal to the length of anal fissure. All patients followed at 1, 6 and 12-month interval postoperatively. Anal fissure healing evidenced by clinical examination. The adequacy of internal sphincterotomy, as tested by endorectal ultrasound and anal manometry and incontinence scores in postoperative follow up period.

Results: Total of fifty patients (32 Male, 18 Female) included to the study; mean age 38.2 years (19-46y), mean follow-up 12±0.2 months (3-16). All cases healed clinically without any recurrence. Resting anal canal pressure decreased to normal after surgery in both group. Postoperative complication rates similar in two groups of patients.

Conclusions: This study suggests that this new described internal sphincterotomy technique is as feasible and effective as Closed LIS in decreasing anal resting pressure in chronic anal fissure patients. By using this technique, it may be possible to perform anal fissure surgery in a standard way for all general or colorectal surgeons.



PD6

PRIMARY ANASTOMOSIS WITH OR WITHOUT PROXIMAL DIVERSION IN EMERGENCY SURGERY FOR DIVERTICULAR DISEASE: IS THERE A DIFFERENCE IN 30-DAY OUTCOMES?

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Purpose: Acute complications of diverticulitis include bleeding, perforation, and abscess. Although non operative and radiologic treatments are available, some patients progress to operation. Studies have suggested that resection with primary anastomosis and proximal diversion is a safe alternative to a Hartmann's procedure. We sought to determine whether there was a difference in 30 day outcomes in patients treated with resection and primary anastomosis with or without proximal diversion.

Methods: ACS NSQIP database was queried from 2005 to 2013 based on an ICD9 coded diagnosis of diverticula or diverticulosis of colon without bleeding (562.1) and diverticulitis of colon without bleeding (562.11) and who had emergency surgery. We used CPT codes for colectomy with anastomosis (44140, 44145), colectomy with resection and diversion (44146, 44141) as well as lap colectomy with anastomosis (44204, 44207) and lap colectomy with anastomosis with proximal diversion (44208). To assure we correctly identified patients with proximal diversion we included concurrent procedure codes ileostomy/jejunostomy non-tube (44310) or cecostomy (44320).

Results: 2038 patients met criteria. 1912 (94%) had resection and primary anastomosis (Group I). 123 (6%) had resection and anastomosis with proximal diversion (Group II). Group I included 905 males(mean age 56.2 ± 14 yrs) and 1007 females(65.4 ± 14yrs). Group II included 64 males(mean age 54.9 ± 12 yrs) and 58 females(63.5 ±14yrs). There was no difference in gender distribution but women were significantly older in both groups ($p < 0.0006$). There was no difference in BMI (29.1±6 vs 28.1± $p = 0.11$), preop albumin (3.3 ± 0.7 vs 3.5 ± 0.6 $p = 0.10$), preop HCT (35 ± 5.9 vs 28 ± 5.3 $p = 0.52$), preop WBC count (13.4 ± 6.4 vs 13.7 ± 5.7 $p = 0.54$) or functional status $p=0.71$) between the groups. Group II patients did not appear to be sicker at the time of surgery with regards to ASA class ($p = 0.14$) or wound class ($p = 1498$). Group II patients did have a higher incidence of diabetes, COPD, and smoking. Regardless of preop physiology, patients fared the same postoperatively despite longer operative times in Group II (133 ± 61 vs 158 ± 67 minutes $p < 0.0001$). There was no difference in SSI (141 vs 7 $p = 0.76$), deep wound infection (36 vs 5 $p = 0.09$), organ space infection (124 vs 8 $p = 0.93$), septic shock (126 vs 3 p value 0.18), PE (20 vs 3 $p = 0.15$), CVA (7 vs 0 $p = 0.5$), MI (15 vs 0 $p = 0.32$) or LOS(10 vs 8 days $p = 0.11$). There were 88 deaths in the no diversion group and 2 deaths in the proximal diversion group ($p = 0.51$).

Conclusions: There is no difference in 30 day outcome for patients undergoing emergency surgery for diverticular diseases with primary anastomosis with or without proximal diversion. Our data suggests an extremely limited role for diversion if a primary anastomosis is possible.

PD7

VEDOLIZUMAB AS RESCUE THERAPY IN CROHN'S DISEASE: RESULTS FROM A TERTIARY CARE CENTER.

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Purpose: Vedolizumab (VDZ) is a monoclonal antibody that binds to the a_4b_7 integrin and results in gut-selective anti-inflammatory activity. It was FDA-approved in May 2014 for use in patients with Crohn's disease (CD). No data exists on the specific ability of VDZ to prevent surgery in cases where all other medical therapies have failed. We hypothesized that patients with CD who failed TNF-a antagonists can be effectively treated with VDZ and avoid surgical intervention.

Methods: A retrospective review was performed on consecutive patients with CD who received VDZ between May 2014 and October 2015 in the IBD Center at Penn State Hershey Medical Center. These patients were unresponsive or intolerant to TNFa antagonist therapy, and in the previous era they would have undergone surgery for medically refractory disease. Patient demographics (age, sex, smoking, ASA class), disease characteristics (age of diagnosis, length of time with disease, location, behavior, reason for TNFa antagonist failure) and prior surgery were recorded. Outcomes included clinical response to VDZ, defined by symptomatic improvement in abdominal pain and frequency of bowel movements, and need for surgical intervention. Statistical analysis was performed using chi-square test for categorical variables and t-test for continuous variables.

Results: A total of 42 patients with refractory CD receiving VDZ were included with a mean age 39.3 ± 10.9 years (female predominance 62%) and median disease duration of 10 years. The length of follow up ranged from 1-15 months, with a median of 10 months. Previous treatment failures with ≥ 2 TNFa antagonists occurred in 62% of patients, and 10% of patients were steroid dependent. Overall clinical response was achieved in 24 patients (57%), while documented endoscopic improvement was noted in 20%. Surgical intervention was required in 10 of 42 patients (24%). Eight operations were for intestinal disease, while 2 surgeries treated perianal disease. Adverse events related to VDZ occurred in 24% of patients, but none warranted discontinuation of the medication. No patient or disease characteristic was found to be associated with either clinical response or surgical intervention (Table 1).

Conclusions: VDZ was both safe and effective when used as a rescue therapy in CD patients who failed other medical therapy; however, 25% of these patients still required surgery while on VDZ. No patient or disease characteristics were found to predict failure of VDZ rescue therapy in CD patients.

Patient and disease characteristics

Variable	No Surgery (n = 32)	Surgery (n = 10)	P value
Age (mean ± SD)	39.3 ± 11.7	39.3 ± 8.6	0.230
Gender			0.465
Female, n (%)	21 (65.6%)	5 (50%)	
Smoker, n (%)	4 (12.5%)	1 (10%)	0.659
ASA Class			0.128
Class 2, n (%)	23 (71.9%)	4 (40%)	
Class 3, n (%)	9 (28.1%)	6 (60%)	
Hypertension, n (%)	7 (21.9%)	1 (10%)	0.655
Disease duration (years ± SD)	15.2 ± 8.5	19.6 ± 9.2	0.820
Location of Crohn's			0.848
ileal, n (%)	4 (12.9%)	1 (10%)	
colonic, n (%)	5 (16.1%)	1 (10%)	
ileocolonic, n (%)	22 (71%)	8 (80%)	
Behavior of Crohn's			0.184
inflammatory, n (%)	9 (29%)	1 (10%)	
stricturing, n (%)	9 (29%)	6 (60%)	
fistulizing, n (%)	13 (41.9%)	3 (30%)	
Perianal disease, n (%)	11 (36.7%)	5 (50%)	0.482
Extra-intestinal manifestations, n (%)	12 (37.5%)	5 (50%)	0.714
Prior surgery for CD, n (%)	25 (78.1%)	9 (90%)	0.655
Adverse effects of VDZ, n (%)	8 (25%)	2 (20%)	0.746

PD8

ABDOMINOPERINEAL RESECTION: LOCAL RECURRENCE SHOULD OCCUR VERY RARELY.

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Purpose: Abdominoperineal Resection (APR) remains an important option for curative resection of low rectal cancers; however, increased local recurrence rates remain problematic. We have always performed a tumor-specific total mesorectal excision, including appropriate perineal margins, albeit not always a formal "cylindrical APR". We hypothesized this approach would lead to improved oncological outcomes including lower local recurrence rates.

Methods: A retrospective chart review of all patients who underwent APR from 2005 to 2015 at a single tertiary academic medical center by a group of experienced colorectal surgeons. Preoperative, intra-operative and postoperative metrics were evaluated. The primary outcome was local recurrence.

Results: As a whole, 232 APR patients were identified, with a mean follow-up of 30 months (range, 0-123 months). Mean age was 62.8 years (range, 24 – 94) and 53% of the patients were male. Surgical approaches included open (65%), laparoscopic (34%), and robotic (1%). Conversion to open procedure occurred in 19% (15/79). Multi-visceral resections (defined by the addition of cystectomy, hysterectomy or prostatectomy) represented 18% of these procedures. Mean length of stay overall was 10.1 days, with a mean of 11.3 days for the open group and 7.4 days for the laparoscopic group. The most common diagnosis was rectal cancer (81%), followed by 12% having anal cancer, and 7% with either uterine, ovarian, vaginal, urothelial, prostatic, or melanoma. Of the 161 patients undergoing resection for rectal cancer, mean follow-up was 31.3 months (range 0 – 123 months), and 92% had neo-adjuvant therapy. Tumors were a mean of 4.3 cm away from the anal verge. The post-resection circumferential margin was positive in 9% of patients. There were 28 deaths (17.1%) during follow-up and Kaplan-Meier analysis showed five-year overall survival of 73%. Of the rectal cancer patients, 133 patients underwent R0 resection (82.6%), out of whom two (1.5%) had local recurrence, 8 patients had distant recurrences (6.0 %) and Kaplan-Meier analysis showed five-year disease-free survival of 86%.

Conclusions: Abdominoperineal resections can achieve excellent oncological outcomes with low local recurrence rates. Great care needs to be paid to circumferential margins during pre-operative planning and surgery. Short-term outcomes can also be acceptable in the setting of a standardized care plan.

PD9

THE IMPACT OF BOWEL PREP ON THE SEVERITY OF ANASTOMOTIC LEAK IN ELECTIVE COLECTOMY.

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Purpose: There has been a paradigm shift in the use of preoperative bowel prep for elective colorectal surgery, and the current best practice remains uncertain. The literature is conflicted, with most studies focused on surgical site infection. Our goal was to assess the impact of different bowel prep regimens on the incidence and severity of anastomotic leak for elective colon resections. Our hypothesis was the combination of oral antibiotic and mechanical bowel prep was associated with the lowest rate and severity of anastomotic leak.

Methods: The 2012 and 2013 Colectomy Procedure-Targeted American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database was reviewed to identify all patients undergoing elective colectomy through a laparoscopic or open approach. The primary outcome was the relationship between the bowel prep regimen (no prep, mechanical prep only [MBP], oral antibiotic and mechanical prep [OMBP]) and the severity of anastomotic leak (no leak, leak without intervention, leak with percutaneous intervention, leak with reoperation). The secondary outcomes were the rates of ileus, superficial site infection length of stay, readmission, and reoperation in each bowel preparation arm.

Results: 18,485 patients were included in the analysis- 5,364 (29.0%) no prep, 7,613 (41.2%) MBP, and 5,508 (29.8%) OMBP. The overall anastomotic leak rate was 3.2%. The incidence of leak was strongly correlated to bowel preparation regimen. Patients with no bowel prep had the highest incidence of leak (4.3%), followed by MBP (3.3%), then OMBP (1.9%, p=0.05). However, the leak severity/ need for intervention were similar across bowel prep arms. Patients with no prep had higher rates of ileus, surgical site infection, unplanned readmission and reoperation, and longer lengths of stay compared to MBP (all p<0.001), while MBP patients had higher rates of ileus, surgical site infection, unplanned readmission and reoperation, and longer lengths of stay versus OMBP patients (all p<0.001).

Conclusions: Bowel preparation affects the incidence of anastomotic leak, with OMBP having the lowest rates. However, when leaks do occur, the severity and need for intervention were clinically similar across bowel preparation regimens. Short-term clinical and quality outcomes were significantly improved with OMBP compared to MBP and no prep. Our findings support routine use of combined oral antibiotic and mechanical bowel prep for elective colectomy.

Variable	No prep	MBP	OMBP	p-value
n	5,364 (29.0%)	7,613 (41.2%)	5,508 (29.8%)	
No leak	5,135 (95.7%)	7,365 (96.7%)	5,403 (98.1%)	<0.001
Anastomotic Leak	229 (4.3%)	248 (3.3%)	105 (1.9%)	0.05
Leak without intervention	34 (14.8%)	34 (13.7%)	13 (12.4%)	
Leak with percutaneous intervention	54 (23.6%)	56 (22.6%)	23 (21.9%)	
Leak with reoperation	141 (61.6%)	158 (63.7%)	69 (65.7%)	
Postoperative Ileus (%)	16.1	12.2	9.1	<0.001
Surgical Site infection (%)	7.6	6.5	3.1	<0.001
Unplanned Readmission (%)	10.4	8.7	7.4	<0.001
Reoperation (%)	5.5	4.6	3.2	<0.001
Length of Stay (mean, SD)	8.5 (8.4)	6.9 (7.4)	5.8 (5.1)	<0.001

MBP- mechanical prep; OMBP- oral antibiotic and mechanical prep

PD10

WHO GETS A POUCH AFTER COLECTOMY IN NEW YORK STATE AND WHY?

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Purpose: It is unclear which factors are associated with creation of an ileal pouch-anal anastomosis (IPAA) following total colectomy for ulcerative colitis. This study sought to identify and explain sources of variation in IPAA rates across individual surgeons and hospitals within New York State.

Methods: The Statewide Planning & Research Cooperative System (SPARCS) was used to identify patients with ulcerative colitis who underwent total colectomy in New York State from 2000-2011. Surgeons and hospitals performing the total colectomy were characterized as IPAA surgeons/hospitals if they performed an average of ≥ 2 IPAAs for ulcerative colitis per year. Bivariate and mixed-effects multivariable analyses were performed to assess patient, surgeon, and hospital-level factors as well as surgeon and hospital-level variation associated with subsequent IPAA within two years of total colectomy.

Results: Of the 1,819 patients who met inclusion criteria, 34% of patients underwent IPAA following total colectomy, of which 7.5% of the IPAAs were performed with a minimally invasive approach. Overall, 424 surgeons and 139 hospitals performed at least one total colectomy for ulcerative colitis from 2000-2011, and 36 surgeons and 12 hospitals were characterized as IPAA surgeons/hospitals during the study period. Patient-level factors independently associated with IPAA were younger age, male sex, lower comorbidity burden, and elective total colectomy. Surgeon and hospital-level factors independently associated with IPAA were colorectal surgery board-certification and characterization as an IPAA surgeon or hospital. Patient factors explained only 44% of the surgeon-level and 39% of the hospital-level variation. However, surgeon and hospital-level factors explained 50% of the surgeon-level and 44% of the hospital-level variation, suggesting that the surgeon and institution where total colectomy was performed have a larger influence on IPAA creation than individual patient factors.

Conclusions: These findings suggest that surgeon and hospital-level variation in IPAA creation for ulcerative colitis is largely influenced by provider practices/preferences or lack of referral of patients to surgeons and centers that perform IPAA. Providers and hospitals that do not routinely perform IPAA should refer patients to centers with IPAA expertise following total colectomy.

Table: Multivariable Analysis of Factors Associated with IPAA

	Odds Ratio (95% CI)	P-Value
Patient-Level Factors		
Age (10 year incremental increase)	0.64 (0.59, 0.69)	<0.0001
Sex		
Female	Reference	
Male	1.24 (0.99, 1.57)	0.06
Comorbidities		
Hypertension	0.87 (0.63, 1.19)	0.38
Congestive Heart Failure	0.31 (0.09, 1.08)	0.07
Chronic Obstructive Pulmonary Disease	1.09 (0.73, 1.62)	0.69
Diabetes Mellitus	0.88 (0.55, 1.40)	0.59
Peripheral Vascular Disease	0.15 (0.02, 1.20)	0.07
Renal Failure	0.42 (0.13, 1.29)	0.13
Patient Residence Location		
Non-Rural	Reference	
Rural	0.91 (0.57, 1.46)	0.70
Distance from Nearest IPAA Hospital		
≤ 60 Miles	Reference	
> 60 Miles	1.01 (0.68, 1.51)	0.94
Elective Admission for Total Colectomy	1.64 (1.27, 2.17)	0.0002
Surgeon-Level Factors		
Board-Certification		
General Surgery	Reference	
Colorectal Surgery	1.36 (1.02, 1.83)	0.04
Years in Practice		
< 5	Reference	
5-10	1.26 (0.83, 1.93)	0.27
10-20	1.12 (0.75, 1.67)	0.58
> 20	0.93 (0.61, 1.41)	0.73
IPAA Surgeon*	2.78 (2.05, 3.78)	<0.0001
Hospital-Level Factors		
Academic Status		
Non-Academic	Reference	
Academic	1.18 (0.81, 1.70)	0.39
Location		
Urban	Reference	
Rural	0.35 (0.11, 1.11)	0.07
IPAA Hospital*	2.74 (1.88, 4.01)	<0.0001

*Due to a high degree of collinearity between IPAA surgeons and hospitals (R=0.66), two separate analytic models were utilized for the IPAA surgeon and IPAA hospital variables.

PD11

TREATING WISELY: ANTIBIOTIC STEWARDSHIP IN COLORECTAL SURGERY.

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Purpose: In 2015, President Obama released the National Action Plan to Prevent Antibiotic Resistance. Broad adoption of antibiotic stewardship is one of the key interventions in the plan. Healthcare-acquired infections (HAIs) are among the most common adverse events in in surgical patients. Despite national guidelines regarding appropriate treatment, antibiotic therapy for HAIs has the potential to be highly variable in practice. We evaluated the management of HAIs at our institution in order to assess variability in management, deviation from recommended protocols and opportunities for improvement.

Methods: Using our hospital's ACS NSQIP registry (2010-15), we identified 241 patients who underwent elective colorectal surgery and were diagnosed with HAIs within 30 days of surgery. Each case was retrospectively reviewed and evaluated for the antibiotic management of surgical site infections (SSIs), urinary tract infections (UTIs), and pneumonia. Appropriateness of the antibiotic therapy administered to these patients was evaluated against treatment recommendations for adult inpatients dictated by the Johns Hopkins Antibiotics Guidelines. Additional treatments (drain placement, return to the operating room and readmission) were also assessed.

Results: 28.6% of patients with HAIs did not receive appropriate initial antibiotic therapy. 22.8% of superficial SSIs, 36.8% of deep SSIs, 45.8% of organ space SSIs, 37.5% of pneumonias, and 17.1% of UTIs were not managed in accordance with antibiotic guideline recommendations. Furthermore, 24.1% of patients with HAIs required readmission for management and 81.3% of patients with HAIs were managed as inpatients. 10% of patients with HAIs underwent an unplanned return to the OR. The duration of therapy ranged from 0 to 48 days. Antibiotic therapy was more likely to deviate from the recommendations for organ space (22 of 45.8, %) as compared to superficial (28 of 123, 22.8%) SSIs. Patients were often over treated with antibiotics for their HAIs.

Conclusions: Antibiotic management of post-colorectal surgery HAIs is highly variable. When compared to recommended treatment protocols, a significant proportion of patients received inappropriate antibiotic therapy and underwent treatment for longer durations that necessary. These findings suggest that colorectal surgeons should embrace antibiotic stewardship as well as develop improved provider educational program and systems based improvements to ensure patients receive appropriate therapy while limiting antibiotic resistance.

	Number of Patients	Inappropriatene Initial Antibiotic	Duration Range	Readmission	Inpatient Management	Return to OR	Drain
All HAI	241	69 (28.6%)	0 to 48 days	58 (24.1%)	196 (81.3%)	24 (10%)	45 (23.9%)
Superficial SSI	123	28 (22.8%)	0 to 47 days	24 (19.5%)	84 (68.3%)	6 (4.9%)	4 (3.3%)
Deep SSI	19	7 (36.8%)	0 to 25 days	6 (31.6%)	17 (89.5%)	6 (31.6%)	5 (26.3%)
Organ Space SSI	48	22 (45.8%)	1 to 48 days	26 (54.2%)	47 (97.9%)	9 (18.8%)	36 (75%)
UTI	35	6 (17.1%)	1 to 22 days	2 (5.7%)	32 (91.4%)	2 (5.7%)	
Pneumonia	16	6 (37.5%)	3 to 43 days	0 (0%)	16 (100%)	1 (6.25%)	

PD12

PERCUTANEOUS POSTERIOR TIBIAL NERVE STIMULATION VERSUS MEDICAL THERAPY FOR THE TREATMENT OF LOW ANTERIOR RESECTION SYNDROME: CLINICAL AND MANOMETRIC SHORT-TERM OUTCOME OF A RANDOMIZED PILOT TRIAL.

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Purpose: A high proportion of patients underwent sphincter sparing rectal resection complains the low anterior resection syndrome (LARS), significantly associated with a deterioration in the quality of life (QoL). Currently there are no specific therapies for the LARS and its medical treatment is usually ineffective. Sacral nerve stimulation has shown promising results in small series of patients with faecal incontinence after anterior resection of the rectum. The percutaneous tibial nerve stimulation (PTNS) is a minimally invasive and inexpensive technique of indirect modulation of sacral nerve function via stimulation of the posterior tibial nerve. The aim of the present study was to establish the efficacy of PTNS in treating LARS.

Methods: Patients, with LARS score ≥ 21 and underwent neoadjuvant chemoradiotherapy and low anterior rectal resection for cancer, were randomly assigned to receive either PTNS + medical treatment (Arm A) or medical treatment (arm B) according to a computer generated randomization list. PTNS was delivered via the Urgent PC neuromodulation system (Uroplasty, Minnetonka, MB, USA) according to the manufacturer's instructions. Subjects underwent one 30-min weekly session for 12 consecutive weeks, followed by 2 fortnightly sessions and one a month later. Medical treatment was based on the predominant symptom and consisted in using fibers or loperamide or osmotic laxatives. At baseline, all patients underwent a physical examination, endoanal ultrasound, anal manometry and completed validated questionnaires of symptom severity score (LARS, FISI and ODS score) and QoL (FIQL, CRQoL, EORTC QOL-C30 and C38). The questionnaires and anal manometry were repeated at the end on the treatment. The primary outcome was a clinical response, defined as a reduction of the LARS score.

Results: Between Jenuary 2015 and October 2015 we randomly assigned 12 eligible patients in arm A (n=6) or B (n=6). In both groups the predominat symptom was faecal incontinence. Baseline demographic, clinical data and LARS score (35.8±2.5 vs 33.2±2.2, p=ns) were similar between groups. In group A, LARS score and FISI score improved significantly with treatment (35.8±2.5 vs 29±3.8, p=0.03, 36.8±4.3 vs 18.5±8.0, p=0.02, respectively) while there was no change in ODS score. In group B there was no

significant improvements in symptom severity scores. In group A changes were observed in all domains of QoL instruments. In both group, the anal resting pressure and the maximum squeeze pressure did not increase significantly. No adverse events related to treatment were reported in the trial.

Conclusions: PTNS could be an effective treatment for LARS. Additional studies are warranted to investigate clinical effectiveness in LARS. This trial is registered in clinicatrial.gov, identifier: NCT02177084.

PD13

A COMPARISON OF COMORBIDITY INDICES IN RISK ADJUSTMENT FOR POSTOPERATIVE COMPLICATIONS AFTER COLORECTAL SURGERY.

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Purpose: Comorbidity indices (CI) based on administrative data are increasingly being used in surgical outcomes research. However, these CIs were designed to predict mortality and other non-surgical endpoints. The purpose of this study was to determine if any of the most commonly-used CIs predict postoperative complications after colorectal surgery.

Methods: Current Procedural Terminology (CPT) codes were used to identify patients undergoing elective colectomy for neoplasia at a single institution from 2009 to 2014. We collected clinical, operative, and postoperative data by chart review. International Classification of Disease (ICD-9) and CPT codes acquired from the institution's administrative database were used to calculate five CIs for each patient: Charlson Comorbidity Index, Charlson-Deyo, Charlson-Romano, Elixhauser Comorbidity Score and American Society of Anesthesiology classification (ASA). Cancer-related categories were removed from index calculations and controlled for separately. Outcomes of interest were any postoperative complication, surgical site infection (SSI), and highest complication grade using the Clavien Dindo (CD) classification. Two analyses were conducted: in the first, base models for each outcome were created using significant operative, tumor, and demographic variables from univariate analyses. Six logistic regression models were constructed for each outcome: one containing the base model alone, and the remainder, the base model plus each CI as an additional covariate. We evaluated the contribution of each CI by comparing the c-statistics of each model, with a difference of $\geq$0.02 considered significant. In the second analysis, the CIs were compared using Receiver-Operating Characteristic (ROC) curves with the Charlson Comorbidity Index as the reference.

Results: A total of 1,817 patients were included (mean age 61.2 years); 756 (42%) had postoperative complications; 164 (9%) had grade 3+ complications and 409 (22.5%) had SSI. Significant predictors used in all base models were surgical approach (robotic, open, laparoscopic), surgeon, age, preoperative chemotherapy, and tumor stage, along with other outcome-specific variables. The base model was a fair predictor for all 3 outcomes (c-statistics=0.69 to 0.73). Addition of each CI did not improve the base models significantly. All CI-augmented models performed equally **(Table 1).** The ROC curves comparing the 5 CIs were also similar for all outcomes (AUCs=0.512 to 0.58).

Conclusions: A base model consisting of operative, tumor, and demographic characteristics predicts postoperative complications moderately well. The addition of a CI does not improve model performance and all CIs are equally poor predictors of postoperative outcomes. Widely-used comorbidity indices using administrative data may not be valid for predicting surgical complications after colorectal surgery.

C-statistics of comorbidity models by outcome

	Any Complication	SSI	Highest CD Grade (+3)
Base Model	0.687	0.725	0.702
Base Model + Charlson	0.690	0.728	0.714
Base Model + Charlson-Deyo	0.693	0.730	0.712
Base Model + Charlson-Romano	0.692	0.728	0.706
Base Model + Elixhauser Comorbidity Score	0.691	0.728	0.707
Base Model + ASA	0.694	0.727	0.707

PD14

ARE WE COMPARING APPLES AND ORANGES? BENCHMARKING SURGICAL OUTCOMES FOR TRANSFERRED COLORECTAL SURGERY PATIENTS.

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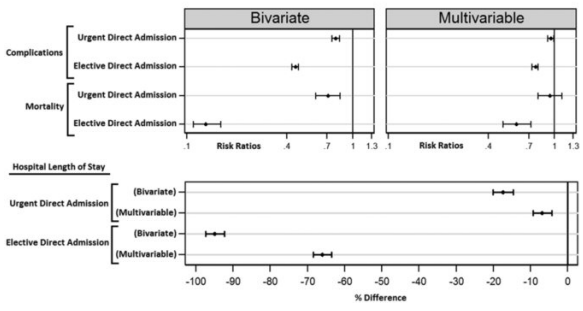
Purpose: Interhospital transfer is common among colorectal surgery patients, and this group frequently has worse outcomes compared to directly admitted patients. A paucity of data exists on the impact of transfer status on outcomes in the non-emergency surgical setting. Using a large nationwide surgical database, we sought to determine the impact of transfer status on outcomes in non-emergency colorectal operations. Furthermore, given that elective direct admissions are used for benchmarking surgical outcomes, we wished to compare this cohort to the non-emergency transferred cohort using multivariable analysis to determine the absolute difference between the two groups.

Methods: The American College of Surgeons NSQIP database from 2012-2013 was used. Colorectal surgery cases involving colon, rectum, and small bowel were selected. Non-elective/non-emergency (urgent) direct admissions and elective direct admissions were compared with non-emergency (urgent) transferred patients using unadjusted bivariate and adjusted multivariate analysis models. Primary outcomes of interest were overall complications, mortality, and hospital length of stay.

Results: A total of 82,151 admissions were analyzed. On bivariate analysis, urgent direct admissions had a lower risk for complications compared to urgent transferred patients (RR = 0.79; 95% CI, 0.75-0.83), lower mortality (RR = 0.71; 95% CI, 0.60 – 0.84), as well as shorter length of stay (17% shorter; 95% CI, 15 - 20%). However, after multivariable analysis, transfer status had minimal impact for complications (RR = 0.95; 95% CI, 0.91 - 0.99) and length of stay (7% shorter; 95% CI, 4 - 9%), and had no significant effect on mortality (RR = 0.94; 95% CI, 0.80 – 1.11). Furthermore, elective direct admissions still had significantly lower rates of poor outcomes after multivariable analysis (complications: RR = 0.77; 95% CI, 0.73 – 0.80; mortality: RR = 0.59; 95% CI, 0.49 – 0.72; length of stay: 66% shorter; 95% CI 64-69%).

Conclusions: Transfer status in patients undergoing non-emergency colorectal surgery is mainly associative and does not significantly contribute to poor outcomes, which are largely due to patient comorbidities and disease severity. Our results suggest that operative acuity plays a larger role than transfer status and should be taken into consideration when analyzing the outcomes of colorectal surgery patients. Benchmarking outcomes should be standardized based on operative acuity and multiple other patient factors.

Figure 1. Surgical Outcomes in Non-Emergency Colorectal Surgery Transfers vs. Direct Admissions



PD15

RIGHT-SIDED ACUTE UNCOMPLICATED DIVERTICULITIS: A 10-YEAR RETROSPECTIVE COMPARATIVE REVIEW.

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Purpose: Guidelines exist for management of acute uncomplicated left sided (LD) diverticulitis but not for right sided (RD) diverticulitis. The lack of literature is due to the low incidence of RD in the West. There is however a significant burden of disease in the east. We aim to establish guidelines for management of RD by comparing clinical presentation characteristics and treatment outcomes of right and left sided acute uncomplicated diverticulitis.

Methods: We retrospectively reviewed 402 patients admitted to our institution with Computed Tomography scan proven acute uncomplicated diverticulitis between January 2004 and December 2013. We compared patient demographics, clinical characteristics such as inpatient parameters, duration of antibiotics and length of stay and treatment outcomes such as rates of complication, recurrence and surgical intervention between RD and LD. Statistical analyses were performed using Pearson's $\chi 2$ test for discrete variables and *t* test for continuous variables with normal distribution. The Mann–Whitney *U* test was used for ordinal data without normal distribution.

Results: We identified 294 (73.1%) RD and 108 (26.9%) LD who fulfilled our study criteria. The mean age for RD was younger (48.6 vs 61.0, $p < 0.001$). There were no statistical differences in heart rate, white cell count and temperature at presentation between both groups. RD however received a significantly shorter mean duration of intravenous antibiotics (2.76 days vs 3.28 days, $p = 0.015$) and required a significantly shorter mean length of stay (3.35 days vs 3.94 days, $p = 0.034$). Over a median follow-up period of 24.8 months the rate of complicated recurrence and surgical intervention was lower in the RD arm (0% vs 2.4%).

Conclusions: By reviewing our data and within limits of a retrospective comparative review, we conclude that RD occurs in a younger population with a relatively milder clinical course and does not develop complicated recurrences nor require surgical intervention. This data supports the notion that the current guidelines for LD can be applied similiarly for RD. With further prospectively designed studies, we may be able to show clearly that RD may not require antibiotic therapy.

PD16

COMPREHENSIVE HUMAN PAPILLOMAVIRUS GENOTYPING AND OUTCOMES IN ANAL CANCER: AN NRG ONCOLOGY/RTOG 98-11 TISSUE SPECIMEN STUDY.

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Purpose: Accurate characterization of HPV infection patterns in anal squamous cell cancer (ASCC) has implications not only for understanding carcinogenesis but also potentially for predicting prognosis, treatment response and efficacy of preventive vaccination. Our objectives were to perform comprehensive HPV genotyping in anal cancer specimens and correlate infection patterns with clinical outcomes.

Methods: ASCC specimens were derived from the RTOG 98-11 trial formalin-fixed paraffin-embedded tissue repository. Tissues underwent macrodissection, DNA extraction and genotyping for 28 HPV types using the INNO-Lipa HPV kit. Using univariate and multivariate Cox proportional hazards models, outcome [overall survival (OS); disease-free survival (DFS); locoregional failure (LRF); distant metastases (DM) and colostomy failure (CF)] comparisons were made between HPV-16 positive/negative and single/multiple oncogenic HPV infections.

Results: The 186 ASCC cases (119 females and 67 males) had a median age of 55 years (min-max: 25-79) with median follow up of 6.2 years (min-max: 0.15-11.76). Overall, 181 (97%) were positive for any oncogenic HPV type with 175 (94%) being HPV-16-positive; singly (n=159; 91%) or in combination (n=16; 3%). Twelve other HPV types (<5%) and multiple infections (n=15; 8%) were of low prevalence. There was no difference in survival between HPV-16-positive (n=175) and HPV-16-negative (n=11) groups. Univariate analyses demonstrated a significantly higher rate of CF and a trend towards increased LRF in patients with multiple vs. single HPV infections (**Table 1**). By multivariate modeling, patients with multiple infections (n=15) had significantly greater likelihood of CF [HR=3.91, 95% CI (1.28, 11.93), p=0.016] and a trend towards greater risk of LRF [HR=2.59, 95% CI (0.99, 6.79), p=0.052] compared to those with single infections (n=166). Among clinicopathologic variables, only younger age (<55 years) distinguished between ASCC with multiple vs. single infections (73.3% vs. 46.4%; p=0.046).

Conclusions: In one of the largest HPV genotyping studies of ASCC, almost all cases were HPV-16 positive with few cases harboring multiple infections or other HPV types. Based on ASCC HPV profiling, currently approved vaccine preparations would adequately target the etiologic types for anal cancer prevention. Multiple HPV infections are associated with worse outcomes and further investigation into contributing biologic and patient factors are indicated.

Univariate Cox Proportional Hazards Models for Number of Oncogenic HPV Infections (n=181)

Endpoint	Number of HPV Infections	Hazard Ratio	95% C.I. LL	95% C.I. UL	p-Value †
OS	Single vs. Multiple	1.24	0.45	3.48	0.68
DFS	Single vs. Multiple	1.11	0.45	2.77	0.82
LRF	Single vs. Multiple	2.20	0.86	5.59	0.098
DM	Single vs. Multiple	1.14	0.27	4.91	0.86
CF	Single vs. Multiple	3.68	1.23	11.00	0.02

† p-value from Chi-square test using the Cox proportional hazards model.

PD17

THE YIELD OF SIGNIFICANT FINDINGS AT COLONOSCOPY AFTER DIVERITICULITIS: A MULTICENTER REVIEW.

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Purpose: The ASCRS guidelines recommend a colonoscopy following the resolution of an acute episode of diverticulitis to confirm the diagnosis and to exclude other significant pathology. However, research supporting this practice is limited. The aim of our study was to evaluate the incidence of malignant and advanced adenomatous pathology detected on colonoscopy following an episode of diverticulitis.

Methods: We performed a retrospective review of a prospectively maintained endoscopy database at two tertiary care centers. All endoscopy reports reporting diverticular disease as the indication for colonoscopy from 2005 to 2015 were reviewed. Demographic data, imaging studies, endoscopy findings, pathology reports of endoscopic biopsies and surgical pathology in operated patients were reviewed. Advanced adenomas were defined as one centimeter or larger adenomas, serrated adenomas, tubulovillous adenomas, or those with high grade dysplasia.

Results: 442 patients (205 women, 237 men) with a median age of 52 (range, 22-86) years underwent colonoscopy for history of diverticulitis. 367 patients underwent a complete colonoscopy, with a relatively low yield of advanced findings (Table). Colonoscopy was incomplete in 75 patients (17%) and 36 (48%) of those patients underwent surgical intervention. Two (5%) of those patients were found to have sigmoid adenocarcinoma in the resected segment; both patients had sigmoid strictures preventing completion of their colonoscopies.

Conclusions: Following an episode of diverticulitis there is a low yield of significant non-diverticular pathology in patients with complete colonoscopy. However, the rate of incomplete colonoscopy is high in these

patients, which may be a reflection of severity of the diverticular disease or non-diverticular pathology. Our study indicates that patients with incomplete colonoscopies, especially if they have persisting symptoms, may benefit from further assessment or intervention.

Pathology findings in patients with complete colonoscopy

	Patients (N=367)	Median age in years (Range)
Diverticular disease only	337 (92%)	52 (22-86)
Advanced adenoma	21 (5.7%)	54 (46-69)
Adenocarcinoma	3 (0.8%)	59 (58-60)
Rectal carcinoids	3 (0.8%)	53 (30-63)
Inflammatory bowel disease	3 (0.8%)	46 (42-66)

PD18

ASPIRIN USE IN RESECTED STAGE IV COLORECTAL CANCER PATIENTS: IS THERE ANY BENEFIT?

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Purpose: Existing evidence suggests that aspirin (ASA) use is associated with a lower risk of mortality in stage I-III colorectal cancer (CRC) patients. Little is known, however, concerning the effect of aspirin use on mortality after resection for incurable stage IV CRC. The objective of this study was to evaluate the association between ASA use and post-operative survival within a continuous case series of resected incurable stage IV CRC patients.

Methods: A large single-institution chart review of all patients with stage IV CRC who had their primary tumor resected from a major cancer center between 2000-2012 was performed. Emergent operations and re-operations for recurrent disease were excluded. Differences in 1-, 2-, 3-, 4-, and 5-year survival between patients with and without post-operative ASA use were assessed using descriptive statistics and time-to-event survival analysis with Cox proportional hazard models. Survival models were risk-adjusted based on propensity-score quintile inclusive of: patient demographics, tumor characteristics, and occurrence of post-operative complications.

Results: A total of 497 stage IV CRC patients were included, of whom 14.3% (*n*=71) used ASA; 74.0% (*n*=368) died within 5y. Median follow-up was 17.2months. Among ASA users, 64.8% of patients died (*n*=48), compared to 75.6% of non-ASA users (*n*=322; p=0.05). ASA users were, on average, older (median age: 68 v 57y) and more likely to be male (64.8% v 48.1%), present with a lower percentage of high-grade disease (27.3% v 36.8%), and experience major complications (22.5% v 18.8%) relative to non-ASA users. Overall, ASA users were qualitatively less likely to die (risk-adjusted HR: 0.82; p=0.25). Point estimates suggest an increasingly protective effect during the first 3 years: 1-year survival HR: 0.82; 2-year survival HR: 0.70; 3-year survival HR: 0.60 (p=0.19-0.43). Beyond 3 years, only 10 ASA users and 67 non-ASA users remained alive.

Conclusions: While unable to reach a statistical threshold of 95% confidence due to limited sample size, the results of the largest continuous case series of resected stage IV CRC patients to date suggest a tendency toward improved survival among ASA users up to 36 months post-operation. Further analysis and continued enrollment of patients is warranted to verify the robustness of this trend among patients with resected, incurable stage IV disease.

PD19

PRESENTATION, MANAGEMENT, AND OUTCOMES OF COLORECTAL ADENOCARCINOMA DIAGNOSED WITHIN ONE YEAR OF PREGNANCY: AN INSTITUTIONAL CASE SERIES.

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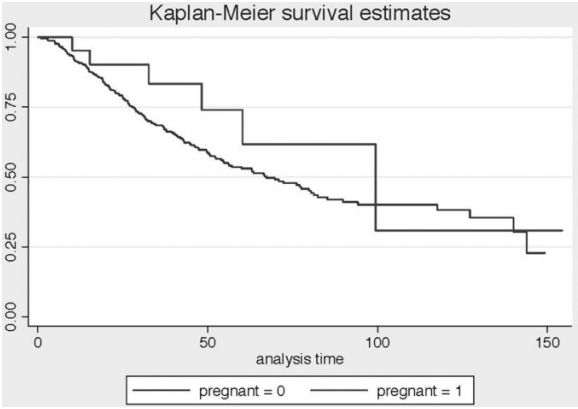
Purpose: Colorectal adenocarcinoma (CRC) diagnosed during or after a recent pregnancy is fortunately rare. Small case series suggest that the prognosis is poor in these patients with a median survival less than 1 year. We aimed to review presentation and outcomes of patients diagnosed with a peripartum colorectal adenocarcinoma at a single tertiary care institution.

Methods: We conducted a retrospective cohort study of all female patients of childbearing age at our institution between 1/2002 and 11/2014 who were diagnosed with CRC. We categorized patients into two groups based on whether they did or did not experience a pregnancy within the 12 months prior to their diagnosis. We used descriptive statistics and Kaplan-Meier survival analyses to report the results.

Results: We identified 31 patients with CRC diagnosed during or within 12 months of a pregnancy. Mean age was 32.7 (SD 5.9) years. Eighty-seven percent were Caucasian. Two patients had known FAP and 1 had Lynch syndrome. All patients had symptoms during pregnancy. Eleven cancers were diagnosed during pregnancy, 2 during a C-section, and the remainder postpartum when the symptoms persisted. Tumor location was rectum or sigmoid in 23 (74%). TNM stage at presentation was I in 6 patients (19%), II in 4 patients (13%), III in 8 patients (26%), and IV in 13 (42%). The most common site of metastasis in the stage IV patients was the liver. Surgical resection was performed in 23 patients (2 while pregnant, 2 at time of C section, remainder postpartum). Across all stages, overall survival was 95% at 1 year and 62% at 5 years. We compared survival outcomes between these patients and a cohort of 524 non-pregnant women with CRC diagnosed between the ages of 18 and 45. Patients in the non-pregnancy group were significantly older than the pregnancy cohort (38.3 $\pm$6.2 vs. 32.7 $\pm$5.9 years, p<0.001). There were no statistically significant differences in stage at presentation (data not shown) or in overall survival between the two groups (Figure 1, p=0.16).

Conclusions: Women diagnosed with CRC during or after a recent pregnancy usually have advanced stage tumors. However, these women do not differ significantly from women of childbearing age who have CRC without any association to pregnancy. Survival is better than that reported in the literature, but aggressive therapy was often required to achieve these outcomes.



PD20

WHAT ARE THE CONSEQUENCES OF OMISSION OF DIVERTING ILEOSTOMY IF PELVIC SEPSIS OCCURS?

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Purpose: Creation of diverting loop ileostomy (DLI) is believed to lessen the severity of postoperative pelvic sepsis after ileal pouch anal anastomosis (IPAA). However, DLI can be omitted in carefully selected patients. The aim of this study was to assess the short-term and long-term consequences of DLI omission during IPAA surgery complicated by postoperative pelvic sepsis.

Methods: A single institution prospectively maintained database was queried to identify patients who underwent IPAA complicated by pelvic sepsis or anastomotic separation diagnosed postoperatively between 1983

– 2014. Pelvic sepsis and anastomotic separation diagnosis were based on clinical, endoscopic and radiologic (CT) assessment. Patients with Crohn's disease or cancer were excluded. Patient cohort was divided into two groups, depending on the presence or absence of DLI. Patient characteristics, short-term and long-term outcomes were compared between groups by univariate statistical analysis. Long-term pouch survival was estimated by using Kaplan – Meier method. Pouch failure was defined as either pouch excision with end ileostomy or permanent pouch diversion. Patient quality of life (QOL) was compared between groups at the latest follow up.

Results: Of 4031 patients, 357 patients were identified with IPAA-related pelvic sepsis or anastomotic separation. 322 had diversion at time of IPAA (D) and 35 had omitted DLI (O). Gender and ASA were comparable between groups (table). O group had shorter operative time (p=0.03), with significantly longer length of hospital stay (LOS) (p=0.03). Anastomosis type, pouch configuration, and surgical approach were not significantly different between groups (table). 45.7% of patients from O group underwent reoperation, compared to 11.5% in D group (p=0.001). All O group patients had newly created DLI at reoperation. 50% of cases with pelvic sepsis from O group were managed with percutaneous drainage. Readmission rates were similar between groups (43% O vs 41% D, p=0.82). O group had significantly longer LOS during readmission – 12.5 ± 6.6 vs 5.5 ±6.3 (p=0.01). Despite septic complications, 84.2% of patients had their ileostomy reversed at 6.1±4.8 months. In long-term follow-up, there was no difference in pouch survival rates between the groups. 5 year follow up pouch survival rates were 99% vs 97%, and at 10 year follow up 88% vs 87% for D and O groups, respectively (p=0.4). There was no difference in patient QOL observed between the groups.

Conclusions: Omission of diverting loop ileostomy in selected patients who underwent IPAA surgery did not increase pouch failure, or adversely affected the quality of life, if pelvic sepsis occurred.

Baseline patients' characteristics and postoperative outcomes.

Variable	Diverting loop ileostomy (n=322)	No diverting loop ileostomy (n= 35)	p-value
Age	48.2±15.4	45.9±14.5	0.44
BMI, kg/m2	27.1±5.0	25.4±4.0	0.10
ASA score			0.40
I	3.2%	11.1%	
II	72.1%	72.2%	
III	23.3%	16.7%	
IV	1.3%	-	
Gender, male	215 (66.7%)	19 (54.3%)	0.13
Pathologic diagnosis			0.007
Mucous ulcerative colitis	241 (74.8%)	19 (54.3%)	
Indeterminate colitis	68 (21.1%)	11 (31.4%)	
Familial adenomatous polyposis	13 (4%)	5 (14.3%)	
Resection type			0.27
Total proctocolectomy	206 (64%)	19 (54.3%)	
Completion proctectomy	116 (36%)	16 (46%)	
Anastomosis type			0.07
Double stapled	260 (80.7%)	29 (83%)	
Single stapled	15 (4.7%)	5 (14.3%)	
Mucosectomy	42 (13.6%)	1 (3%)	
Pouch configuration			0.53
J-pouch	300 (93.2%)	31 (88.6%)	
S-pouch	21 (6.5%)	4 (11.3%)	
Laparoscopic approach	44 (14%)	4 (11.4%)	0.71
Operative time, minutes	169±95	133±106	0.03
Length of hospital stay, days	10.1±0.43	13.1±1.3	0.03
Mean follow up, years	7.2 ±6.3 (0.3 - 28.1)	9.1±7.4 (0.3 - 24.1)	0.12

Data represented as n, % and mean ± SD = standard deviation and range, unless otherwise specified.

PD21

HIGH LEVEL OF ASXL1 PROTEIN IS ASSOCIATED WITH BETTER DISEASE-FREE SURVIVAL IN COLORECTAL CANCER.

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Purpose: *ASXL1* gene is on chromosome region 20q11.21. Either amplification in cervical cancer or truncation mutations in colorectal cancers with microsatellite instability (MSI), malignant myeloid diseases, chronic lymphocytic leukemia, liver, prostate and breast cancers occurred. The functional and the prognostic roles of *ASXL1* mutations and the expression of protein in colorectal cancer are still unknown.

Methods: We performed NGS of eleven colorectal cancer with peritoneal seeding to find genetic markers for aggressive phenotype. All showed a frameshift deletion at codon 1934delG. To clinically validate the functional and the prognostic roles of the mutations, we performed an immunohistochemical staining (IHC) on tissue microarrays of 414 consecutive colorectal cancers.

Results: The ASXL1 protein expression was strong positive in 5.8% (24 patients), moderate positive in 38.5% (157 patients) and negative in 55.6% (227 patients). In the patients with *ASXL1* frameshift mutation, 25% (2/8 patients) expressed moderate positive and 75% (6/8 patients) did not expressed ASXL1 protein. The patients with negative ASXL1 expression had more lymph node metastasis than the patients with strong positive expression [59.0% (134/227 patients) *vs.* 33.3% (8/24 patients), *p=0.038*]. None of the patients with strong positive expression had recurrent disease in the stage I-III cancers [0% (0/21 patients) *vs.* 19.4% (27/139 patients) *vs.* 18.9% (34/180 patients)] and the disease free survival rate of the patients with strong positive expression was significantly better than that of the patients with moderate positive or negative expression (*p=0.037*; *p=0.031*). The level of ASXL1 protein expression was not correlated with MSI status of colorectal cancer.

Conclusions: The decreased level of the expression of the ASXL1 protein was associated with lymph node metastasis in its progression of cancer. Strong positive ASXL1 protein expression was a 'good' prognostic factor of colorectal cancers. The ASXL1 protein might be tumor suppressive in colorectal cancer.

PD22

BUYER BEWARE OF BIG DATA: A COMPARISON OF NIS AND NSQIP DATASETS IN RECTOURETHRAL FISTULA REPAIRS.

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Purpose: Population databases such as the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) and the National Inpatient Sample (NIS) are often used to evaluate short-term outcomes for uncommon conditions such as rectourethral fistulas (RUF). We hypothesized that demographics and outcomes would differ between datasets for conditions such as RUF that may lead to varying conclusions.

Methods: Review of ACS-NSQIP (2005-2013) and NIS (2006-2011) of all patients with a RUF or RUF repair based on either CPT code or ICD-9-CM coding. Patient characteristics and co-morbidities were compared. Thirty-day outcomes for NSQIP and in-hospital outcomes for NIS were evaluated.

Results: ACS-NSQIP identified 347 cases of a RUF repair (mean age 62.6, 95.4% male). CPT coding of RUF repair with and without stoma creation accounted for 131 cases (45820=105 and 45825=26). Additional procedures included a perineal (n=45) or radical (n=28) approach, and diversion alone (n=80). While demographics, morbidity, and mortality rates were similar, RUF repair with stoma creation had a significantly greater readmission rate (50% vs. 4.3%; p<0.01). NIS identified 2,357 patients with a RUF (mean age 46.5; 13.1% female). A closure of the urethral fistula based on ICD-9-CM procedure coding accounted for 228 (9.7%) cases; however, the specific approach was not provided. Rectal/prostate cancer and inflammatory bowel disease (IBD) were reported at 596 (25.3%) and 97 (4.1%) cases, respectively. Morbidity rates were similar between the cancer and IBD group (22.9% vs. 18.6%; p=0.33). Cancer was associated with fewer routine discharges compared to the IBD cohort (46.2% vs. 63.8%; p=0.01), but an equivalent length of stay of approximately 5 days. In comparing the datasets based on ICD-9-CM coding (ACS-NSQIP: n=286, NIS: n=2,357), NIS included a greater number of female patients compared to NSQIP (13.1% vs. 2.8%; p<0.01). Co-morbidity rates that differed between NIS and NSQIP included heart failure (7.9% vs. 0.4%; p<0.01), vascular disease (5.1% vs.

1.6%, p=0.02), and hypertension (39.2% vs. 46.5%; p=0.02). Notably, RUF etiology is not available in ACS-NSQIP, and specific operative approach is not identified by NIS. NSQIP cases had greater morbidity compared to NIS (23.1% vs. 16.1%; p<0.01); however, the median LOS was longer (6 day, IQR [3-11] vs. 5 days, IQR [2-9]; p<0.01), while mortality was greater in the NIS vs. NSQIP cohort (2.6% vs. 0.7%; p=0.04).

Conclusions: This study represents one of the largest cohorts of RUF cases, and characterizes how utilizing variables from both databases better elucidates key details of this rare clinical problem. These results also exhibit how evaluating comparable metrics and outcomes demonstrate significant inconsistencies between databases. This data provides a foundation for future research and efforts to standardize national data collection and reporting.

PD23

SARCOPENIA MORE IMPORTANT THAN BMI? THE PREVALENCE AND ASSOCIATED SURGICAL OUTCOMES OF SARCOPENIC RECTAL CANCER PATIENTS.

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Purpose: Sarcopenia, or lack of lean muscle mass, has been associated with worse outcomes in cancer patients. This potentially amenable risk factor has yet to be studied in patients with locally advanced rectal cancer

Methods: Skeletal muscle mass index was measured on initial staging CT scans of patients undergoing neoadjuvant chemoradiation followed by radical resection for rectal cancer at a single tertiary care center, 2007-2013. Using Mimics® software (Belgium), skeletal muscle area including the paraspinal, psoas and rectus muscles, was measured three times at the L3 level and the mean along with the patient's height was then used to calculate the lumbar skeletal muscle mass index (cm^2/m^2). Sarcopenia was defined as 2 standard deviations below the index cutoff established in adult obese cancer patients: 38.5 in females, 52.4 in males (Lieffers 2012, Prado 2008).

Results: 47 patients were included in this study; mean age was 59.3 (36-82 years) and 61.7% were male. Mean lumbar skeletal muscle index for males was 51.54 (34.63-73.89 cm^2/m^2) and 39.1 (23.69-49.80 cm^2/m^2) for females. 55.2% of males and 44.4% of females were considered sarcopenic, with an overall prevalence of 51.1% in the study population. Age was significantly associated with sarcopenia (p=0.025), but gender, race, ethnicity, smoking and multiple co-morbidities were not. Overall BMI and obesity (BMI>30) trended towards but were not significantly associated with sarcopenia (p=0.065 and 0.055). Blood transfusions were more frequent in sarcopenic patients (0.005) and increased operative time trended toward significance (p=0.056). Although readmissions and length of stay were not increased, overall postoperative complications were significantly higher in sarcopenic patients (p=0.028). Specific complications were not individually associated. Interestingly, BMI and obesity were not associated with postoperative complications. Oncologic outcomes such as local and distant recurrence and mortality did not correlate with sarcopenia.

Conclusions: Sarcopenia was present in over 50% of patients with locally advanced rectal cancer at diagnosis. It is associated with longer operations and more transfusions as well as increased overall postoperative complications. BMI did not correlate with these negative outcomes. Sarcopenia may be a better predictor of surgical outcomes than BMI or obesity. Thus, "*pre*-habilitative" interventions specifically focused on muscle-strengthening during the waiting period between radiation and surgery could potentially improve surgical outcomes in patients with locally advanced rectal cancer.

PD24

PATTERNS OF HEALTH SERVICES UTILIZATION IN PATIENTS WITH LOCALLY ADVANCED AND LOCALLY RECURRENT CANCERS OF THE PELVIS.

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Purpose: Patients with advanced or recurrent cancers are known to have higher treatment costs compared to patients with early or primary cancers. An important component of cost, is that of ongoing health service utilisation (HSU) within the community because of extended survival. The purpose of this study is to document the patterns of HSU in patients with locally advanced or recurrent cancer of the pelvis so as to inform clinicians and policy makers about the ongoing resource utilisation and cost involved in the ongoing care of these patients.

Methods: Consecutive patients referred for consideration of pelvic (PE) at 2 Australian referral centres for locally advanced and recurrent malignancies of the pelvis between 2008 and 2011 were recruited into a prospective non-randomised comparative study between patients who did and did not undergo PE. Patients in the non-PE group comprised of patients elected not to undergo PE surgery despite having resectable disease or patients with small volume peritoneal disease discovered at the time of surgery. The 2 groups are therefore deemed as comparable as possible at the time of referral and therefore recruitment. A randomised trial in this setting was deemed inappropriate because of the survival advantage offered by PE. The cost of ongoing HSU was prospectively collected for both groups of patients for 24 months from the time of recruitment. In the PE group of patients, in order to ensure that there is a comparable setting and time frame, HSU data was collected from the time of discharge for 24 months. Associations between cost and complications, extent of surgery were tested using univariate analysis.

Results: There were 182 patients with 174 with sufficient data for analysis. Of these, 139 underwent PE and 35 were in the non-PE group. At 24 months, there was a non-statistically significant difference in cost between the 2 groups ($40,214 in PE group vs $47,747 in non-PE group, p=0.27). Although there is no difference in the overall cost involved in treatment, the pattern of HSU is different between PE and non-PE patients. PE patients needed more ongoing allied health input with stomal therapists, physiotherapists and dieticians ($1273 vs $416, p<0.001) and costs associated with stoma care ($6202 vs $219, p<0.001). Non-PE patients had much higher costs associated with ongoing treatment (chemotherapy and radiation) compared to PE patients ($13755 vs $28132, p<0.001). Gender, age and type of cancer did not impact on HSU. In PE patients, complications, in particular more severe complications, correlated with higher HSU costs ($8666 for Dindo Clavien 0 and $12615 for Dindo Clavien 4, p = 0.0345).

Conclusions: Patients with locally advanced and recurrent cancers have considerable ongoing HSU and therefore costs of treatment. The results of this study is helpful in informing about the ongoing care needs of this group of patients.

PD25

IMPACT OF BOWEL PREPARATION ON SURGICAL SITE INFECTION, ILEUS, ANASTOMOTIC LEAK, MAJOR MORBIDITY AND MORTALITY AFTER ELECTIVE COLORECTAL SURGERY: AN ACS-NSQIP ANALYSIS BY COARSENED EXACT MATCHING.

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Purpose: Recent studies demonstrated a reduction in postoperative complications with the use of combined mechanical and oral antibiotic bowel preparation prior to colectomies. The aim of this study was to assess the impact of these two interventions on surgical site infections, ileus, anas-

tomotic leak, major morbidity and 30-day mortality in a large cohort of elective colectomies.

Methods: After institutional review board approval, patients who underwent elective colectomies between 2012-2014 were identified from the American College of Surgeons National Surgical Quality Improvement Program database. Mechanical bowel preparation alone, oral antibiotic preparation alone, mechanical bowel preparation with oral antibiotics (combined preparation) and no preparation were compared. Coarsened-exact matching algorithm was used to match patients based on age, gender, body mass index, American Society of Anesthesiologists class, race, chemotherapy, stoma, and laparoscopic approach. Multivariate logistic regression with matched patients was performed to determine the impact of preparation on surgical site infections, ileus, anastomotic leak, major morbidity and mortality.

Results: 40,446 patients were included for analysis: 13,935 (34.5%) 1,572 (3.9%), 11,720 (29.0%) and 13,219 (32.7%) patients were in the mechanical bowel, oral antibiotic, combined and no preparation groups, respectively. After matching, 3,889, 1,461 and 3,284 patients remained in the mechanical, oral antibiotic, and combined preparation groups, respectively. On univariate analysis, groups differed in patient characteristics, and mechanical, oral and combined preparation were all significantly associated with decreased surgical site infections, ileus, anastomotic leaks, major morbidity and mortality when compared to the no preparation group (Table1). On multivariate regression of the matched groups, combined preparation remained protective of surgical site infection (OR=0.36, 95% CI 0.29-0.43), ileus (OR=0.71, 95% CI 0.61-0.82), anastomotic leak (OR=0.51, 95% CI 0.38-0.70), major morbidity (OR=0.69, 95% CI 0.38-0.70) and mortality (OR=0.47, 95% CI 0.31-0.72), while oral antibiotics alone were protective for all outcomes except anastomotic leak (Table 1).

Conclusions: Combined mechanical and oral antibiotic bowel preparation significantly reduces surgical site infections, ileus, anastomotic leak, major morbidity and mortality following elective colorectal surgery. To our knowledge, this is the first study to demonstrate that combined bowel preparation significantly reduces major morbidity and mortality, and that oral antibiotic preparation alone is significantly associated with a reduction in surgical site infections, ileus, major morbidity and mortality.

Major postoperative outcomes by type of bowel preparation

	Univariate OR (95%CI)	p-value	Univariate OR after Coarsened Exact Matching (95%CI)	p-value	Multivariate OR after Coarsened Exact Matching (95%CI)	p-value
Mechanical Bowel Preparation alone vs. No preparation						
Surgical Site Infection	0.78 (0.73-0.84)	<0.001	0.89 (0.75-0.99)	0.042	0.89 (0.78-1.03)	0.123
Ileus	0.70 (0.66-0.75)	<0.001	0.83 (0.73-0.93)	0.002	0.87 (0.77-0.98)	0.026
Leak	0.84 (0.74-0.95)	0.004	0.94 (0.75-1.18)	0.578	0.91 (0.73-1.15)	0.442
Major Morbidity	0.70 (0.66-0.74)	<0.001	0.95 (0.46-1.53)	0.385	0.98 (0.87-1.12)	0.797
Mortality	0.36 (0.30-0.45)	<0.001	0.58 (0.40-0.81)	<0.001	0.64 (0.45-0.90)	0.011
Oral Bowel Preparation alone vs. No preparation						
Surgical Site Infection	0.57 (0.47-0.68)	<0.001	0.64 (0.50-0.81)	<0.001	0.63 (0.49-0.80)	<0.001
Ileus	0.69 (0.59-0.80)	<0.001	0.75 (0.61-0.91)	0.005	0.76 (0.20-0.94)	0.012
Leak	0.60 (0.44-0.82)	0.002	0.68 (0.22-0.79)	0.007	0.67 (0.44-1.02)	0.062
Major Morbidity	0.69 (0.40-0.82)	<0.001	0.72 (0.59-0.87)	0.001	0.71 (0.58-0.87)	0.001
Mortality	0.41 (0.24-0.67)	<0.001	0.42 (0.22-0.79)	0.007	0.43 (0.22-0.84)	<0.001
Mechanical and Oral Bowel Preparation vs. No preparation						
Surgical Site Infection	0.42 (0.38-0.45)	<0.001	0.34 (0.28-0.41)	<0.001	0.36 (0.29-0.43)	<0.001
Ileus	0.52 (0.49-0.56)	<0.001	0.66 (0.57-0.76)	<0.001	0.71 (0.61-0.82)	<0.001
Leak	0.52 (0.19-0.32)	<0.001	0.64 (0.55-0.74)	<0.001	0.51 (0.38-0.70)	<0.001
Major Morbidity	0.50 (0.45-0.60)	<0.001	0.51 (0.38-0.68)	<0.001	0.69 (0.38-0.70)	<0.001
Mortality	0.24 (0.19-0.32)	<0.001	0.39 (0.26-0.59)	<0.001	0.47 (0.31-0.72)	<0.001

OR = odds ratio

PD26

SELF-EXPANDING METAL STENTS DO NOT ADVERSELY AFFECT LONG-TERM ONCOLOGIC OUTCOMES IN ACUTE MALIGNANT LARGE BOWEL OBSTRUCTION.

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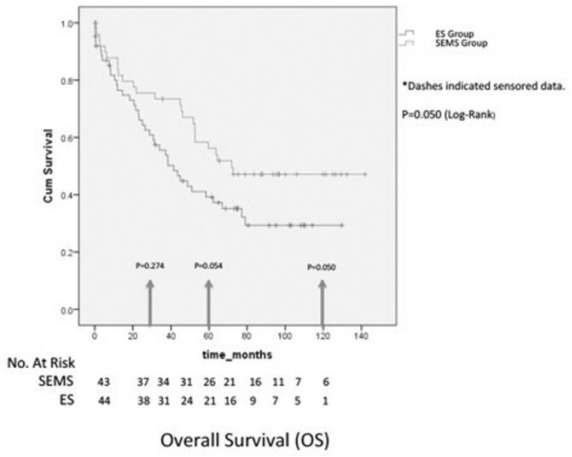
Purpose: Patients presenting with acute malignant colonic obstruction often present a treatment dilemma. Management options typically include Self-Expanding Metal Stents (SEMS) as a bridge to surgery, or emergent surgical resection (ES). Concerns regarding oncologic outcomes following SEMS placement have been expressed. The objective of this study was to assess the short and long-term outcomes for patients presenting with acute malignant large bowel obstruction treated with curative intent either by ES or staged resection following SEMS insertion.

Methods: Patients presenting with acute malignant obstruction between April 2002 and March 2009 were identified retrospectively. Those with clinical and/or radiographic evidence of perforation at presentation, incomplete obstruction and metastatic disease were excluded. Electronic and conventional medical records were reviewed. Demographic data, location of the tumor, clinical outcomes of attempted stent insertion, and type of surgery performed were recorded. Patients with an attempted stent insertion were analyzed on an intention to treat basis. 30-day mortality was calculated**.** Overall survival (OS) and Disease free survival (DFS) were determined using the Kaplan Meier method.

Results: 114 patients were included. 62 underwent ES and 52 underwent SEMS insertion as a bridge to resection with curative intent. 30-Day mortality was 8.06% in the ES group versus 3.8% in the SEMS group (p=0.451). Two, five and ten-year OS in the SEMS vs. ES group were 76.9% vs. 67.7% (p=0.274); 59.6% vs. 43.5% (p=0.054); and 51.9% vs. 31.7% (p=0.050) respectively. 10-year DFS was 61.5% in the SEMS group and 62.9% in the ES group (p=0.33). Patients with a failed SEMS had similar 10 year OS and DFS compared to the ES group.

Conclusions: Our study demonstrates that SEMS as a bridge to curative resection in patients presenting with acute malignant large bowel obstruction is safe and oncologic outcomes are similar compared to emergent surgical resection.



Overall Survival (OS)

PD27

TOWARDS THE ADOPTION OF TRANSANAL TOTAL MESORECTAL EXCISION (TATME): ASSESSMENT OF A STRUCTURED TRAINING PROGRAM AND THE EXPERIENCE OF SURGEON TRAINEES.

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Purpose: Towards the Adoption of Transanal Total Mesorectal Excision (Tatme): Assessment of a Structured Training Program and the Experience of Surgeon Trainees.

Methods: During a 12 month period (11/2014-10/2015), eight 2-day taTME courses were conducted under the guidance of 4 experienced taTME surgeons. The essential course components included live taTME surgery, comprehensive didactic sessions, and hands-on male cadaveric training with paired surgeon teams assigned to each cadaver. The attendees were systematically evaluated by faculty during the cadaver sessions and assessed for competency using various metrics. Upon course completion, an anonymous survey was administered to all course attendees in order to define the effect of TaTME training and its subsequent impact on surgical practice.

Results: Eighty-one colorectal surgeons from 51 institutions in 6 countries completed the TaTME course. During cadaveric dissection, the mean time to completion of the distal purse-string was 9.9±0.6 min, to achieving correct TME dissection plane was 22.7±1.8 min, and to completion of TME dissection was 76.1±2.8 min. All participants were able to perform anterior, posterior and lateral TME dissections via transanal approach. During cadaveric dissection, 71% achieved complete TME specimen; 9.1% demonstrated dissection in the incorrect plane, while 4.5% created major injury to the rectum or surrounding structures, excluding prostate. Approximately 1:5 paired trainees were observed to inadvertently mobilize the prostate during the anterior dissection. Of survey respondents, 83.8% found the course 'very helpful' and 94.6% felt it should be required before performing TaTME in practice. Post training, there was a non-statistically significant increase in surgeons performing TaTME (32.4 vs 51.3%, p=0.078). The proportion of participants describing themselves as 'extremely comfortable' with TaTME increased following course attendance (2.7 vs 18.9%, p=0.028) and 70.3% plan to continue using TaTME in their practice. Of surgeons planning to use TaTME in practice, 94.3% plan to for distal-third rectal cancers, 74.3% for middle-third cancers, and 8.6% for proximal-third cancers. Procedure specific complications reported by survey respondents included urethral injury, wrong plane surgery, and billowing [Table 1].

Conclusions: This study is an objective evaluation of a structured training program for colorectal surgeons who have chosen to adopt the technique of TaTME. As this technique for rectal cancer surgery becomes adopted by colorectal surgeons worldwide, it is imperative that appropriate training be instituted and cases recorded in a registry so that outcomes can be tracked and training paradigms can be improved.

During Course: Assessment of 2-Surgeon Teams During Cadaveric Dissections				
	Time to purse-string completion	Time to achieving correct TME dissection plane	Time to completion of TME	
Mean time, min (SD)	9.9 (±0.6)	22.7 (±1.8)	76.1 (±02.8)	
	Visible defect in purse-string	Failure of stapled anastomosis	Significant dissection out of plane	Injury to rectum or surrounding structures
Rates of complications	39.0%	17.0%	9.1%	4.5%
	Complete TME	Near-Complete TME	Incomplete TME	
TME specimen quality	71%	25%	4%	

After Course: Self-Reported Surgeon Experience in Practice (n = 37 responding surgeons)							
Complication	Bleeding	Wrong Plane	Incomplete Specimen	Billowing	Anastomotic Leak	Urethral Injury	Injury to other organs
	3	12	0	7	2	4	0

Table 1: Results of instructor assessments during cadaveric dissections and results of survey sent to surgeons after course.

PD28

OPEN WOUNDS IN COLORECTAL SURGERY: FEWER INFECTIONS… BUT AT WHAT COST?

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Purpose: Surgical site infection (SSI) is a frequent cause of morbidity after colorectal resection, and is now a quality measure for hospitals and individual surgeons. In an effort to reduce the risk of SSI, many wounds are left open at the time of surgery for secondary or delayed primary wound closure. This study evaluates the impact of wound closure on postoperative infections and resource utilization after colorectal surgery. We hypothesized that while leaving wounds open may decrease the rate of superficial SSI, it may also increase resource utilization to care for these wounds.

Methods: The American College of Surgeons National Quality Improvement Program (NSQIP) Participant Use File (2014) was analyzed, and colorectal operations including open and laparoscopic colectomy, proctectomy, and stoma creation were selected based on CPT codes (n=50,212). Emergent and elective cases were included. Patient and operative-related factors were assessed using Pearson chi-square and Mann-Whitney tests, as appropriate. Patients with wounds left open were propensity matched in a 1:1 fashion with a cohort of patients with primary skin closure. The primary outcome measure was development of an SSI postoperatively. Secondary endpoints included 30-day mortality, length of stay, and discharge status.

Results: The NSQIP colorectal subset contained 50,212 patients. Of these, surgical wounds were left open in 2.9% of cases (n=1,466). Median NSQIP-estimated probability of 30-day mortality was 0.45% for patients whose skin was closed, and 3.4% for those whose skin was left open (p<0.0001). Adjusted analysis included 1,382 patients from each of the two strata, well matched between those with skin closed versus left open at the end of the procedure. Unadjusted and risk-adjusted outcomes stratified by wound closure are illustrated in **Table 1**.

Conclusions: Prior to risk adjustment, open surgical wounds were associated with higher rates of early postoperative morbidity, mortality, reoperation and hospital readmission. After accounting for patient severity, secondary/delayed wound closure was associated with reduced superficial SSI rate, longer hospital length of stay, and discharge to a medical facility. These data suggest that delayed wound closure is effective at reducing SSI in

appropriately selected patients, but may inadvertently result in increased utilization of postoperative resources.

Table 1: Outcomes following colorectal surgery

	Unadjusted outcomes					Propensity-match outcomes				
	Skin Closed		Skin Open		p-value	Skin Closed		Skin Open		p-value
	n = 48,746		n = 1,466			n = 1,382		n = 1,382		
	n	(%)	n	(%)		n	(%)	n	(%)	
Superficial incisional SSI	2,777	5.70	16	1.09	<0.001*	120	8.68	15	1.09	<0.001*
Deep incision SSI	768	1.58	36	2.46	0.008*	45	3.26	33	2.39	0.168
Organ space SSI	2,519	5.17	166	11.32	<0.001*	154	11.14	160	11.58	0.719
30-day mortality	1,199	2.46	174	11.87	<0.001*	152	11.00	166	12.01	0.404
Total hospital length of stay (days)†	5	4, 9	11	7, 17	<0.0001*	10	6, 17	11	7, 17	0.006*
Discharge destination					<0.001*					<0.001*
Home	42,238	86.78	828	56.67		888	64.35	777	56.39	
Facility	5,535	11.37	497	34.02		367	26.59	471	34.18	
Expired	902	1.85	136	9.28		125	9.06	130	9.43	

*Denotes significance (p<0.05)

†Expressed as median (interquartile range)

PD29

RACIAL DISPARITIES IN POSTOPERATIVE COMPLICATIONS FOR PATIENTS WHO DIE AFTER SURGERY.

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Purpose: To determine the contribution of race to post-operative complications in patients who died after major abdominal surgery.

Methods: We queried the 2012-2013 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) cohort for all patients who died within 30-days after undergoing major abdominal surgery and stratified patients by race. Primary outcome was post-operative complications. Univariate/bivariate comparisons and backwards stepwise logistic regression analysis were used to identify predictors of selected complications.

Results: Of 5,677 patients who died within 30 days after major abdominal surgery, 86.8% and 13.2% were white and black, respectively. Compared to white patients, black patients who died had more pre-existing co-morbidities including diabetes mellitus (32.0% vs 24.1%), hypertension (74.8% vs 68.2%), ASA class 4 or higher (61.2% vs 52.5%), smoking (22.1% vs 18.8%), and poor functional status (11.1% vs 6.0%) (p<0.05). On unadjusted comparison, black patients experienced significantly higher rates of 3 or more total postoperative complications (39.28% vs 32.10%, p<0.0001), cardiac (32.76% vs 19.98%, p<0.0001), renal (18.11% vs 14.74%, p=0.0165), bleeding (44.34 vs 38.10%, p=0.0011) and respiratory complications (53.93% vs 49.23%, p=0.0164) in addition to longer index, in-hospital lengths of stay (11 days vs 8 days, p<0.0001). On multivariate analysis, black race remained an independent predictor for having more than 3 post-operative complications (Odds Ratio [OR] 1.3, 95%-Confidence Interval [CI] 1.1-1.6, p<0.05) and for cardiac complications (OR 2.0, 95%CI 1.7-2.4, p<0.0001) (**Table 1**). For other complications, the contribution of race was mitigated but still present for bleeding (OR1.17, p=0.06), renal complications (OR=1.19, p=0.09), and respiratory complications (OR=1.16, p=0.07).

Conclusions: Black patients who die after major abdominal surgery suffer from significantly more postoperative complications than white patients even after adjustment for differences in co-morbidities. In particular, black patients have two times higher odds of post-operative cardiac complications. Programs that adjust for patient-specific risk factors, such as prehabilitation efforts and enhanced recovery pathways, may be possible mechanisms to eliminate these disparities.

TABLE 1. Predictors of post-operative complications for patients who died after surgery.

	3 or more total complications		Cardiac Complications		Renal Complications		Bleeding Complications		Respiratory Complications	
Risk Factors	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval
Race	1.35	1.1-1.6	2.0	1.7-2.4	1.19	0.98-0.99	1.17	0.99-1.4	1.16	0.98-1.4
Hypertension	1.39	1.2-1.6	1.3	1.1-1.5	1.3	1.1-1.6			1.1	1-1.3
ASA Class 3	0.94	0.7-1.2	0.7	0.5-0.9			1.2	0.9-1.6	0.97	0.75-1.3
ASA Class 4-5	1.1	0.9-1.5	0.6	0.5-0.8			1.5	1.8-3.3	1.1	0.9-1.5
COPD	1.4	1.19-1.61								
Functional Status: partial dependence	1.04	0.9-1.23			0.8	0.6-1	1.2	1-1.4	1.0	0.9-1.2
Functional Status: Total dependence	0.65	0.5-0.8			0.4	0.3-0.6	1.1	0.9-1.4	0.8	0.6-0.98
BMI: Obese	1.3	1.15-1.54								

E-posters

P1

HYPOXIA ENHANCES DIFFERENTIATION OF ADIPOSE-DERIVED STEM CELLS TO SMOOTH MUSCLE CELLS.

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Purpose: Adipose tissue derived stem cells (ASC) are being used for regeneration of smooth muscle containing tissue, such as blood vessels and sphincters. Hypoxia has been shown to promote ASC proliferation and maintenance of pluripotency, but the effect of hypoxia on differentiation and contraction of differentiated cells has not been studied. This study explored the effect of hypoxia on differentiation of smooth muscle cells (SMC) from ASC as well as the effect of hypoxia on cell contractility of differentiated cells.

Methods: Adipose tissue was obtained from two healthy patients (ASC-1 and ASC-2) undergoing liposuction procedure. Adipose tissue was washed, digested then centrifuged to obtain the stromal vascular fraction (SVF) pellet. The SVF was incubated overnight in a standard incubator and after 24 hour the non-adherent mononuclear cells were removed. Cells that reached 80% confluence were passaged and ASCs of passage 6-10 were used. The effect of hypoxia on differentiation of ASC and aortic smooth muscle cell (control) was investigated at oxygen concentrations of 2, 5, 10 and 20% for 2 weeks. Real time reverse transcription polymerase chain reaction (RT-PCR) and immunofluorescence staining were used to detect the expression of SMC-specific markers including early marker smooth muscle alpha actin (α-SMA), middle markers calponin, caldesmon and late marker smooth muscle myosin heavy chain (MHC). The specific contractile properties of cells were tested with both a single cell contraction assay and a gel contraction assay. The physiological effect of hypoxia on differentiation of ASC was examined using a collagen gel contraction assay, which measures the change in gel size over time.

Results: Adipose tissue derived stem cells acquired smooth muscle cell morphology and showed spindle-like morphology and the typical "hill and valley" pattern after differentiation for 2 weeks. Cells grown in 5% oxygen concentration showed the highest up-regulation of smooth muscle cell specific genes such as α-SMA, calponin and myosin heavy chain compared to 20% oxygen concentration (P<0.05). Cells differentiated in 20% oxygen

conditions showed increased gel contraction after 24 hours (control=34,8%; ASC21=26.9; ASC23=44.5%) whilst 5% oxygen conditions showed the largest contraction effect by collagen gel lattice assay as the size of the gel lattice reduced further (control=29.4%; ASC-1=22.3%; ASC-2=28.9%).

Conclusions: The combined results of marker expression and contraction assays showed 5% hypoxia to be the optimal condition for differentiation of human adipose stem cells into contractile smooth muscle cells.

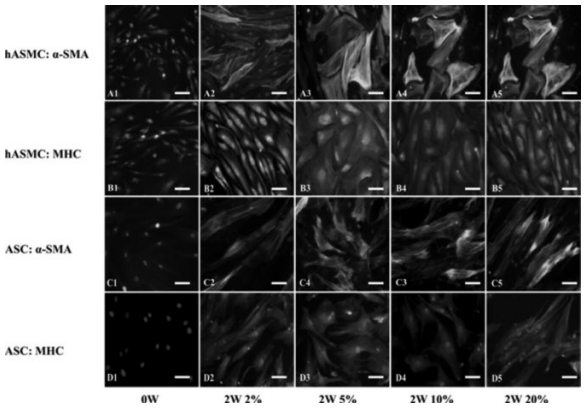

Figure. Effect of hypoxia on the expression of smooth muscle cell (SMC) specific proteins. (A1-A5) Expression of α-SMA in undifferentiated and differentiated human aortic smooth muscle cell (hASMC). (B1-B5) Expression of myosin heavy chain (MHC) in undifferentiated and differentiated hASMC. (C1-C5) Expression of α-SMA in undifferentiated and differentiated adipose stem cell (ASC). (D1-D5) Expression of MHC in undifferentiated and differentiated ASC. Bar scales: 20 μm for all images. α-SMA and MHC in green; nuclei in blue.

P2

DIMETHYL FUMARATE ATTENUATES COLONIC INFLAMMATION IN MICE.

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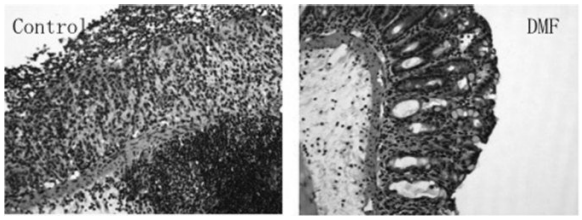
Purpose: Patients with inflammatory bowel disease (IBD) are at increased of developing colorectal cancer. Oxidative stress and its constant companion inflammation play critical roles in the pathogenesis of IBD. Dimethyl fumarate (DMF) was recently approved by the FDA for use in the treatment of patients with multiple sclerosis. The mechanistic action of DMF is not clearly understood. No data is available on the role of DMF in IBD. DMF has been shown to inhibit pro-inflammatory mediator production, and to activate Nrf2 pathway and to regulate immunomodulation. In this study, we hypothesized that by preventing oxidative stress and inflammation, administration of DMF may protect the colon against DSS-induced colitis in a mouse model.

Methods: 8-week old male C57B1/6 mice were given 3% DSS by drinking water for one week to induce intestinal inflammation. They were then randomized to DMF (25mg/kg, n=6) or vehicle (control, n=6)-treated groups by gastric gavage twice daily. One week after DSS administration, the animals were euthanized and their colons were collected for histological and molecular assessments.

Results: The length of the colon in the DMF group was significantly longer than the control group (5.25±0.53 versus 3.92±0.18 cm, respectively, P<0.05). H&E staining (figure below), revealed the control group had severe inflammatory changes in the colon compared to the DMF group. The histopathological score of control group was significantly higher than DMF-treated group (5.42±0.5 versus 3.27±0.46, respectively, P<0.05). The mRNA and protein expression of antioxidant enzymes including Glutamate-cysteine ligase (GCLC) and Glutathione peroxidase (GPX) in the colonic tissue were significantly increased in DMF group.

Conclusions: The administration of DMF significantly decreased DSS-induced colonic inflammation in mice. These observations suggest that DMF may be effective in improving colonic inflammation in IBD patients.



P3

CLINDAMYCIN-GENTIMICIN PERITONEAL LAVAGE DECREASES SURGICAL SITE INFECTIONS IN COLORECTAL SURGERY PATIENTS.

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Purpose: Studies have shown clindamycin-gentimicin peritoneal lavage decreases surgical site infections (SSI) in colorectal cancer patients. The purpose of this study is to determine the impact of clindamycin-gentamicin irrigation on SSI and clinically significant anastomotic leak in all types of colorectal patients.

Methods: All patients who underwent colorectal surgery between January 2008 and May 2014 (n=2439) were divided into two groups based on irrigation treatment: Group 1 was irrigated with a clindamycin-gentamicin solution (n=287) and Group 2 was irrigated with normal saline (n=2152). From these, a total of 200 patients (Group 1, n=100, Group 2, n=100) were propensity score matched based on age, sex, diabetes, smoking status, and primary procedure using nearest neighbor method. Primary endpoints included SSI (superficial, deep, and organ space) and anastomotic leak; these were collected retrospectively and compared between groups using chi-square tests.

Results: The resulting propensity score matched groups revealed no statistically significant differences in demographics or comorbidities between the two groups. The average patients was male with a mean age of aproximately 60 years (Group 1: 60±14.7, Group 2: 61±15.5). With regard to post-operative complications, Group 1 had a significantly reduced rate of overall complications (12% vs. 27%, p=0.012). Group 1 also had a lower rate of SSIs (8% vs. 16%, p=0.006), with the majority in both groups being superficial (87.5% vs. 69.6%). The rate of anastomotic leak was also lower in Group 1 (4% vs. 8%); this difference, however, did not reach statistical significance.

Conclusions: This data shows use of clindamycin-gentimicin peritoneal lavage results in a decreased rate of SSIs in a variety of colorectal patients.

P4

POTENTIAL USE OF AN ORAL NONGLUCOSE AMINO ACID-BASED FLUID FOR PREVENTING DEHYDRATION IN PATIENTS WITH ILEOSTOMY.

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Purpose: Dehydration is the most common reason for readmission in patients with ileostomy. Recent studies have shown that glucose containing rehydration products could increase chloride secretion and paracellular permeability in addition to increasing the well understood glucose-stimulated sodium absorption. The aim of this project is to determine whether an oral formulation, initially developed for cancer patients to prevent gastrointestinal symptoms and improve electrolyte abnormalities, could be potentially used to prevent and treat dehydration in ileostomy patients. Using a functional approach with electrophysiological techniques a fluid called Enterade, that consists of a mixture of amino acids and electrolytes

at pH 4.2 with a total osmolarity of 232 mOsmols, has been developed. The amino acids were selected based on the criteria of increasing chloride secretion, sodium absorption and not increasing paracellular permeability.

Methods: NIH Swiss mice were irradiated at 0 and 7 Gy to establish a dehydration model. They were randomized to receiving Enterade or a glucose containing formulation, administered by oral lavage. To determine efficacy of treatment, crypt count and villous height were determined from histological sections of their ileal tissues while chloride flux was measured using ileal tissue mounted in Ussing chambers.

Results: Enterade fed mice showed decreased paracellular permeability, chloride secretion, IL-1b expression, plasma endotoxin levels and increased sodium and chloride absorption. Mice treated with Enterade also showed increased villous height with increased expression and protein levels of transporters essential for electrolyte and nutrient absorption compared to the glucose-formulation fed mice.

Conclusions: Enterade, an amino acid based electrolyte fluid, has been shown to improve nutrient reabsorption and decrease inflammation as compared to other glucose containing oral rehydration formulations in irradiated bowel mucosa with visible histological advantages. We are in the process of administering this compound to bowel exposed to surgical stress to determine if readmission rates due to dehydration with ileostomy are affected by switching patients to consuming Enterade as opposed to fluids containing glucose. This has the potential to further reduce ostomy output and dehydration in patients with ileostomies and could reduce the readmission rate and incidence of acute kidney injury. Further studies are ongoing.

P5

SHORT- AND LONG-TERM EFFECTS OF A NEW SURGICAL SEALANT ON ANASTOMOTIC HEALING

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Purpose: Anastomotic leak following colorectal surgery can cause serious complications. We investigated the short and long term functional and histopthological effects of a new surgical sealant on colorectal anastomosis.

Methods: Two different animal models swine (n=19) and canine (n=32) of anastomotic leak were created to evaluate the short and long term functional and histopathological changes related to the application of the sealant around the anastomosis; Circular staplers were used to create a complete anastomosis in both models. Animals were randomized between control and sealant group in which up to 4 mL of the sealant was applied over the staple line prior to and following closing the stapler. Animals were sacrificed at 5, 7 and 10 days (swine) and at 1, 3,6 and 12 months respectively (canine). For the canine study, leakage was detected using macroscopic evaluation and radiography; In addition, bowel motility, surgical site strictures, and grading of adhesions were recorded. For both the canine and swine models, the complete anastomotic site was resected en-block, numerous perpendicular sections were submitted for blinded histological examination (H&E stain). Short term histopathological analysis: The number and type of inflammatory cells were semiquantitatively recorded by image analysis and the mean number of cells was thencalculated for each group. *Long term histopathological changes:* Area of tissue damage represented by fibrosis in mm^2 using image analysis.

Results: For the canine study, no leaks were detected in either the treated or the control group. In addition, evaluation of bowel motility, surgical site stricture, evaluation of adhesion formation, and macroscopic examination found no differences between the treated and control groups (Table 1). No significant differences were found in the number or type of inflammatory cells between test and control groups. Sealant coverage area was fully maintained at 1-month post operation and then gradually resorbed over time to completely disappear at 2 years. No significant histopathological differences were noted in the area of fibrosis between the two groups.

Conclusions: The new surgical sealant can be safely applied over colorectal anastomoses without interfering with the healing processes. The sealant can maintain a seal over the healing anastomosis during the entire duration of healing.

	Bowel Motility				Anastomoses		Adhesions			
	OCTT (hr)		Clearance Time (hr)		Strictures (%)		% of animals with presence of adhesions (Severity range)		Percent of anastomotic circumference Covered by Adhesions (%)	
Month	Control	Sealant	Control	Sealant	Control	Sealant	Control	Sealant	Control	Sealant
1	15 (1)	16 (4)	30 (5)	28 (8)	28 (3)	30 (7)	50 (1)	25 (2)	8 (14)	4 (8)
3	17 (6)	15 (3)	24 (16)	24 (16)	43 (7)	35 (12)	25 (1)	0	13 (25)	0 (0)
6	16 (4)	29 (22)	20 (4)	42 (22)	24 (11)	18 (4)	25 (1-2)	50 (1-2)	0 (0)	9 (14)
12	14 (4)	12 (0)	54 (14)	43 (18)	20 (14)	21 (10)	50 (1-2)	25 (1)	8 (10)	0 (0)
24	23 (7)	19 (3)	28 (7)	25 (2)	36 (6)	31 (19)	75 (1)	50 (1)	0 (0)	0 (0)

Table 1: Quantitative functional data- control group and LifeSeal treated group average values and standard deviations of: OCTT (Orocecal transit time), clearance time, strictures, percent of animals with presence of adhesions, and percent of anastomosis circumference covered by adhesions.

P6

POOL OF FREE HEMOGLOBIN ALPHA (HB-α) CHAIN: A PRECUSOR FOR COLITIS-ASSOCIATED COLORECTAL CANCER.

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Purpose: Recently, we found a pool of free hemoglobin alpha (Hb-α) chain in the mucosal/ submucosal layers of inflamed colon tissue lesions in surgical pathology resections of pouch operated patients suffering from ulcerative colitis (UC) and Crohn's colitis (CC). This observation is a previously unknown tissue by-product in inflammatory bowel disease (IBD). We also found the source of free Hb-α chain to be infiltrated immune cells (extravasated macrophage erythrophagocytosis). In vitro studies indicated a correlation between Hb-α induced reactive oxygen species (ROS, (8-hydroxy-deoxyguanosine, 8-OHdG)) and subsequent DNA damage. Our experience shows that all colitis-associated-colorectal cancers (CACC) are found to occur in segments with colitis. Based on the high incidence of colorectal cancer (CRC) in patients with IBD coupled with our finding of a pool of Hb-α in tissue lesions causing DNA-damage in colitis segments, we investigated whether the accumulation of free Hb-α in the cell microenvironment is a key transformational step to increased risk of colorectal carcinogenesis.

Methods: 1] Sample mucosa/submucosa was identified by a pathologist. The protein identification profile was accomplished from extracted tissue samples and intact protein LC-MS/MS analysis. MS analysis was accomplished using an LTQ Velos linear ion trap instrument equipped with a nano-electrospray source. Data dependent MS/MS acquisition was used to select the top 5 most abundant MS signals for fragmentation by electron transfer dissociation (ETD) and collision induced dissociation (CID). Among these 5 signals was the triply charged Hb-α chain. 2] MRC-5 cells were seeded in 96-well plates at a concentration of 30000 cells/well and incubated for 24 h. The following concentrations of hemoglobin α were used, with or without vitamin C or vitamin E: 0, 12.5, 25, 50, and 100μM. Based on available data on physiological serum concentrations [Levine 2011, Ford 2006], we used 100μM of vitamin C and 50μM of vitamin E.

Results: We found, in both the in vitro and in vivo observations, that prolonged-repeated exposure of colon epithelial cells to free Hb-α chain increases the vulnerability of CACC through induced ROS (8-OHdG)-DNA (H2A.X) damage sequence in irreparable DNA and failure of apoptosis (**Fig. 1**). Apoptosis/necrosis measurements by flow cytometry revealed that apoptosis was significantly enhanced in the early exposure of cells to antioxidants while necrosis was decreased, though necrosis increased with time and in higher concentrations (figure not shown).

Conclusions: As 8-OHdG has shown to be promutagenic, producing mutagenic, carcinogenic and cytotoxic substances, reduction of ROS by the

intake of antioxidants (vitamins E and C) promotes apoptosis and subsequent carcinogenesis risk reduction. These studies could further lend mechanistic insights into the increased risk of CACC in IBD patients and how could be prevented.

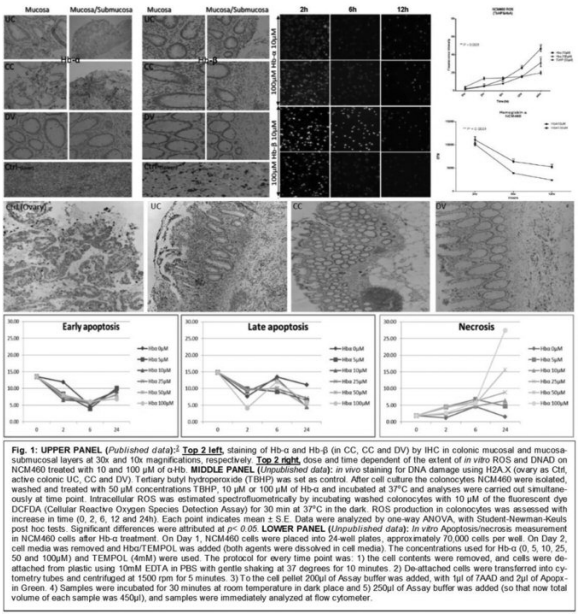

Fig. 1: UPPER PANEL (*Published data*):[2] **Top 2 left**, staining of Hb-α and Hb-β (in CC, CC and DV) by IHC in colonic mucosal and mucosa-submucosal layers at 30x and 10x magnifications, respectively. **Top 2 right**, dose and time dependent of the extent of *in vitro* ROS and DNAD on NCM460 treated with 10 and 100 μM of α-Hb. **MIDDLE PANEL** (*Unpublished data*): *in vivo* staining for DNA damage using H2A.X (ovary as Ctrl, active colonic UC, CC and DV). Tertiary butyl hydroperoxide (TBHP) was set as control. After cell culture the colonocytes NCM460 were isolated, washed and treated with 50 μM concentrations TBHP, 10 μM or 100 μM of Hb-α and incubated at 37°C and analyses were carried out simultaneously at time point. Intracellular ROS was estimated spectrofluometrically by incubating washed colonocytes with 10 μM of the fluorescent dye DCFDA (Cellular Reactive Oxygen Species Detection Assay) for 30 min at 37°C in the dark. ROS production in colonocytes was assessed with increase in time (0, 2, 6, 12 and 24h). Each point indicates mean ± S.E. Data were analyzed by one-way ANOVA, with Student-Newman-Keuls post hoc tests. Significant differences were attributed at $p< 0.05$. **LOWER PANEL** (*Unpublished data*): *In vitro* Apoptosis/necrosis measurement in NCM460 cells after Hb-α treatment. On Day 1, NCM460 cells were placed into 24-well plates, approximately 70,000 cells per well. On Day 2, cell media was removed and Hbα/TEMPOL was added (both agents were dissolved in cell media). The concentrations used for Hb-α (0, 5, 10, 25, 50 and 100μM) and TEMPOL (4mM) were used. The protocol for every time point was: 1) the cell contents were removed, and cells were de-attached from plastic using 10mM EDTA in PBS with gentle shaking at 37 degrees for 10 minutes. 2) De-attached cells were transferred into cytometry tubes and centrifuged at 1500 rpm for 5 minutes. 3) To the cell pellet 200μl of Assay buffer was added, with 1μl of 7AAD and 2μl of Apopxin Green. 4) Samples were incubated for 30 minutes at room temperature in dark place and 5) 250μl of Assay buffer was added (so that now total volume of each sample was 450μl), and samples were immediately analyzed at flow cytometer.

P7

SIGNIFICANTLY ELEVATED LEVELS OF PROANGIOGENIC PROTEINS IN WOUND FLUIDS AFTER COLORECTAL CANCER RESECTION ARE A LIKELY SOURCE OF THE PERSISTENTLY ELEVATED PLASMA LEVELS OF PROANGIOGENIC PROTEINS NOTED POST-SURGERY.

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Purpose: Persistently and significantly elevated plasma levels of the following proangiogenic proteins have been noted for 3-5 weeks after colorectal cancer resection (CRC): VEGF, Placental growth factor (PlGF), Angiopoietin 2(Ang2), Monocyte Chemo-attractant Protein-1 (MCP-1), Chitinase 3-like 1(CHI3L1), Osteopontin (OPN), Matrix Metalloproteinase 2 (MMP2) and Matrix Metalloproteinase-3 (MMP3). These sustained plasma elevations postoperatively (postop) may promote tumor angiogenesis and the growth of residual tumor deposits in cancer patients. The source of the added protein is unclear. Whereas early plasma increases may be related to the acute inflammatory response noted after surgery, the cause of the elevations 2-5 weeks postop is unclear. The surgical wounds are a potential source since angiogenesis plays a prominent role in the healing process. This study's purpose is to determine the levels of the above 8 proteins in fluid from the intra-abdominal wounds and in plasma samples taken simultaneously at multiple postop time points after CRC.

Methods: Consenting elective CRC patients (pts) enrolled in an IRB approved plasma/data bank in whom an intra-abdominal Jackson Pratt (JP) drain had been placed were studied. Clinical and pathologic data were reviewed. In addition to preop blood samples, postop blood and wound fluid samples (WFS) were simultaneously collected, centrifuged and stored at -80°C. Three time points were assessed: postop day (POD) 1, POD 3, and a bundled multi-day time point, POD 7-13. VEGF, PLGF, ANG2, MCP-1, CHI3L1, OPN, MMP2 and MMP3 levels were determined in duplicate via ELISA. The paired *t* test was used for statistical analysis (significance $p<0.05$).

Results: Wound and plasma samples from 14 CRC patients were studied (colon 4, rectal 10; 7 males, 7 females; mean age 65.2± 11.4years). The surgical methods used were: laparoscopic, 8; hand-assisted, 3; open, 3 (mean incision length: lap & hand 8.3±1.7 cm; open25.0±8.8). The mean length of stay was 7.1± 3.1days and there were no major complications noted. At all 3 time points for all 8 proteins, wound levels were 5 to 92 times higher ($p<0.05$ for all comparisons) than the corresponding plasma levels; postop plasma levels, in turn, were elevated from the preoperative baseline (see Table for specific results).

Conclusions: After CRC resection, intra-abdominal wound fluid concentrations of the 8 proteins assessed were significantly higher than corresponding plasma levels. Importantly, as previously noted, postop plasma levels were also notably higher than the preop plasma levels. These results support the hypothesis that the wounds are a major source of the added proangiogenic proteins noted in the blood of post surgery.

Proangiogenic protein levels in preop and post op Plasma vs. postop Wound fluids

Protein	Plasma Level			Wound fluid Level		Plasma vs Wound Level	
	Preop	POD 1	POD 7-13	POD 1	POD 7-13	P value POD 1	P value POD 7-13
VEGF (pg/ml)	66.3± 37.8	97.0±65.6	176.6±151.5	1442±1323	6415±5416	<0.01	0.03
PLGF (pg/ml)	14.0± 5.1	21.0±6.4	22.8±5.5	192.1±147.5	1315±1806	<0.01	0.03
ANG2 (pg/ml)	2439±1236	3855±2043	3722±1463	9715±6142	33791±24024	<0.01	0.03
MCP-1 (pg/ml)	241.5±71.8	354.1±225.5	322.5±135.5	14097±9495	23091±11937	<0.01	0.03
CHI3L1 (ng/ml)	52.9±40.5	652.9±310.7	259.1±266.4	1431±1136	1655±978	0.01	0.03
OPN (ng/ml)	60.0±16.7	198.4±125.3	136.3±61.2	689.6±880.2	2823±1359	0.03	0.03
MMP 2 (ng/ml)	190.1±52.0	225.9±47.7	221.6±47.5	627.2±599.5	1260±450	<0.01	0.03
MMP 3 (ng/ml)	11.1±7.1	15.5±10.1	12.8±7.7	117.5±176.1	160.6±42.6	<0.01	0.03

P8

EXPRESSION OF CYSTATHIONINE-γ-LYASE IN NORMAL COLONIC MUCOSA AND ULCERATIVE COLITIS.

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Purpose: Ulcerative colitis (UC) is a lifelong inflammatory disease of the colon and rectum often characterized by debilitating symptoms such as stomach pain, diarrhea, intestinal bleeding and weight loss. In addition to the morbidity, the risk of colorectal cancer remains higher than that of the general population. While microbial, genetic, and autoimmune factors have been implicated, the cause of UC has yet to be elucidated. Hydrogen sulfide (H_2S), a gasotransmitter, has been shown to exhibit anti-inflammatory effects in various disease states such as acute pancreatitis, sepsis, and COPD. This gaseous mediator is produced mainly by two enzymes—cystathionine-γ-lyase (CSE) and cystathionine-β-synthase (CBS). CSE has been shown to be a major endogenous H_2S-producing enzyme in the colons of mice and rats, protecting the mucosa from inflammatory insults. CSE is constitutively expressed in human normal colonic mucosa (NCM) but there are no studies comparing CSE levels between NCM and UC. We hypothesize that the protective effects of CSE are lost in UC and progression of UC can lead to colitis-associated carcinogenesis (CAC).

Methods: Fresh human tissue samples were obtained from surgical resection of patients with UC or from the normal margin of cancer, in compliance with protocols approved by the UTMB IRB. The tissue was frozen in O.C.T and cryosectioned at 10μm intervals. Samples were fixed with 1% paraformaldehyde, blocked with murine and rabbit sera, and immunostained with conjugated CSE polyclonal antibody. To assess specific cell-types, fibroblasts, epithelial, and immune cells were stained with pre-conjugated anti-α-smooth actin (SMA), EpCAM, and CD-45 antibodies, respectively. Confocal microscopy was performed with a Zeiss LSM510 META laser microscope. Fluorescence was quantified using ImageJ software and statistical analysis performed using SPSS.

Results: Using in-situ confocal microscopy of 3 normal and 5 UC patients' colons, we confirmed that CSE expression was significantly (One-way ANOVA, $p < 0.0001$) lower in UC when compared with NCM and also colocalized with EpCAM, an epithelial marker. CD45+ cells were visibly increased in UC, denoting increased presence of cells of hematopoietic lineage, as expected in inflammation. α-SMA staining, a marker of activated fibroblasts, highlighted the colonic lamina propria.

Conclusions: We show, for the first time, that CSE is expressed in UC, but at lower levels than that of NCM and is predominantly expressed within epithelial cells. This may serve as a rationale for UC's lack of mucosal defense and delayed healing in inflammation. We also examined the level of CBS within UC and noted no significant difference when compared to NCM. Further studies are underway to ascertain the expression of CSE mRNA levels and also to determine whether CSE may be the missing link in playing protective role in CAC.

P10

HEREDITARY MUTATIONS IN COLORECTAL CANCER: MORE THAN MEETS THE DIAGNOSTIC EYE.

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Purpose: Approximately 5-10% of colorectal cancer (CRC) has a hereditary basis. The clinical availability of hereditary multi-gene panel testing (MGPT) allows for CRC patients to be tested concurrently for common hereditary CRC syndromes such as Lynch syndrome, familial adenomatous polyposis (FAP), and MUTYH-associated polyposis (MAP), along with rare CRC syndromes such as juvenile polyposis syndrome (JPS). This study aimed to assess the prevalence of hereditary mutations among CRC patients undergoing MGPT and to describe the clinical histories and impact of the genetic test results for those with mutations detected.

Methods: Clinical histories and genetic test results were reviewed for CRC patients who underwent MGPT between March 2012 and December 2014. MGPTs ranged in size from 5 to 49 genes. The mutation-positive CRC cohort was then analyzed to determine if patients met the National Comprehensive Cancer Network's (NCCN) diagnostic testing criteria for the respective syndrome (v1.2015).

Results: Of 2,555 CRC patients analyzed by MGPT, 268 (10%) were found to carry a pathogenic mutation or likely pathogenic variant. The majority of mutation-positive individuals (62%) harbored mutations in genes associated with Lynch syndrome (46%; n=124), FAP (6%; n=17), and MAP (9%; n=24). The remaining 38% (n=103) had a mutation detected in one of 17 other hereditary cancer genes, including *CHEK2* (n=31), *TP53* (n=10), *BRCA1* (n=*10),* and *BRCA2* (n=11). NCCN diagnostic testing criteria were available for 13 of the 24 genes in which a pathogenic mutation was identified (see table). Of individuals with mutations in one of the five genes associated with Lynch syndrome, 91% met NCCN testing criteria. For those with mutations in *APC* or biallelic *MUTYH* mutations, FAP/MAP criteria for testing or to "consider testing" were met by 37% (n=15/41). Overall, 42% (n=17/40) of individuals with mutations in non-Lynch/FAP/MAP genes met NCCN testing criteria for the associated syndrome, including 3 of 7 *BMPR1A* or *SMAD4* mutation carriers, 0 of 2 *CDH1* mutation carriers, 3 of 10 *TP53* mutation carriers, and 12 of 21 *BRCA1/2* mutation carriers.

Conclusions: Results from this study demonstrate the ability of MGPT to identify hereditary mutations in CRC patients who may have otherwise evaded diagnosis of both common and rare CRC syndromes based on current testing guidelines. This is supported by the observation that only 37% of those with *APC* or biallelic *MUTYH* mutations met testing criteria for FAP/MAP and only 44% of individuals with mutations in non-Lynch/FAP/MAP genes met NCCN testing criteria for the associated syndrome. The utilization of MGPT increases the identification of CRC patients who may not otherwise be tested and allows them to benefit from increased screening and prophylactic surgery to reduce their risks of cancer.

Syndrome	Gene(s)	Mutations Detected, N	Meets NCCN Criteria	
			n	%
Lynch syndrome	*MLH1/MSH2/MSH6/PMS2/EPCAM*	124	113	91
Familial adenomatous polyposis	*APC*	17	6	35
MUTYH-associated polyposis	*MUTYH (biallelic)*	24	9	37.5
Juvenile polyposis	*SMAD4/BMPR1A*	7	3	43
Li-Fraumeni syndrome	*TP53*	10	3	30
Hereditary Diffuse Gastric Cancer	*CDH1*	2	0	0
Hereditary Breast and Ovarian Cancer	*BRCA1/BRCA2*	21	12	57
	Total	205	146	71
	CHEK2	38	N/A	
	ATM	8		
	PALB2	4		
	MRE11A	3		
	RAD50	3		
	NBN	2		
	RAD51C	1		
	BRIP1	1		
	BARD1	1		
Familial Atypical Mole-Malignant Melanoma	*CDKN2A*	1		
Neurofibromatosis, type 1	*NF1*	1		
	Total	268		

P11

COMPARATIVE GENE EXPRESSION ANALYSIS IN COLORECTAL ADENOCARCINOMA: DOES AGE MATTER?

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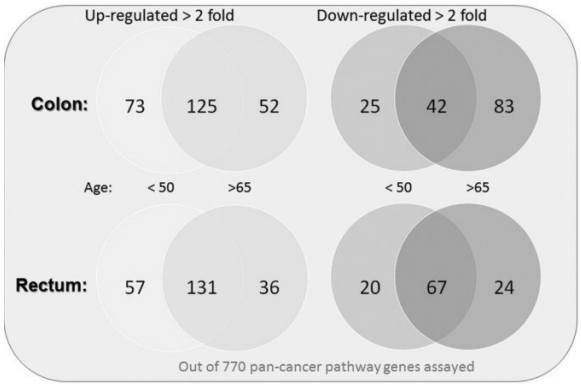
Purpose: Colorectal cancer (CRC) is the third most commonly diagnosed cancer and the second leading cause of cancer related deaths in the US. The overall incidence of CRC in the US has decreased over the past three decades, yet recent literature indicates increase in incidence among individuals younger than 50. The aim of this study is to elucidate the etiology of early-onset (EO) CRC and show its molecular uniqueness compared to late-onset (LO) CRC.

Methods: Two cohorts of patients with sporadic EO and LO CRC tumors were identified. Tumors and their matching non-involved tissue samples were obtained from 24 patients; six under 50 and six over 65 colon cancer patients, six under 50 and six over 65 rectal cancer patients. Patients with Lynch syndrome, familial adenomatous polyposis and inflammatory bowel disease were excluded. De-paraffinized tissues were macro-dissected from FFPE sections, RNA isolated and used for NanoString nCounter mRNA gene expression analysis to assess expression levels of up to 800 cancer genes. Statistical analysis was performed using the Gene Expression R-script module within the nCounter software v2.5. 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.

Results: We analyzed a total of 24 colon and rectal tumor samples and compared their expression profiles to their matching non-involved tissues in order to identify genes that are unique to colon and rectal neoplasm, respectively. Out of 770 PanCancer Panel pathway genes assayed, 98 genes were uniquely expressed in EO colon tumors with 73 genes being up- and 25 down-regulated with a fold change higher than two. 77 genes were uniquely expressed in EO rectal tumors, with 57 of them up-regulated and 20 down-regulated. Further statistical analysis revealed that, from 265 genes differentially expressed specifically in EO colon tumors, changes in expression of 147 genes were statistically significant ($p<0.05$). Similarly,

from 275 genes differentially expressed in EO rectal tumors, 82 showed statistically significant alterations in expression.

Conclusions: This study suggests that EO CRC is a distinct molecular subtype from LO disease and is characterized by unique molecular events. Further studies using larger cohorts of patients are needed to validate these findings. Validated studies will offer the possibilities of finding novel molecular markers to enhance newer, faster and noninvasive detection and personalized treatment modalities for young patients with CRC tumors.



P12

PROSPECTIVE ANALYSIS OF THE SEALING ABILITY OF THE ENSEAL G2 ARTICULATING TISSUE SEALER ON HUMAN MESENTERIC VESSELS IN COLORECTAL SURGERY.

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Purpose: The vascular ligation and sealing of mesenteric vessels is a crucial step in minimally invasive colorectal surgery. Our study examined the sealing quality of the EnSeal® G2 tissue articulating sealer in three different articulations in mesenteric vessels.

Methods: This was a prospective experimental study within a tertiary healthcare center. In total, 30 patients were recruited to be in the study. For primary outcome measures, burst pressures for each specimen were measured. Ten specimens at each of the three articulations of the device were also histologically assessed for the extent of thermal injury and quality of seal.

Results: We evaluated 54 sets of specimens from 30 patients for bursting pressure, all of which were harvested and sealed in the OR using the same EnSeal® device that was used for the surgical procedure. No statistical difference was seen in burst pressures from seals recorded at no angulation (0 degrees), half-maximal angulation (30 degrees), or maximal angulation (60 degrees) (1604, 1507, 1478 mmHg; p=0.07). A small correlation was seen between vessel diameter and burst pressure at each of the three articulations of the device (r=0.28, p=0.04; r=0.31, p=0.02; r=0.29, p=0.03). Histological analysis showed no statistical differences in the average vessel diameter (p=0.57), lateral extent of thermal injury (p=0.48), degree of vascular sclerosis (p=0.22), or the integrity of the seal at the three different articulations of the device. No cases of intra-operative or post-operative bleeding were seen in any of the patients. Five (16.7%) of the EnSeal® devices developed insulation breaks as a result of repeated articulation and de-articulation. Electrical arcing did not appear to have occurred as a result of the insulation break, although this was not formally examined.

Conclusions: The maximum sustainable pressure in mesenteric vessels sealed with a bipolar electrothermal device is supraphysiological and consequently, the device can be safely used to seal vessels up to 8 mm in diameter during colorectal surgery. In addition, no difference was seen in bursting pressures during use of the articulation feature in angling the device. None of the patients in the study reported post-operative bleeding. About 17% of the devices examined had insulation breaks and it is unknown whether this poses a risk for electrical arcing. Further study is warranted.

P13

ANTI-INFLAMMATORY AND ANTI-OXIDANT EFFECTS OF CURCUMIN ON TNBS-INDUCED COLITIS OF RATS.

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Purpose: Curcumin is antioxidant and anti-inflammatory molecule known to be a potent inhibitor of nuclear factor-kappaB (NF-kappaB). This study was designed to investigate the effect of these molecule in an animal model of colitis induced by 2,4,6-trinitrobenzene sulfonic acid (TNBS).

Methods: Experimental colitis was induced by TNBS and ethanol in 42 rats under anesthesia. The curcuminoid mixture was dissolved in corn oil (1 mg/ml) and given for 7 day. Subsequent to induction of colitis, rats were divided into six groups; In the curcumin oral group, curcumin (20 mg/kg) ; in the corn oil oral group, corn oil (20 mg/kg) was administered by gastric gavage. In the curcumin rectal group, curcumin; in the corn oil rectal group, corn oil was administred via rectal route. The control group received 1 mL saline solution (0.9% NaCl) *via* rectal route. In the sham group, only routine rectal catheterization without any material. At the end of 7 day, laparotomy and total colectomy were performed for histopathological examination. Also blood and intestinal tissue samples were obtained to investigate levels of myeloperoxidase (MPO) activity, malondialdehyde (MDA), nitric oxide (NO), platelet derived growth factor (PDGF), interleukin (IL)-6, and tumor necrosis factor (TNF)-alpha, NF-kappaB.

Results: Macroscopic damage score was significantly higher in curcumin oral, croin oil oral and saline groups when compared to sham group ($p < 0.05$). But, no significant difference was found between curcumin and croin oil groups. The inflammatory cell accumulation and ulceration was higher in curcumin oral group than sham group (p=0,019 / p=0,009). Also corn oil oral and saline rectal groups' inflammatory cell accumulation was significantly higher than sham group (p=0,031 / p=0,011). Granuloma formation of saline rectal (p=0,049) and curcumin oral (p=0,008) group was significantly higher than sham group. The biochemical analysis of blood samples for PDGF, TNF- α, MPO did not show any significant difference among groups. The significant differences between groups was evaluated by the analysis of intestinal tissue sampling for IL-6, NO, NF-kB, PDGF, TNF-α, MDA, MPO ($p < 0.05$). NF-kB levels of blood in curcumin oral, curcumin rectal, sham, corn oil oral, corn oil rectal groups were significantly increased when compared to saline rectal group (p≤0,001). NF-kB levels of corn oil rectal was lower than sham group (p=0,012). IL-6 levels in corn oil oral group was significantly increased when compared to corn oil rectal (p=0,033) and saline rectal (p=0,035) groups.

Conclusions: Curcumin improved colitis possibly by modulating the NFκB signaling pathway. The macroscopic scores suggests that curcumin rectal route may have topical anti-inflammatory effects; even if it's not statistically significant.Curcimin against colitis alone or in combination with the conventional anti-colitic therapies; the effects should be considered in future studies.

Tabel-1: Histopathological and biochemical analysis

Groups	s_IL6	s_NO	s_NFkB	s_PDGF	s_TNF	s_MDA	s_MPO	Macroscopic damage score	Inflamatory cell infiltration	Ulcer	Granuloma
Serum rectal	±21,40578	±22,94748	±0,46874	±0,28449	±55,19273	±0,09032	±1,82732	3(2-4)	3(2-3)	2(1-2)	2(1-2)
Curcumin oral	±19,16586	±28,92822	±0,71217	±0,7946	±39,68902	±0,27843	±2,51256	2(1-4)	3(2-3)	2(1-2)	2(1-2)
Curcumin rectal	±19,45271	±17,10295	±0,513	±0,40222	±39,74144	±0,24003	±3,17476	1(0-3)	1(0-3)	0(0-2)	1(0-2)
Sham	±31,86611	±12,66025	±0,56503	±0,31837	±18,52345	±0,27712	±2,85332	0(0-1)	0(0-2)	0(0-0)	0(0-0)
Corn oil oral	±51,05288	±9,83666	±0,39242	±0,66382	±20,9036	±0,19791	±1,93731	3(1-4)	3(1-3)	2(0-2)	2(0-2)
Corn oil rectal	±20,33232	±19,62671	±0,43677	±0,65038	±37,00288	±0,22209	±3,00997	2(1-4)	2(1-3)	0(0-2)	5(0-2)
P	*0,017*	*0,036*	*<0,001*	*0,364*	*0,158*	*0,004*	*0,126*	*0,001*	*0,003*	*0,01*	*0,006*

P14

IMMUNE CELL RECONSTITUTION OF PRIMARY HUMAN COLON CANCER XENOGRAFTS IN THE NSG MOUSE MODEL.

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Purpose: Immune cells within colon tumors have been implicated in tumor suppression and proliferation. To study the complex interaction of the immune cells with the tumor cells, we used the NOD.Cg-*Prkdc*^{scid} *Il2rg*^{tm1Wjl}/SzJ (NSG) mouse model which faithfully propagates human colon patient derived xenograft (PDX) with retention of tumor architecture, stroma, and immune cells. This study was undertaken to 1) define the pattern of immune cell infiltration in primary tumors relative to peripheral blood, 2) determine if this immune environment is maintained in the PDX colon tumors in the NSG model, and 3) analyze reconstitution of the propagated PDX with autologous peripheral blood mononuclear cells (PBMC).

Methods: PBMC and colon cancer specimens from 4 patients were collected at the time of surgery by our tissue bank under an IRB-approved protocol. Patients were treatment naive, and had peripheral WBC counts within the normal range. Tumor fragments were implanted subcutaneously in the flank region of NSG mice and allowed to engraft. Some mice received patient specific PBMC once tumors were palpable. PBMC, primary patient tumors, PDX, PDX from NSG injected with healthy donor PBMC, and mouse spleens were examined as follows: tumors were digested and whole tumor cell populations or PBMC were analyzed. Fluorescent antibodies directed against the following were used: anti-human- or mouse- CD45, CD3, CD4, CD45RA, HLA-DR, TIM3-PD1. Cell populations were analyzed by flow cytometry. Tumor sections were examined and leukocyte populations were compared between the primary tumor and the PDX model.

Results: Tumor infiltrating immune cell populations differ from those found in the circulating blood. Tumors have an increase in activated CD4 T cells, fewer naïve CD4 and CD8 T cells, and an increase in both PD1+TIM3+CD4+ and CD 8+ T cells. There is a trend toward an increased percentage of plasmacytoid dentritic cells in the tumor compared to peripheral blood. NSG mice engraft quickly with human PBMC, and in 1 mouse at week 5, 70% of circulating CD45+ cells are human derived, and these cells are recovered from the spleen and tumor.

Conclusions: The NSG model supports propagation of colon cancer fragments and allows the propagation of host immune cells, and reconstitution of tumor with infused patient derived PBMC. This model will allow interrogation and manipulation of the immune environment and its effect on tumor growth.

P15

A NEW TECHNIQUE FOR SACROCOCCYGEAL PILONIDAL SINUS DISEASE SURGERY.

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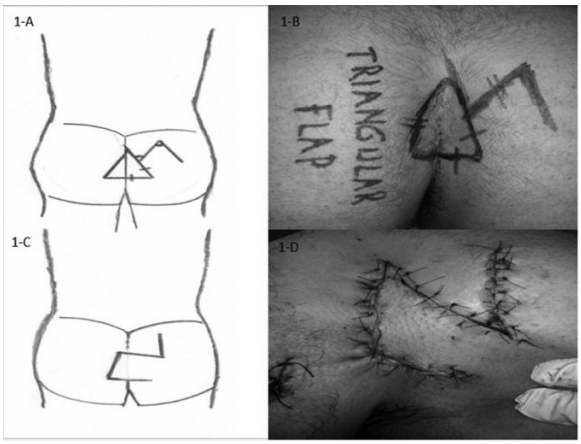
Purpose: In this study we present a new surgical procedure which has been put in practice successfully for the myelomeningocele and hidradenitis suppurativa of the sacrococcygeal region, also can be used for the closure of large fasciacutaneous defects in SPSD.

Methods: In this procedure, skin and subcutaneous tissues related with complicated pilonidal sinus disease were removed totally in a triangular shape.Then, the triangular defect is closed by transposition of 2 skin flaps designed in an unequal z-plasty manner. Over 10 years, this new technique, namely Mutaf's triangular closure procedure, was used for the closure of large meningomyelocele and hidradenitis suppurativa defects. In our patients defect size was 7x4.7x2.6 cm on average.

Results: In all patients, a tension-free one stage closure was obtained. Except two with a minimal wound dehiscence, and one with tip ischemia, all patients healed with no complication. There was no patient with infection. A mean follow-up for 13 months (7-19 months) revealed no recurrence of pilonidal sinüs disease seen. No patient required additional surgery.

Conclusions: Triangular closure technique enables the surgeon to achieve a tension-free defect closure of large sacrococcygeal defects resulting from surgical excision of complicated SPSD. Using two well-vascularized fasciocutaneous flaps, it provides a durable coverage and soft tissue padding over sacrococcygeal and gluteal region with good cosmesis. With these advantages, triangular closure technique seems to be a useful, one-stage, and safe reconstructive alternative for the closure of these challenging defects.



P16

QUALITY OF LIFE IMPROVEMENTS AFTER DOPPLER GUIDED HEMORRHOID ARTERY LIGATION.

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Purpose: Doppler-guided hemorrhoid artery ligation (DGHAL) has been in use for nearly 20 years, and it has been established as a safe and efficacious treatment for grade II and III hemorrhoids. DGHAL and other hemorrhoid surgeries have been shown to have similar outcomes regarding operative success, recurrence, post-operative pain and other complications; yet, compared with other operative options, DGHAL is underutilized in the

United States. Patient satisfaction is a critical metric for elective procedures, and we underwent this study to evaluate patient satisfaction after DGHAL.

Methods: A retrospective chart review was performed for patients that underwent the DGHAL procedure at two different hospitals with study approval by their respective institutional review boards. The surgeries were performed by two surgeons from 2008 to 2013. The attending physicians completed the procedures personally on an outpatient basis for symptomatic hemorrhoid disease. A post-operative telephone survey was conducted with the patients following a questionnaire (Figure 1). The data was also evaluated for a trend in satisfaction with the length of time at follow up. A total of 340 patients received the DGHAL procedure and 219 patients (n=219) agreed to participate in the phone interview with an average long-term follow up time of 0.98 ± 0.79 years. Five percent of patients had grade II hemorrhoids, 61% had grade III hemorrhoids, and 60% had grade IV hemorrhoids with 0.4% having both grades II and III and 26% having both grades III and IV. Pre-operative bleeding and pain was noted for 83% and 64% of patients, respectively.

Results: At the time of survey, no pain or bleeding was noted for 56% of patients while occasional pain, bleeding, or both were seen in 9%, 14%, and 14% of patients, respectively; and 7% of patients continued to have significant pain and/or bleeding. Overall satisfaction was high for 49% of patients, moderate for 30%, low for 16%, with dissatisfaction for 6% and no answer for 0.5%. Symptoms were completely resolved for 52% of patients, partially resolved for 37%, and 11% said their symptoms were not resolved. Low (0-10 tablets), moderate (10-30), and high (30+) narcotic medication needs were noted for 77%, 16%, and 7% of patients with no answer from 2%. Finally, 68% of patients stated they would definitely recommend the procedure to family and friends, 18% would "maybe" recommend the procedure, and 13% patients would not recommend it, with 1% patients not answering. No trend between patient satisfaction and post-operative duration at follow up was found.

Conclusions: DGHAL was shown in prior studies to have comparable outcomes and complications to other hemorrhoid surgical techniques. This study demonstrates that patient satisfaction for the DGHAL procedure is generally high with low narcotic use. Satisfaction and symptom improvements were shown to be durable, with high ratings at various follow up times.

1. Do you currently have any pain or bleeding due to hemorrhoids?
   a. None
   b. Occasional Pain
   c. Occasional Bleeding
   d. Occasional Pain and Bleeding
   e. Significant Pain and/or Bleeding

2. How satisfied are you with the procedure?
   a. Highly Satisfied - (no symptoms)
   b. Reasonably Satisfied - (remaining symptoms that do not interfere with daily life)
   c. Not Satisfied - (symptoms interfering with quality of life or no change compared to before surgery)
   d. Dissatisfied - (symptoms are worse than before the surgery)

3. Were your symptoms resolved after the initial procedure?
   a. Complete
   b. Partially
   c. None

4. How much prescription pain medications did you use after surgery?
   a. 0-10 Tablets
   b. 10-30 Tablets
   c. More than 30 Tablets

5. Would you recommend this newer surgery to your family and friends?
   a. Definitely
   b. Maybe
   c. No

P17

CAN THREE-DIMENSIONAL ANORECTAL ULTRASONOGRAPHY BE INCLUDED AS A DIAGNOSTIC TOOL FOR ASSESSMENT OF ANAL FISTULA BEFORE AND AFTER SURGICAL TREATMENT?

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Purpose: This study aims to evaluate the usefulness of three-dimensional anorectal ultrasound(3D-US) in the assessment of anal fistula, quantifying the length of the sphincter muscle to be transected, selecting patients for different approaches and identify healing, failure or recurrence after surgical treatment.

Methods: A prospective study evaluating 48 patients(25 male-M and 23 female-F), median age 39y with transsphincteric fistulas assessed by Cleveland Clinic Fecal Incontinence score(CCFIS), 3D-US and anal manometry before and after surgery. The percentage(%) of sphincter muscle to be transected during the surgery was measured by 3D-US and the patients were selected to procedures:Seton placement followed by fistulotomy or LIFT (% of muscle transected≥50% in M and ≥40% in F) or fistulotomy (% of muscle transected< 50% in M and <40% in F). After surgery, the % of the fibrosis(muscles divided) and residual muscles were measured on 3D-US and compared with the pre-operative findings. The anal pressures were measured before and after surgery.

Results: The majority of the fistulous tract was positioned in the anterior quadrant. The % of the anterior external anal sphincter(EAS) to be transected was significant high in F than M and the % of anterior internal anal sphincter(IAS) was similar. The indication for seton placement was significant high in F and Fistulotomy was performed only in M. The fecal incontinence(FI) symptoms and the CCCF were similar in both genders. The % of the anterior EAS and IAS divided were similar compared before and after surgery in both genders. There was a significant reducing in resting and squeeze pressures compared before with after surgery. The success rate of healing by 3D-US was 100%(Table). The LIFT was indicated in 12F(10 in the anterior) and 10M(5 in each quadrant) and the 3D-US identified complete healing in 15/22, visualizing fibrosis in the intersphincteric space(IS) and in the extrasphincteric position(EP) previously occupied by the external opening. There was only one case of small persistent cavity in the IS space and one in the EP, both treated conservatively. The success rate was 17/22(77%). There were no postoperative changes in the anal pressures and no one reported FI. 3D-US identified 3 cases failed, as intersphincteric fistulas and 2 recurrences as transphincteric fistulas. All of them underwent a new surgical procedure. The median postoperative follow-up was 12 months.

Conclusions: 3D-US show to be an effective method in the preoperative assessment of anal fistulas by quantifying the length of muscle to be divided since that the results were similar in the post-operative, providing a safe treatment approach according to the gender and % of muscles involvement. Additionally, the 3D-US identified successfully the healing tissue and the type of failure or recurrence

3D-US data and outcomes before and after surgical treatment for anal fistula

Data	Male 25 (52%)	Female 23 (48%)	p
Ultrasound finding			
Anterior/posterior tract position	20/5	21/2	0.49
% of EAS to be transected mean (range)	44% (16-78)	59% (25-89)	0.01
% of IAS to be transected mean (range)	33% (11-63)	32% (22-56)	0.83
% EAS divided before vs. after surgery	39% vs 40%	57% vs 53%	>0.05
% IAS divided before vs. after surgery	32% vs 34%	32 vs 32%	>0.05
Treatment approach			
Seton placement (yes)	04	11	0.01
Fistulotomy (yes)	11	00	0.01
LIFT	10	12	
Functional outcomes after seton or fistulotomy			
Fecal Incontinence (yes)	07	05	1.00
CCFIS median (range)	0 (0-6)	1 (0-5)	0.89

P18

ROUTINE AND COMPLEX ANORECTAL SURGERY IN A TERTIARY ACADEMIC CENTER: DO THE CURRENT GUIDELINES FOR TRAINING REFLECT THE COMPLEXITY OF CASES PERFORMED BY COLORECTAL SURGEONS?

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Purpose: The spectrum of anorectal procedures varies from simple abscess drainage to complex excisions or reconstruction. The ACGME (Accreditation Council for Graduate Medical Education) Review Committee for Colon and Rectal surgery recommends minimum case numbers (64) for one-year specialty trainees in 6 categories of anorectal surgery, specifying 10 of 30 fistula cases to be complex. The objective of this study was to create a modified version of the ACGME minimum categories for the analysis of anorectal cases performed at a tertiary care academic center, with stratification of these cases to routine or complex.

Methods: A retrospective review of a prospectively maintained, IRB-approved database was performed to identify all anorectal procedures performed at a single tertiary academic center. Procedures were identified by CPT coding and entered into 6 categories. All codes were reviewed and stratified as routine or complex according the senior author's judgment of the perioperative care and technical expertise required (see Table 1). Patients with an abdominal portion to any anorectal procedure were excluded**.** The data were reviewed in duplicate to ensure accuracy of data collection. Descriptive statistics and univariate analyses were performed with SPSS v20.

Results: Between 1/1/2011 and 12/31/2014, 7 colorectal surgeons performed 2,483 anorectal procedures (mean 620/year**)**. The mean age of patients was 48 (±16 years) with a mean BMI of 27 (±5) Kg/m^2. The majority of procedures were performed under general anesthesia (92%) and as outpatient (91%). 64% were identified as routine and 36% as complex. Table 1 summarizes the 6 categories of anorectal procedures with examples of complex procedures. Common routine cases included but were not limited to single or multiple quadrant hemorrhoidectomy, intersphincteric fistulas, internal sphincterotomy, and incision and drainage of abscesses. The CPT coding captured 72 different procedures. Fistula was the most common procedural category (48%), 37% of the 1182 procedures were complex. All procedures performed for fecal incontinence or advanced anorectal techniques were considered complex. Regarding the 6 procedural categories, no significant change in volume was identified over the study period (p=0.25).

Conclusions: 36% of 2,483 consecutive anorectal cases were defined as complex. Fistula surgery was the most common with 1182 cases (48%), of which 37% were complex. The current case minimum required by the ACGME does not reflect the complexity of anorectal cases currently performed at an academic tertiary medical center. Expanded categories and an acknowledgement of the complexity of all procedures should be reflected in current training requirements.

Table 1

Anorectal Procedures	Total cases (%)	% Complex Procedures in Category	Examples of Complex Procedures
Hemorrhoidal disease	403 (16)	8	PPH
Fistula management	1182 (48)	37	LIFT, ERAF
Fecal incontinence procedures	95 (4)	100	Sphincteroplasty, SNS, ABS
Internal sphincterotomy/stenosis	265 (11)	8	Anoplasty
Transanal excision	459 (18)	50	Excision of condylomata, Altmeier, Delorme, TEMS/TAMIS
Highly technical anorectal procedures	79 (3)	100	Gracilis interposition, ileoanal pouch advancement

PPH: Procedure for Prolapsing Hemorrhoids; LIFT: Ligation of Intersphincteric Tract; ERAF: Endorectal Advancement Flap; SNS: Sacral Nerve Stimulation; ABS: Artificial Bowel Sphincter; TEMS: Transanal Endoscopic Microsurgery; TAMIS: Transanal Minimally Invasive Surgery

P19

HEMORRHOID ENERGY THERAPY (HET): A PROMISING OUTPATIENT TREATMENT OPTION FOR SYMPTOMATIC HEMORRHOIDS.

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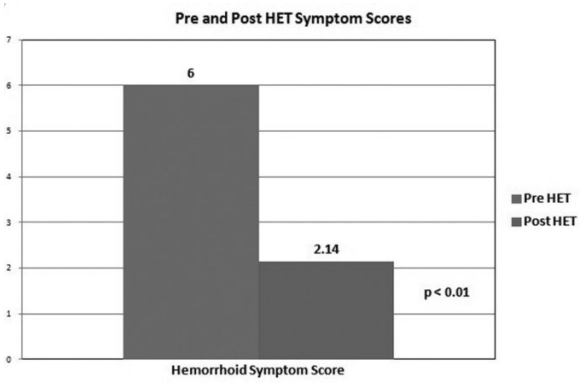
Purpose: Patients with internal hemorrhoids are frequently encountered in the colorectal clinic. Outpatient treatment options include diet modifications, various ointments, and procedures (sclerotherapy, infrared coagulation, and rubber band ligation) that often require repeated clinic visits. The current study aims to evaluate the safety and effectiveness of the HET™ Bipolar System (Medtronic, Boulder, CO) for the treatment of grade I-III hemorrhoids in a prospective pilot study.

Methods: Patients seen at a colorectal clinic in a single institution with grade I-III hemorrhoids were offered to participate in a prospective pilot trial. The HET device is a modified anoscope equipped with LED lighting, a tissue clamping mechanism and a bipolar energy source used to treat multiple hemorrhoidal columns in one sitting. Three columns of hemorrhoids were treated with 2 heat energy applications per column. The primary outcome of this study is the treatment effect on hemorrhoid symptoms of bleeding, pain, prolapse, itching, and soiling. This was measured with a patient completed questionnaire documenting each symptom's frequency from 0 to 3 (i.e. 0 is < 1x/month; 3 is daily) before therapy and at 3 weeks follow-up. Secondary outcomes were also recorded at follow-up and included perceived pain associated with the procedure, changes in the clinical grade of hemorrhoids, and adverse events. Post-treatment pain scores were recorded using the visual analog scale (VAS).

Results: Eight patients (5 females) with mean age of 54 (± 16.4) years underwent the HET procedure. The median duration of symptoms was 6 (range, 1-36) months and the most common symptom was bleeding (100%). Two patients had previously been treated with banding. Before the HET procedure, 1 patient had grade I, 5 patients had grade II, and 2 patients had grade III hemorrhoids. Hemorrhoid associated symptoms improved significantly after the procedure and the symptom score decreased from 6.0 before treatment to 2.1 after treatment (p<0.01; Figure). Mean VAS score was 1.5 (± 1.8). No difference in the median clinical grade of hemorrhoids was observed. One patient experienced delayed onset pain (VAS 4) 1 week after the procedure, secondary to a thrombosed hemorrhoid. Otherwise, no complications were observed.

Conclusions: The HET treatment, applied in a single outpatient visit, reduced hemorrhoid symptoms in all patients and was not associated with any significant adverse events in this small pilot trial. Patient accrual is ongoing and further assessment in a larger cohort is needed.



P20

MRI-BASED MORPHOLOGICAL STUDY OF THE ADULT COMPLEX CRYPTOGLANDULAR FISTULAS.

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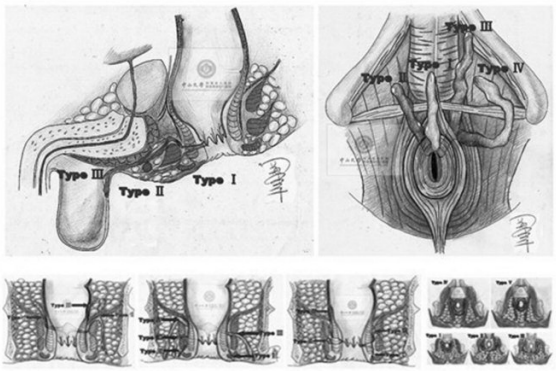
Purpose: To present a more spatially visualized classification system of complex anal fistulas and a simplified classification of anterior cryptoglandular anal fistulas.

Methods: This was a retrospective study. Patients recruited were older than sixteen years old and underwent pelvic MRI for cryptoglandular anal fistula between October 2012 and December 2014. MRI-based characteristics of the extension course of fistulas were independently evaluated by two examiners and were blinded to each other's findings. The specific forms and occurrence rates of four general fistula extension patterns were determined. A simplified classification of anterior cryptoglandular anal fistula was established.

Results: Nine hundred and ninety-nine primary cryptogladular fistulas from 848 patients, including 208 complex fistulas, were evaluated. Five hundred and thirteen cases were posterior, 227 were anterior, and 259 were lateral. Four general fistula extension patterns were determined. They were intersphincteric longitudinal extension, trans-sphincteric transverse extension, supralevator extension, horseshoe-like circumferential extension.The occurrence rates were 100%, 36.0%, 3.2% and 7.4%, respectively. More specifically, there were four types of longitudinal extension pattern, four of transverse extension pattern, three of supralevator extension pattern and five of circumferential extension pattern. Four types of anterior cryptoglandular anal fistula were indentified. Type I fistula is an intersphincteric tract spreading to anterior perianal space, and finally to perineal or scrotal subcutaneous space (56.2%). Type II fistula is a low anterior trans-sphincteirc tract spreading to anterior superficial anal space, then to perineal or scrotal subcutaneous space in the end (15.1%). Type III fistula is a high anterior trans-sphincteric tract spreading to deep anterior anal space, then to superficial perineal space and extend along with the bulbous urethra and bulbospongiosus, eventually to scrotal subcutaneous space (26.0%). Type IV fistula is a high anteriorly trans-sphincteric tract spreading to deep anterior anal space, then involves anterolateral ischioanal fossa and subsequently perianal space, eventually to perineal or scrotal subcutaneous space (2.7%). The detailed morphologies of the general extension forms and the four types of anterior anal fistulas were shown in a series of illustrations.

Conclusions: The morphology of anal fistula, especially complex fistula, can be delineated by a more spatially visualized classification system, which consists of intersphincteric longitudinal extension, trans-sphincteric transverse extension, supralevator extension, and horseshoe-like circumferential extension. A simplified classification of anterior cryptoglandular anal fistula, which includes four specific types, was established.



P21

INCREASED INCONTINENCE IN BOTULINUM TOXIN VERSUS LATERAL INTERNAL SPHINCTEROTOMY FOR TREATMENT OF ANAL FISSURE: A SURPRISING FINDING.

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Purpose: Surgeons often prefer treating patients with anal fissures with chemical denervation (Botulinum toxin, Botox) instead of lateral internal sphincterotomy (LIS) to reduce the rate of long-term incontinence. We hypothesized that Botox would have a lower rate of fecal incontinence than LIS, with an increased recurrence rate.

Methods: A retrospective chart review was conducted for all patients undergoing treatment for anal fissure (ICD-9 code 565.0) by surgeons in the Division of Colorectal Surgery between 2009 and 2015. Patients who were deceased and those with concomitant secondary procedures or procedures other than LIS or Botox, were excluded. Patients underwent LIS or Botox based on the surgeon's clinical judgment and preference based on patient and surgeon factors. A telephone survey was conducted inquiring about the return of anal fissure and Cleveland Clinic Fecal Incontinence Score (CCFIS). Statistics were calculated using the Chi squared test.

Results: From 197 initial patients, 95 patients were excluded as above. There were 76 (74.5%) patients who underwent LIS, and 26 (25.5%) who underwent Botox injection. The mean time from surgery to date of survey was 44 months (Range 3 to 81). Contact was attempted on102 patients (49 males (48%) mean age 49.4 years). Response rate was 58.8% (60/102); 8 patients declined to participate. Overall, 55 of 60 (91.67%) patients reported being satisfied or very satisfied with their procedure results, which was similar between groups (LIS 93% vs. Botox 88%). The self reported recurrence rate for patients who underwent LIS was 9.3% (4/43) and for Botox was 29% (5/17) (p=0.049). Patients undergoing Botox had a statistically increased risk of having postoperative incontinence to liquid stool, when compared patients who underwent LIS.

Conclusions: After chemical denervation the rates of both recurrence and liquid incontinence were statistically higher than in the population undergoing LIS. Further evaluation and consideration of Botulinum toxin should occur to determine if this is the "safer" option for patients with anal fissures.

Patients Reporting Incontinence Episodes Greater Than Once per Month

	Procedure Performed			
	LIS (n=43)		Botox (n=17)	
	Pre Op	Post Op	Pre Op	Post Op
Incontinence to Gas	3 (6.9%)	4 (9.3%)	0	3 (17.6%)*
Incontinence to Liquid Stool	1 (2.3%)	1 (2.3%)	1 (5.9%)	4 (23.5%)**
Incontinence to Formed Stool	1 (2.3%)	1 (2.3%)	0	1 (5.9%)*

*NS

**p=0.0074

P22

AVOIDING EMERGENT SURGERY: PHENOL SCLEROTHERAPY FOR ACUTE INPATIENT HEMORRHOIDAL BLEEDING.

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Purpose: Hemorrhoids can result in significant gastrointestinal bleeding, occasionally requiring inpatient management. Standard treatment is hemorrhoidectomy, which can be expensive, morbid, and often requires prolonged recovery. There is a paucity of literature regarding effective non-surgical options in this setting. Our institution offers phenol sclerotherapy injections to treat both inpatient and outpatient hemorrhoidal bleeding. The treatment is usually well tolerated and can usually be completed in under ten minutes. Our hypothesis was that bedside phenol sclerotherapy

is a safe, fast, inexpensive, and effective primary treatment of acute inpatient hemorrhoidal bleeding.

Methods: We retrospectively identified and included all patients who presented to our institution with acute gastrointestinal hemorrhage, isolated to hemorrhoidal bleeding, that required inpatient colorectal surgery consultation between 1/1/2011 and 10/20/2015. All subjects received at least one sclerotherapy treatment via anoscopy with 3 ml of a phenol/vegetable oil mix in up to four quadrants. Exclusion criteria were initial treatment with anything other than sclerotherapy, rectal varices, or concurrent anorectal disease (i.e. fissure, fistula, or rectal prolapse).

Results: Nineteen patients met our inclusion criteria. Demographics and results are presented in the attached image. Only one patient required hemorrhoidectomy prior to discharge (via a stapled approach). The same patient was the only patient to require post-sclerotherapy blood transfusion. Our average population was generally elderly with a high prevalence of co-morbidities. There were no significant complications from our treatment.

Conclusions: Hemorrhoids can result in hemodynamically significant gastrointestinal bleeding requiring inpatient admission; these patients frequently have other medical co-morbidities, making surgical intervention more risky. Sclerotherapy, a common treatment modality for hemorrhoidal bleeding in the outpatient setting, can be a safe, rapid, cost-effective, and efficacious treatment in the acute inpatient setting. This treatment may help expedite discharge from hospital, decrease the need for blood transfusion, and avoid the morbidity and expense of an emergent operation, particularly in the medically frail. We propose a prospective, randomized study to compare safety, long-term efficacy, and cost-effectiveness of sclerotherapy versus hemorrhoidectomy in acute hemorrhoidal bleeding.

Image: Clinical demographics and results of patients who received sclerotherapy for acute hemorrhoidal bleeding(n=19)

Variables (n=19)	Parameter	
	Mean (range)	
Age (years)	61 (33-84)	
# sclerotherapy treatments	1.1 (1-2)	
	n (%)	
Female gender	10 (53%)	
ASA class 3 or 4	10 (53%)	
ICU Admission	3 (16%)	
Hemodynamic instablity	9 (47%)	
Discharged without surgery	18 (95%)	
Complications from sclerotherapy	0 (0%)	
	Pre-treatment	*Post-treatment*
Required blood tranfusion: n (%)	13 (68%)	1 (5%)
# of transfused units of blood	33	7
	Mean (range)	
Hemoglobin (g/dl)	8.1 (5.1-12)	9.5 (7.3-11.3)
Length of stay (days)	3.5 (1-13)	2.1 (0-8)

P23

FISTULOTOMY AROUND THE SPHINCTER (FATS) PROCEDURE: A SIMPLE NEW CONCEPT TO TREAT HIGH FISTULA-IN-ANO.

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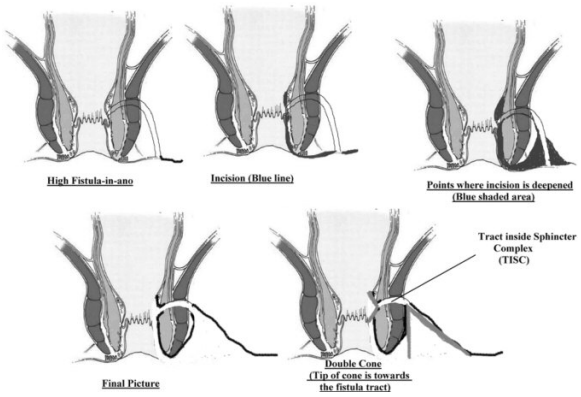
Purpose: High fistula-in-ano (involving more than one-third of sphincter complex) pose a therapeutic challenge as sphincter cutting procedures (fistulotomy or cutting seton) carries a high risk of incontinence. Fistulotomy around the sphincter (FATS) procedure is a new simple concept. It is a logical modification of fistulotomy with primary sphincter reconstruction (FPR).

Methods: In FPR, a conventional fistulotomy is done, the involved sphincter is cut and then repaired. In FATS, conventional fistulotomy incision is given but instead of cutting and then repairing the sphincter, the sphincter is not cut at all. The incision is given from internal opening to the external opening. The incision is deepened till the level of the sphincters. The sphincter complex (internal plus external sphincters) is not cut and is completely preserved. The fistula tract, all around the sphincter complex, is thoroughly cleaned, curetted and debrided. The fistula heals by secondary intention (granulation tissue). The important technical point is to form a double cone at internal as well as external opening so that the tip of both the cones point towards the fistula tract (figure-1). The fistula tract passing through the sphincter (TISC- tract inside sphincter complex) is thoroughly curetted and cleaned but is not widened. The aim is that TISC(tract inside sphincter complex) heals first. Subsequently, both the wounds around the internal and the external openings heal from TISC towards the openings. The fecal matter or the mucus doesn't pass through the wound as the TISC is the narrowest part of the wound and is kept collapsed by sphincter muscle pressure. Ethical committee approval was taken. The wound was cleaned regularly (at least twice daily) in the post operative period. Vaizey's incontinence scores were evaluated preoperatively and postoperatively at 6 weeks.

Results: Three patients with high fistula-in-ano were operated with this technique. All were males. Average age- 49.3 years and median follow-up was 3 months. Two were posterior fistula whereas one was anterior. The fistula healed in all the three patients. There was no change in the Vaizey's incontinence scores.

Conclusions: The fistulotomy around the sphincter (FATS) procedure is a simple novel procedure with no risk of damage to the sphincter complex. The preliminary results are encouraging. Further evaluation and studies are needed to substantiate the results.



P24

COMPARISON OF WOUND COMPLICATIONS IN OPEN VS CLOSED LATERAL INTERNAL SPHINCTEROTOMY FOR ANAL FISSURE.

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Purpose: Partial lateral internal sphincterotomy (PLIS) is considered the preferred surgical treatment for chronic anal fissure in most patients. PLIS can be performed by either the open or closed technique, with equivalent efficacy in fissure healing rates. Few studies have specifically compared wound complication rates between the two techniques. Our aim in this study was to compare the incidence of wound complications at the sphincterotomy site between open and closed technique.

Methods: Retrospective review of patients in a single specialty practice undergoing PLIS for chronic anal fissure over a 5 year period. We then identified those patients who underwent either open or closed sphincterotomy. Preoperative variables included age, gender, surgeon, and location of fissure. Post-operative outcomes included surgical site infection, delayed wound healing, need for reoperation, and fissure healing. Statistical analysis was performed using Chi-square and Fisher's exact test.

Results: 253 patients were identified, 88 of whom had open sphincterotomy, while 165 had closed sphincterotomy. There were no differences

between groups with regard to age, gender, surgeon, location of fissure and length of follow-up. Compared to the closed technique, the open technique had a higher incidence of surgical site infection (14.8% vs 2.4%, p<0.0001), delayed wound healing (30.7% vs 12.6%, p=0.001) and need for reoperation (9.1% vs 1.8%, p=0.018). There was no difference in fissure healing rate.

Conclusions: Open and closed sphincterotomy have been shown to be equally efficacious with regard to fissure healing rate. Our study shows that the open technique appears to have a significantly higher wound complication rate, including higher incidence of surgical site infection and delayed wound healing. While the choice of technique is sometimes dictated by the findings at the time of surgery, the closed sphincterotomy appears to be the preferred technique.

Results

	Open (n=88)	Closed (n=165)	p-value	Odds ratio
Infection	13 (14.8%)	4 (2.4%)	0.0002	0.141
Delayed Healing	27 (30.7%)	21 (12.6%)	0.0005	0.329
Re-operation	8 (9.1%)	3 (1.8%)	0.0183	0.185
Fissure Healed	82 (93.2%)	163 (98.8%)	0.0686	N/A

P25

TRANSANAL OPEN HEMORRHOIDOPEXY - 9-YEARS RESULTS.

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Purpose: The choice of an adequate treatment for hemorrhoids still remains a problem. Like Longo's hemorrhoidopexy transanal open hemorrhoidopexy (TOH) follows a concept that preserves hemorrhoidal tissue, respecting its importance concerning continence and sensation. This study examines the results of TOH in a period of 9 years.

Methods: Between November 2006 - October 2015, 313 patients; male: 172; female: 141; age: 51.7 ± 15 years; follow-up: 5.8 ± 3.1 years, were treated with TOH. All patients had rectal mucosal prolapse combined with II-III degree hemorrhoids. In lithotomy position and under general anesthesia the rectal mucosa was lifted and fixed by Z-stitches four centimeters above the hemorrhoidal base after infiltration with adrenaline solution (1:100,000 dilutions) and removal of a small rectal mucosa flap. Z-stitches were positioned in up to four segments of the lower rectum dependent on the size of prolapse. Postoperatively all patients received a fiber rich diet. In case of pain diclofenac and metamizol was prescribed.

Results: Of all 313 patients 261 patients **(83%)** were without any complaint at one week, 52 patients **(17%)** experienced pain and were treated with oral analgesics and 10 patients **(3%)** experienced minor bleeding that stopped spontaneously during the first week after operation. 238 patients **(76%)** had no further complaints during the complete follow up period. A new segmental prolapse was noticed in 42 patients **(13%)** and was treated by a second TOH in 19 patients **(6%)** and managed conservatively in 23 patients. 43 patients **(14%)** had persistant pruritus ani despite the operation. 22 patients **(7%)** were lost.

Conclusions: Transanal open hemorrhoidopexy seems to be an attractive alternative to other hemorrhoidal tissue-preserving surgical techniques. The procedure can be performed easily, under direct vision is very cost effective and shows promising results for a time period of 9 years.

P26

COMBINATION OF CONSERVATIVE MANAGEMENT WITH WELL-DEFINED GOALS (TONE) AND AN OFFICE PROCEDURE (RUBBER BAND LIGATION) CAN PREVENT NEED FOR SURGERY IN MOST ADVANCED HEMORRHOID PATIENTS.

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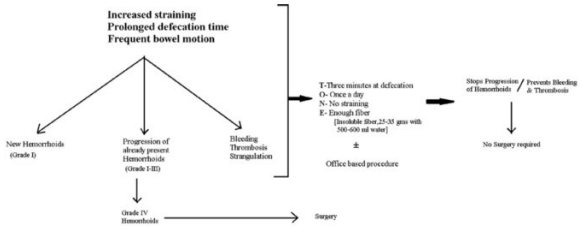
Purpose: Hemorrhoids are caused by deranged defecation habits (DDH) having three components - increased straining while passing bowel motions, prolonged defecation time and, frequent bowel motions. DDH are responsible for development of new hemorrhoids, progression of existing hemorrhoids and bleeding (and/ or thrombosis). All clinicians recommend high fiber and correct defecation habits to their hemorrhoid patients but the precise target goals are usually not communicated to the patients. Due to this, full compliance and desired clinical beneficial effect is not achieved. If the exact goals of the treatment are defined and communicated to the patient(TONE- **T**hree minutes at defecation, **O**nce a day frequency of defecation, **N**o straining during passing motions and, **E**nough fiber-5-6 teaspoonfuls of fiber with 500-600 ml of water), then the patient knows precisely whether he is doing fine or further efforts are needed to achieve the desired goals. Once DDH are corrected, then progression of hemorrhoids and bleeding can be prevented. An additional office procedure (Rubber band ligation-RBL) would further downgrade the hemorrhoids to some extent.

Methods: All consecutive patients with advanced hemorrhoids (late grade II, III & IV) who were referred for surgery were prospectively enrolled. All patients were motivated to follow TONE and RBL was done on two larger hemorrhoids. The procedure was repeated as necessary. The satisfaction score was measured as highly satisfied, moderately satisfied and not satisfied.

Results: Seventy four (74) patients of advanced hemorrhoids were enrolled over 5 year period. Fourteen patients were lost to follow. The median follow-up was 21 (3-50) months. Male/Female: 53/7. Age 45.6 ±13.9 years. The grade of hemorrhoids was late grade II- 29, III-29, IV-2. Bleeding was present in 75% (40/60) patients. RBL was done once in 39, twice in 15 and thrice in 6 patients. 67% (40/60) were highly satisfied, 13% (8/60) were moderately satisfied and 20% (12/60) were not satisfied with the treatment. 15% (9/60) underwent operation for hemorrhoids. The prolapse improved in 48% (29/60), didn't increase with time and remained same in 30% (18/60) and increased in 7 % (4/60)[15% (9/60) underwent operation]. In 51 patients, the bleeding episodes occurred in 17.7% (9/51) patients compared 68.7% (35/51) before the treatment (p<0.0001, Fischer's exact test).

Conclusions: Specifying well defined goals to the patients (TONE) is an effective way to correct deranged defecation habits (DDH) and can prevent progression of hemorrhoids and bleeding in most cases of advanced hemorrhoids. Hemorrhoidal prolapse progression stopped in 78% patients and bleeding episodes decreased from 68.7% to 17.7% patients. Surgery could thus be prevented in most patients with advanced hemorrhoids, with only 15% patients requiring surgery.



Overview: Pathogenesis of hemorrhoids and role of TONE & an office procedure in preventing surgery in advanced hemorrhoids

P27

OUTCOMES AFTER LONG-TERM "LOOSE" SETON TREATMENT OF ANORECTAL FISTULAS LONG-TERM "LOOSE" SETON USE IN FISTULA PATIENTS IS ASSOCIATED WITH MIGRATION OF THE INTERNAL OPENING OUTWARD AND MAY ELIMINATE LIFT OR ADVANCEMENT FLAP PROCEDURES AS DEFINITIVE TREATMENT OPTIONS.

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Purpose: Loose setons are frequently used in anorectal fistula patients in anticipation of a LIFT, advancement flap or other definitive procedure. In patients fearful of soiling and fecal incontinence as well as those who have had failed definitive procedures, loose setons are sometimes left in place for longer periods of time. The impact, if any, of long term seton use is unclear; this retrospective study was carried out to examine the implications of this practice.

Methods: Transphincteric anorectal fistula patients who had a loose seton in place for 7 months or more were studied. The office and hospital charts as well as operative reports were reviewed. Having noted significant migration of the internal opening in 1 patient, the senior author began to routinely track the location of the internal opening on follow up visits and also noted the migration distance. Patients were asked about their flatal and fecal continence at each visit.

Results: A total of 22 patients met the study criteria (mean age 36, 16 males, 6 females); 6 had multiple fistulas, and 6 had IBD. In 18, the internal opening was at the dentate line when the vessel loop seton was placed. The mean duration of seton use was 17 months [range 7-32]. Outward internal opening migration (IOM) of 1 cm or more was noted in 84% of patients, and in 42% the migration distance was 1.5 cm or more. In 9 patients (41%), the internal opening moved into or past the intersphincteric groove; this eliminated the LIFT procedure as an option. External opening migration towards the anus was noted in 3 patients and in 1 was associated with a buttock abscess. No migration was noted in 1 patient. Also, a very thin epithelial layer was noted to cover the radial furrow that was the migration path; the more external the internal opening combined with this thinned tissue makes an advancement flap less promising. A cutting seton was offered to 9 patients with residual fistulas involving small amounts of external sphincter; 5/9 successfully underwent the operation. Three patients with less IOM underwent LIFT procedures. At last follow up, 11 patients had the seton in place; also, all 22 patients in this study reported normal continence of feces and flatus except 1 patient with occasional flatal incontinence.

Conclusions: Loose setons actually do "cut" to some extent in most patients if left in long enough; interestingly, continence is maintained. The best case scenario is a residual fistula involving much less sphincter than the original fistula; a cutting seton is a definitve option in those cases. Patients who choose long term setons rather than interval operation 2-4 months after seton placment should know that a subsequent LIFT or advancement flap operation may not be feasible due to IOM.

P28

LONG-TERM FUNCTIONAL RESULTS AFTER OPEN HEMORRHOIDECTOMY: EXTENDED FOLLOW-UP OF A RANDOMIZED TRIAL.

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Purpose: Although minimal invasive procedures have gained increased acceptance, excisional techniques are still considered the golden standard for the surgical treatment of symptomatic hemorrhoids. However, it is not known if Milligans operation where the wounds are left open or Fergusson closed technique is the best choice. The present study is a long term follow up (LTF) of a randomized trial comparing these techniques performed 1999-2003.

Methods: 225 patients were originally randomized to Milligans or Fergussons operation. 26 patients had died and 151 of the remaining 199 accepted to participate (76%) and answered the baseline bowel function questionnaire and a special survey after a median follow up of 10,7 years

Results: 77 participants were in the Milligan group and 74 in the Fergusson group with no gender or age imbalance. 48 (33%) individuals reported recurrent haemorrhoids, 20 (27%) in the Fergusson group and 28 (36%) in the Milligan group (n.s.). Anal bleeding was reported in 80% at baseline but had decreased to 29% at LTF ($p<0.001$). At baseline, 112 subjects (50%) complained of anal pain and 68 (30%) reported pain at defecation. At LTF these figures were reduced to 19% and 11% with no clear differences between the groups. 20% described a sense of an anal stenosis (Milligan 20%, Fergusson 19%) at LTF. The sense of stenosis increased with number of excisions from 14% (one excision) to 33% (four excisions). At baseline, soiling was reported in 49% but at LTF this percentage was reduced to 20% with no difference between the groups. 20% used pads preoperatively but only 6% at LTF. Straining at defecation was stated by 17% of the subjects at baseline, at LTF this figure was 16% in the Milligan group and 10% in the Fergusson group (n.s.). At LTF. the postoperative result was described as excellent in 38%, as good in 37%, as acceptable in 17% and as poor in 8%. Even individuals who reported residual haemorrhoids evaluated the surgical result as excellent or good in 42%.

Conclusions: All symptoms associated with hemorrhoids were reduced at follow-up more than 10 years after excisional hemorrhoidectomy. Suturing (Fergusson) or leaving open of wounds (Milligan) did not affect the results. The most common remaining problems were recurrence and a sense of anal stenosis.

P29

ANALYSIS OF 171 CONSECUTIVE PATIENTS WITH SACROCOCCYGEAL PILONIDAL DISEASE.

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Purpose: To evaluate the outcomes of different surgical approaches utilized for the treatment of pilonidal disease as indicated by average pain score, length of time to return to work, recurrence rate and overall satisfaction score.

Methods: Retrospective chart review of 171 consecutive patients with pilonidal disease that were treated operatively by a single surgeon between August 2007 and September 2015. Surgical treatment included Limberg flap reconstruction (*n*=79), Bascomb cleft lift technique (*n*=9), midline excision (n=54) and open unroofing with secondary healing (*n*=29). Patients were contacted via a telephone interview following their surgery to determine their subjective level of pain following the procedure, the length of time pain medications were required, if antibiotics were necessary, length of time until return to work, recurrence of pilonidal disease and subjective satisfaction with their surgery. This follow-up interview occured from 1 to 97 months postoperatively, with an average of 34 months.

Results: 88 patients were treated with surgical procedures utilizing off-midline incisions, 54 patients had midline closure and 29 patients healed by secondary intention. The off-midline group had statistically significance in lower pain scores, decreased need for pain medication, lower rate of recurrence and faster return to work when compared to the midline closure and open groups. There was no difference found for satisfaction with the surgical procedure between the three groups.

Conclusions: The off-midline incisions, via a Limberg flap reconstruction or Bascomb cleft lift technique, had lower pain scores, fewer days on pain medication, lower recurrence rates and faster return to work. There was no difference found in satisfaction with the operation. Off-midine closures for pilonidal disease produce superior postoperative results compared with midline incision and open secondary intention in our patients.

P30

OUTCOME AUDIT INTO THE MANAGEMENT OF CHRONIC ANAL FISSURES.

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Purpose: Chronic Anal fissure (CAF) is one of the commonest proctological diseases with considerable variation in sequential treatment. We audited our compliance of CAF management with national guidance provided by the Association of Coloproctology of Great Britain and Ireland (ACPGBI).

Methods: We retrospectively audited patients presenting to outpatient clinics with CAF over a 6-month period. Using electronic patient records, notes and clinic letters, we compared their management with ACPGBI algorithm. A prospective re-audit was then performed.

Results: Forty-one patients were analysed (59% male). Sixty-eight percent (n=28/41) of patients had appropriate dietary therapy; only 7.1% (n=2/28) were treated successfully. Nighty-six percent (n=25/26) were then appropriately treated with topical diltiazem 2% or GTN 0.4%. Overall, 43.9% (n=18/41) of all patients' entire management strategy adhered to the ACPGBI guidelines. In total, 48.8% (n=20/41) patients had surgical treatment (excluding Botox), of which 15% (n=3/20) were guideline compliant. Following dissemination of results and education, the 20 patient re-audit demonstrated significant improvement in guideline adherence (43.9% vs. 95%; P=0.0001).

Conclusions: The data suggests that algorithm compliance leads to healing without surgery in 83.3% (n=15/18) of patients, compared to 26.1% (n=6/23) with non-compliant methods (P=0.0004). This highlights the benefit of conservative/medical management of CAF, before attempting surgery.

P31

THE INCIDENCE AND MANAGEMENT OF PERIANAL DISEASES IN THE IMMUNOCOMPROMISED BONE MARRROW TRANSPLANT PATIENT POPULATION: A SINGLE-CENTER EXPERIENCE.

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Purpose: The literature has a number of reports that advocate surgical or nonsurgical approaches to perianal diseases in the neutropenic bone marrow transplant patient population. However, no critical evidence exists to advise clinicians on the best treatment in these complicated scenarios.This study aims to evaluate the incidence of perianal diseases and review the work up and treatment options.

Methods: The bone marrow transplant database at a single institution was queried over a 10 year period (2005-2015) for a perianal diseases in patients with fever or neutropenia prior to, or following bone marrow transplantation. Charts were reviewed in a retrospective manner.

Results: From January 2005 to October 2015; 1,751 bone marrow transplants were performed at The Northside Hospital Bone Marrow Transplant Center. 68 patients(3.88%) had a perianal disease. Of the 68, 11 patients had an unspecified perianal disease and were therefore excluded, leaving 57 patients in the study. 33 (57.89%) patients were males, 24 (42.11%) were females and age ranged from 20 - 77 years. The diagnoses was: inflamed hemorrhoids in 30 patients (52.63%), bleeding hemorrhoids in 6 (10.53%), proctitis in 6 (10.53%), anal fissure in 7 (12.28%), perianal fistula/abscess in 4 (7.02%), herpetic anorectal ulcers in 2 (3.51%), anal squamous cell carcinoma in 1 (1.75%) and rectal zygomycosis in 1 (1.75%). 14 of the 57 (24.56%) perianal diseases occurred prior to transplantation while the remaining 43 (75.4%) occurred afterwards. 43 of the 57 patients (75.44%) were neutropenic with a WBC ranging from <0.1 - 3.2 x 10^9/L. The diagnoses were largely based on clinical findings. Only 7 of 57 patients (12.28%) had CT imaging to aid in the diagnosis of their perianal disease. Overall, 10 of 57 patients (17.54%) required operative intervention. All 4 patients with an abscess/fistula underwent operative drainage and seton fistulotomy. 3 of the 6 patients with bleeding hemorrhoids had a hemorrhoidectomy performed. An examination under anesthesia with biopsy was performed on both the anal squamous cell carcinoma and the rectal zygomycosis patients. Finally, one patient with an anal fissure underwent a sphincterotomy and this patient developed a wound infection requiring debridement.

Conclusions: Perianal disease is a rare but potentially serious complication of bone marrow transplantation. The diagnosis remains largely clinical with imaging studies being of limited assistance. We conclude that in the immunocompromised bone marrow transplant patients, physical exam (often under anesthesia) remains paramount to ensure an accurate diagnosis and to institute treatment with the expectation of a favorable outcome.

P32

TRAUMATIC PERINEAL BLAST INJURY: A CASE SERIES OF SPHINCTEROPLASTY IN WOUNDED WARRIORS.

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Purpose: Injury patterns related to improvised explosive device (IED) detonation during a dismounted patrol have led to increased likelihood of pelvic and perineal injury. The purpose of this case series was to review three cases of Wounded Warriors who suffered perineal blast injuries that resulted in dysfunctional sphincter mechanisms, treated with sphincteroplasty.

Methods: We retrospectively reviewed our experience at Walter Reed National Military Medical Center in caring for three Wounded Warriors who suffered devastating perineal trauma treated with sphincteroplasty.

Results: Over the course of U.S. military combat operations overseas, injury patterns related to improvised explosive device (IED) detonation have led to increased likelihood of pelvic and perineal injury. We retrospectively reviewed our experience at Walter Reed National Military Medical Center in caring for three Wounded Warriors who suffered devastating perineal trauma involving significant anal sphincter damage. These wounds were always accompanied by multiple other injuries to surrounding structures. All three patients in our series suffered severe lower extremity and perineal/pelvic trauma from IED blasts, resulting in bilateral amputations and extensive soft tissue perineal wounds, to include traumatic sphincter disruption. In each case, initial treatment incorporated fecal diversion via colostomy and subsequent serial surgical management of multiple associated soft tissue, orthopedic, and genito-urinary injuries. Evaluation and management of the anal sphincter injuries included interval assessment of healing, digital rectal examination, ultrasound, anal manometry, and early rehabilitation via pelvic floor physical therapy. Upon reaching objective healing milestones and utilizing the judgement of a multidisciplinary surgical team, each patient underwent successful sphincteroplasty with eventual reversal of diverting colostomy in a staged fashion. All patients have reported good functional outcomes and satisfactory continence following sphincteroplasty and ostomy reversal.

Conclusions: This series demonstrates the success of sphincteroplasty in trauma patients who have suffered damage to anterior sphincter structures in high-impact perineal blast injuries. Management began with one of the tenets of damage control surgery: diversion of the fecal stream and control of contamination of the perineal wound. Once out of the acutely injured phase, these sphincter injuries were evaluated with a combined approach of office anoscopy, exam under anesthesia to palpate sphincter defects, and endorectal manometry to evaluate sphincter dysfunction. Finally, long term success of the sphincteroplasty was likely enhanced by early enrollment and continued participation in pelvic floor rehabilitation exercises. All three patients underwent successful sphincteroplasty with good outcomes despite devastating perineal injuries.

P33

TREATMENT OF RETRO-RECTAL TUMORS: A RETROSPECTIVE STUDY OF 5-YEAR EXPERIENCE IN A SINGLE INSTITUTION.

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Purpose: Tumors arising from the retro-rectal (pre-sacral) space are extremely rare in the adult population. Majority of these masses in adults are benign and asymptomatic, however, malignant tumors accounted for 21%. The treatment of choice is by complete surgical excision. This study aimed to investigate the clinicopathological features of retrorectal tumors.

Methods: We reviewed the clinical and radiological findings in 12 patients with preoperative suspicion of retro-rectal tumor who were treated at our hospital between 2010 and 2015. Data of clinical, radiological and pathological reports of these patients were collected retrospectively.

Results: Ten patients (8 women, 4 men; age range, 20-63 years; mean age, 44.9 years; mean BMI, 24.25). Complaint of gluteal or postanal pain had in 8 patients. Retro-rectal tumors diagnosed with MRI in 7 patients, with CT in 4 patients and 1 with US in 1 patient. All patients treated with surgical excision. Transsacral approch for 9 patients, abdominal approch for 2 patient and abdominal-transsacral approch for 2 patients underwent for retro-rectal tumor. The largest size of tumors was 17x12x10 cm. A total of nine benign lesions and three malignant lesions were confirmed by histological examination. Retro-rectal cystic hamartoma (Tailgut cyst) found in the postoperative pathologic findings of 7 patients (Table).

Conclusions: Primary retro rectal tumors are very rare. Successful treatment of these tumors requires appropriate diagnosis and expertise in pelvic surgery.

Table- Demographics, presentation and results of surgery

Patient No	Age	Gender	BMI	ASA	Primer Complaints/ Duration, years	Preop. Diagnosis	Diagnostic Tools, Dimensions, cm	Treatment	Technical of Surgery	Pathologic Findings
1	46	F	25	I	Gluteal pain, 2	Cystic lesion	CT, 8x7x7	Excision	Posterior	Tailgut Cyst
2	61	F	28	III	Gluteal pain, tenesmus,1	Cystic lesion	MRI, 17x12x10	Excision	Posterior	Cordoma
3	61	F	27	II	Gluteal pain, 0,5	Cystic lesion	CT, 5x4x4	Excision	Posterior	Tailgut Cyst
4	28	M	23	I	Gluteal pain,1	Cystic lesion	US,3x4x4	Excision	Posterior	Tailgut Cyst
5	20	M	22,5	I	Postanal pain and swelling	Cystic lesion	MRI,2x2x2	Excision	Posterior	Tailgut Cyst
6	30	F	24	I	Postanal discharge	Perianal fistula	CT, 5x2x2	Excision	Posterior	Tailgut Cyst
7	41	M	27	II	Postanal pain,	Cystic lesion	MRI, 7x8x5	Excision	Abdominal	Cystic lesion
8	56	F	30,5	II	Postanal pain and pus discharge	Cystic lesion	MRI, 3x2x2	Excision	Posterior	Tailgut Cyst
9	33	F	23	I	Vaginal discharge	Cystic lesion	CT, 11x9x8	Excision	Posterior	Chodrosar-coma
10	60	F	24	II	Postanal pain	Cystic lesion	MRI, 8x8x9	Excision	Posterior	Tailgut Cyst
11	40	F	24	II	Disparoni, tenesmus	Cystic lesion	MRI,13x12x11 PET,11x9x12	Excision	Abdominal+ Posterior	Schwannoma
12	63	M	26	II	Tenesmus	Cystic lesion	MRI, 7x9x9	Excision	Abdominal	Leiovoma

P34

THE EFFECT OF PATIENT POSITIONING ON RUBBER BAND LIGATION OF INTERNAL HEMORRHOIDS.

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Purpose: Two positions are commonly used to perform anal examinations: prone jackknife and lateral recumbent. There is no data showing either to be superior to the other, and little comparing the two. The positon chosen varies with physician and patient preference. The purpose of this study was to determine if either position offers superior visualization of the anal canal by analyzing the success rate of rubber band ligations (RBL) done in both positions.

Methods: A retrospective chart review was done on 152 patients during January 2012 through December 2013 who presented to the Texas Colon and Rectal Specialists (TCRS) colorectal surgical practice and underwent an in-office RBL of internal hemorrhoids. Patients without documented resolution of symptoms or with rubber bands placed during a colonoscopy or flexible sigmiodoscopy were excluded from the study. Data was analyzed under two outcome measures: 1) Patients who had complete resolution of their symptoms with a single band placed, and if this varied with patient position. 2) Distribution of rubber band placement to determine if either of the two patient positions affected the pattern of band placement. The data collected included: band location for each rubber band placed, number of banding procedures and days from first treatment to final assessment. Statistical analysis and visual data representation was carried out using a Watson's U^2 test.

Results: A total of 280 bands were placed by 13 physicians during the study period; 255 bands with patients in prone jackknife position and 25 bands with patients in lateral recumbent position. The following results were of significance: The average number of treatments between the two positions; 1.47 visits per patient in prone jackknife versus 1.13 visits per patient in laterally recumbent ($p=0.007$). The proportion of patients whose symptoms were resolved with one office visit between the two positions; 37.69% laterally recumbent positioned patients versus 9.52% prone jackknife positioned patients ($p=0.011$). Band location (in degrees) between the two positions was the same ($0.5 > p > 0.2$). The total treatment time for patients undergoing more than one banding procedure was the same between the two positions ($p>0.5$).

Conclusions: This study demonstrates that hemorrhoid visualization in the lateral recumbent position is just as good, if not better, the prone jackknife position. This suggests that lateral recumbent positioning of patients may provide better visualization of the anal canal, reducing the need for multiple ligation procedures. Future studies with larger sample sizes are needed to further determine this. Nonetheless, this study supports either position. Patient and physician comfort should be considered in patient positioning when performing endoscopies and rubber band ligation of internal hemorrhoids.

P35

ASSESSMENT OF SAFETY AND EFFICACY OF A NOVEL BIPOLAR ENERGY DEVICE AS A TREATMENT MODALITY FOR GRADE I-III HEMORRHOIDS.

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Purpose: To evaluate postoperative outcomes from a single treatment with a novel bipolar energy device for Grade I-III hemorrhoids. **Background***:* Current treatment options for Grade I and Grade II/III hemorrhoids provide temporary symptomatic relief and require patients to undergo multiple procedures such as Rubber Band Ligation and sclerotherapy. A novel device which offers a minimally invasive treatment for hemorrhoidal disease has been devised. This approach involves application of low bipolar energy under constant tissue compression and temperature guidance.

Methods: We conducted a prospective study of patients who were treated with the bipolar tissue ligator for symptomatic grade I to III hemorrhoids between October 2014 and May 2015. All procedures were performed in an ambulatory setting according to a standardized protocol under intravenous sedation. Ketorolac was given intraoperatively and for 5 days post-operatively. Patients were seen postoperatively at 3 weeks unless complications were reported between scheduled follow ups. Telephone surveys were conducted on postoperative day 1 and 3, 6, 9 months.

Results: Sixty consecutive patients with Grade I (n=25, 41.7%), Grade II (n=24, 40.0%), and Grade III (n=7, 11.7%) hemorrhoidal disease were treated with the bipolar tissue ligator. There were 32 males and 28 females. Average age was 51 years and ASA score was 2.2. Average procedure time was 7 minutes (range 3-20) and median number of applications were 5 (range 3-9). Ten (17%) patients underwent treatment while continuing Aspirin or other anticoagulation. Of the 60 patients, on POD 1 (n=52) only 19.2% reported post-procedural pain of which 15.4% required supplemental pain medication. Patients lost to follow up were excluded, 15 at the 3 week follow up and the number increased to a total of 19 at 6 months. At 3 weeks (n=45), 62% of the patients reported complete resolution of original preoperative bleeding and 65% of the pain. At 3 months (n=41), 90% had complete resolution of bleeding and 96% were pain free. At 9 months (n=25), 92% of the patients no longer had any bleeding and 90% were no longer

in pain. All the patients surveyed had reported complete resolution of pruritus. One patient reported recurrent swelling at 9 months. Postoperative improvement in bleeding, pruritus and swelling were statistically significant (p<0.0001). Three (7%) patients reported a recurrence of prolapse of which 2 were reported at 6 months and 1 at 9 months. Thirty-four patients (82%) were highly satisfied with the procedure. No postoperative urinary retention or external hemorrhoid complications were observed.

Conclusions: Patients experienced significant symptomatic improvement after a single treatment with the bipolar energy therapy device. It is safe and effective and offers the potential for immediate return to normal activity. Long term efficacy is yet to be determined.

Comparison of preoperative symptoms to post-treatment improvement

	n	Bleeding (%)	p-value	Pain (%)	p-value	Pruritus (%)	p-value	Swelling (%)	p-value	Postoperative Analgesia (%)	p-value
Preoperative	60	56 (93.3)	-	16 (26.7)	-	12 (20.0)	-	22 (36.7)	-	-	-
POD1°	52	-	-	10 (19.2)	0.4774	0 (0.0)	<0.0001	-	-	8 (15.4)	-
3 weeks	45	17 (37.8)	<0.0001	2 (4.4)	0.0018	0 (0.0)	<0.0001	-	-	2 (4.4)	0.2346
3 months	41	4 (9.8)	<0.0001	3 (7.3)	0.1157	0 (0.0)	<0.0001	1 (2.4)	<0.0001	2 (4.9)	0.0877
6 months	41	4 (9.8)	<0.0001	4 (9.8)	0.2258	0 (0.0)	<0.0001	4 (9.8)	0.0039	2 (4.9)	0.0877
9 months	25	2 (8.0)	<0.0001	2 (8.0)	0.2320	0 (0.0)	<0.0001	1 (4)	0.0422	1 (4.0)	1.000

°POD1, Postoperative day 1

* Bleeding, Pain, Pruritus, Swelling and Postoperative Analgesia reported in absolute values

P36

ADDITION OF BIOPROSTHETIC MESH REINFORCEMENT TO LIGATION OF INTERSPHINCTERIC FISTULA TRACT CAN RESULT IN LONG HEALING TIMES BUT HIGH FISTULA CLOSURE RATES.

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Purpose: Ligation of intersphincteric fistula tract (LIFT) for the treatment of transsphincteric anal fistula had initial success rates as high as 90%, but subsequent series have failed to reach similar figures with more widespread use and longer follow-up. It is unknown whether addition of bioprosthetic mesh reinforcement to LIFT (BioLIFT) results in higher healing rates. The purpose of this study was to retrospectively examine the outcomes of BioLIFT at our institution.

Methods: Patients with transsphincteric anal fistula who underwent the BioLIFT procedure between June 2011 and July 2015 were identified. All patients included were followed postoperatively in the office until primary fistula closure was confirmed on exam. Fistula closure was defined by the absence of drainage with no evidence of internal or external openings and a healed surgical incision.

Results: Forty-eight patients were followed for an average of 9 months after the BioLIFT procedure (range, 1.2 – 45.9). Forty-four (91.7%) had a draining Seton placed prior to definitive fistula repair at a mean interval of 13.6 weeks (range, 3.6 - 49). Primary fistula closure was accomplished in 33 cases (68.8%). Average time needed for healing was 11.5 weeks (range, 3.5 – 38). Eight patients (16.7%) had failed a combined ten previous attempts at fistula repair by fistula plug (n=7), LIFT (n=2) and fistulotomy (n=1). Primary fistula closure rate was 70% (28 out of 40 patients) when the BioLIFT was the initial technique employed. Fifteen patients failed to heal after the BioLIFT: five underwent repeat BioLIFT and ten had a fistulotomy. Nine patients had complete healing following the additional procedure, resulting in a secondary fistula closure rate of 87.5% (42 out of 48 patients). Medialization or conversion to an intersphincteric fistula occurred in six of these fifteen patients with primary failure. The overall fistula recurrence rate was 12.5% (six patients), at a mean interval of 15.3 months after primary closure (range, 5.3 - 43.3).

Conclusions: The BioLIFT procedure resulted in a high transsphincteric fistula-healing rate in our series, even when patients with previous attempts at fistula closure by other techniques were included. Conversion to an intersphincteric fistula was commonly observed in patients who failed to heal with the BioLIFT. Recurrences occurred several months after fistula closure. A potential effect of placing bioprosthetic graft in the wound is prolonged healing time. Randomized trials and longer follow-up times are needed to better delineate the role of BioLIFT.

P37

DRAINING SETONS AS DEFINITIVE MANAGEMENT OF FISTULA-IN-ANO.

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Purpose: To identify the proportion of patients who have either resolution or significant amelioration of their symptoms following placement of a draining seton alone in the management of fistula-in-ano.

Methods: This is a retrospective case series involving chart review and telephone interviews. Procedures were performed at a major teaching centre from June 1, 2005 to June 30 2014. Patients aged 18 and older treated exclusively with draining seton were included. Excluded were patients with Crohn's Disease and those treated with fistulotomy, fistula plug, cutting seton, advancement flap or LIFT. Age, gender, pre- and post-operative symptoms, fistula location, weeks to seton removal, recurrence, and number of additional operative procedures were tabulated. Primary outcome measures were complete healing, significant symptom amelioration, and rate of recurrence.

Results: 87 patients (60 male) met the inclusion criteria. Mean age was 45 years, 95% CI[42.6, 47.2]. Mean follow up was 60 months, 95% CI [52.6, 65.5]. 66 (75.9%) patients were reached for telephone interview. 25 (28.7%) patients required one or more additional surgeries to unroof a collection and/or replace the seton. The average time to seton removal was 37.3 weeks, 95% CI [28.7, 45.9]. 57 (65.5%) patients had complete symptom resolution and 17 (19.5%) had significant amelioration of symptoms with no further surgical management required. Six (6.9%) had persistent severe symptoms. Five (5.7%) had recurrence after seton removal. In terms of rate of symptom resolution and recurrence, there was no difference between seton removal before or after 26 weeks (p>0.05).

Conclusions: Placement of draining seton alone is a viable treatment option for definitive management of fistula-in-ano. As draining setons are sphincter and function preserving, their use should be considered as primary management for fistula-in-ano.

P38

HEMORRHOIDS TREATMENT WITH DOPPLER GUIDED DEARTERIALIZATION AND MUCOPEXY.

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Purpose: Transanal hemorrhoidal dearterialization is an innovative technique and a new approach to treat hemorrhoids. This technique consists in transanal Doppler guided ligation of six hemorrhoidal arteries, using a dedicated proctoscope provided of Doppler probe, and in performing mucopexy of the anal canal submucosa. This is a retrospective analysis of our first series of patients treated with this technique . The purpose of this study was to evaluate outcomes and possible complications of hemorrhoids treatment with this new technique.

Methods: Between January 2011 and March 2015, 184 patients with stage II, III, and IV hemorrhoids were submitted to transanal hemorrhoidal dearterialization and submucosa mucopexy. The operation consisted in all patients of hemorrhoidal dearterialization (6 arteries) and mucosal/submucosal mucopexy. Patients underwent operation in spinal anesthesia in day surgery setting. After surgery, patients were regularly evaluated at 1 week, 1 month, 1 year and then once a year. The one week evaluation consists only in clinical interview to evaluate postoperative pain, rectal tenesmus

and haematochezia; the following evaluation consist always in digital exploration and anoscopy.

Results: 184 patients (mean age: 60, M/F: 1.5:1) underwent to haemorrhoidal Doppler guided ligation and anal canal mucopexy. Haemorrhoidal disease occurred as grade II in 35 patients (19%), grade III in 132 patients (72%) and grade IV in 17 patients (9%). Postoperative complications occurred in 3,3% of patients (4 bleeding and 2 acute thrombosis). Preoperative bleeding and pain significant improved in the postoperative time ($p<0.001$), even in the long term follow-up. The recurrence rate after surgery was 20% at 1 month, 16% at 3-12 months, 13% at more than 12 months follow-up. Preoperative grade prolapse is not related to 1 year recurrence (P value: 0.65). The preoperative disease severity doesen't impact on the patients outcome at one year and more after surgey and did not correlate to risk of recurrence (p value: 0.06). Chronic pain, fecal incontinence were not observed in our series; however some patients complained of immediate postoperative self-limited rectal tenesmus.

Conclusions: Transanal haemorrhoidal dearterialization is a minimally invasive procedure, is safe and effective in the treatment of haemorrhoidal disease. This one of the largest series of patients treated with this techinique and with the longest follow-up. Data proved the effectiveness of this procedure even in the long term follow-up with few complication rate.

P39

TREATMENT OF ANAL FISTULA WITH LIGATION OF INTERSPHINCTERIC FISTULA TRACT AND BIOLOGIC EXTRACELLULAR MATRIX.

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Purpose: Fistula in ano remains a difficult problem for the colon and rectal surgeon to treat. The technique of ligation of intersphincteric fistula tract (LIFT) has become increasingly used as it does not compromise any sphincter muscle and can offer patients a chance for fistula healing without incontinence. The results of the LIFT have been reported to be successful, but recurrence remains an issue. This study aimed at improving the LIFT by adding a biologic extracellular matrix as a barrier in the intersphincteric space to reinforce the repair and prevent recurrence.

Methods: A prospective observational study was performed with three surgeons. Patients with complex fistulas not amenable to lay open fistulotomy were selected. The technique of ligation of intersphincteric fistula tract with the addition of a biologic extracellular matrix was standardized between the surgeons. Patients were followed clinically at approximately two weeks and six weeks postoperatively. The primary outcome measured was recurrence of anal fistula.

Results: Between January 2014 and October 2015 a total of 19 patients underwent a LIFT procedure with biologic extracellular matrix. All patients were evaluated with proctoscopy and clinical exam prior to undergoing the procedure. Twelve males and seven females were included. Mean age was 40.5 years. No intra-operative complications were documented. Recurrence was defined as drainage from the fistula tract after healing. Recurrence was present in 5/19 patients (26.3%). Two of the patients with recurrence had a repeat LIFT procedure with biologic extracellular matrix without evidence of recurrence in short term follow up. No incontinence was documented post operatively.

Conclusions: The addition of a biologic extracellular matrix shows promise in improving the success of the LIFT procedure. More investigation including long term follow up and direct comparison between the LIFT procedure with and without the addition of a biologic extracellular matrix is warranted.

P40

TREATMENT OF FECAL INCONTINENCE WITH NEW ENDOANAL POLYACRYLONITRILE (HYEXPAN) PROSTHESIS.

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Purpose: The purpose of this study was to assess short- and medium-term results for this new type of implants that appears having encouraging results.

Methods: This study is a retrospective review of a database of patient records. Twenty-two patients (M/F=1:9, mean age: 62,13±11,5y) were submitted to HYEXPAN prosthesis implantation between January 2012 and June 2014. The operation consisted of implantation of a self expandable prosthesis in the intersphinteric space under local anhestesia. HYEXPAN (polyacrylonitrile) is an hydrophilic material that becomes thicker (diameter 7mm), shorter (length 17mm), and softer within 48 hours after implantation with absorption of body fluids. Their final shape yields an increase of 720 per cent in volume compared with the volume inserted. The Implanted material was identifiable on the palpation and ultrasonography. Six prostheses were implanted in the intersphincteric space in each patient, using endoanal ultrasonography. Complications and adverse events were also recorded.

Results: After surgery, patients were regularly followed up at 1 week, 1month, 6 month and 1 year and then every 6 months. Outcomes were evaluated by Cleveland Clinic score (CCS) and anorectal manometery (MENFIS Digital Manometer) at baseline and during the follow up. Data were expressed as medians and interquartile ranges. Wilcoxon and t-Student test were used to assess the statistical relevance of results. $P<0,05$ values were considered statistically significant. A significant improvement was found in CCS, decreasing from 14 at baseline to 3 at the 1-year follow up. p=0,001. Manometrical parameters didn't significantly change over time, but an increasing trend in squeeze pressure increase from baseline to 1 year follow up was found.

Conclusions: HYEXPAN prosthesis implantation showed very promising initial clinical improvement and follow-up data were encouraging. Larger studies and longer follow-ups are needed to determine the potential indications and possible side effects of this new prosthesis in the treatment of the faecal incontinence

P41

RETROSPECTIVE REVIEW OF LIMBERG FLAP VERSUS OTHER SURGICAL MANAGEMENT OF PILONIDAL DISEASES IN ACTIVE DUTY MILITARY PERSONNEL.

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Purpose: Pilonidal disease is common in the military active duty population and can cause significant time away from work. Multiple surgical procedures for definitive management of pilonidal disease exist without consensus of a superior method. Traditionally, repairs are prone to wound dehiscence and prolonged wound care. We sought to evaluate the postoperative wound course of the Limberg flap against traditional surgical options for pilonidal disease and its effect on return to duty.

Methods: All patients undergoing definitive pilonidal surgery and having completed follow-up care at our institution over a three-year period (Jul 2012- Oct 2015) were identified (n=73). Active duty personal were then identified (n=61). Cases were divided into categories of Limberg flap (n=19) versus control (n=42). Control procedures included fistulotomy (n=9), simple cystectomy with (n=11) or without (n=10) primary closure, Bascom procedure (n=6) and Karydakis flap (n=6). Medical records were reviewed for preoperative, intraoperative, and postoperative data. Postoperative outcomes were detailed including pain, inpatient hospitalization, time to drain and suture removal, length of wound care services, complications (defined as dehiscence, bleeding, recurrence, infection), and time to return to work.

Results: Patients undergoing Limberg flap experienced complications at a rate of 11%, versus 43% in control patients (11% fistulotomy, 50% cystectomy without primary closure, 55% cystectomy with primary closure, 33% Bascom procedure, and 67% Karydakis flap). Of patients undergoing Limberg flap, only 11% required post-operative wound care services, versus 76% of control patients (89% fistulotomy, 100% cystectomy without primary closure, 55% cystectomy with primary closure, 67% Bascom procedure, and 67% Karydakis flap). Of patients requiring wound care services, the average total number of days of wound care needed was similar between groups (93 days in the two Limberg flap patients, 96 days in control patients), as was the number of wound care visits (12 visits for Limberg flap, 15 visits for controls). Limberg flap patients returned to duty at a mean of 21 days post-operatively, including those patients who required wound care. Only 40% of the historical control patient charts had documentation of return to work. Of those documented, mean days of return to duty was 22.

Conclusions: Definitive surgical management of pilonidal disease with Limberg flap is associated with lower rates of complication and need for post-operative wound care at our institution. Decreasing the need for wound care leads to a faster return to duty for active duty personnel. Although limited by small, retrospective nature of these findings, the Limberg flap may allow less time away from work when treating pilonidal disease in active duty military personnel.

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TRANSANAL HEMORRHOIDAL DEARTERIALIZATION (THD) FOR IV DEGREE HEMORRHOIDAL DISEASE.

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Purpose: The THD procedure is a mini-invasive therapeutical approach to the hemorrhoidal disease. In the last few years, the evolution of both the pathophysiological knowledge on the rectal cavernous body and the development of new devices, has deeply modified the indications to its treatment. In particular, the THD indications have been extended to the IV degree hemorrhoids, specifically when the external piles are non-fibrotic and non-fixed. The aim of this study was to assess the efficacy of the THD procedure in reducing the symptoms in this category of patients.

Methods: Until 2008 only the original THD device was used, subsequently other proctoscopes with a larger lateral window (THD-Surgy) and a sliding lateral part (THD-Slide) were introduced. The evolution of the devices permitted a progression in the technique widening the indications to the IV degree hemorrhoids. Perioperative and late postoperative complications, together with long-term results have been recorded.

Results: 118 patients with IV degree hemorrhoids were enrolled between June 2005 and October 2011(69 men, mean age 52.3 ± 12.5). They underwent THD and mucopexy in seven Italian proctology units. In 5 cases (4.2%) the excision of a single pile was performed. 22 patients (18.6%) underwent the excision of the residual anal tags at the end of the THD procedure. A single case of intraoperative complication (0.8%) was recorded, consisting in a submucosal hematoma. 14 patients (11.9%) had postoperative bleeding, but they did not need any surgical hemostasis. 16 patients (13.6%) experienced urinary retention and were treated with single catheterization. 18 patients (15.3%) presented a prolonged postoperative pain, requiring analgesics for more than 5 days. The mean follow-up was 9.7± 7.1 months. No late postoperative complications were recorded. 12 patients (10.2%) presented with relapse symptoms (1 bleeding, 11prolapses), but only 8 of them (6.8%) underwent a further surgical procedure (4 hemorrhoidectomies and 4 THDs).

Conclusions: The THD procedure represents a valid approach to the IV degree hemorrhoidal disease. The recorded complications appear to be easy to treat and did not require any extra surgery. The re-intervention rate seems to be relatively low, thus highlighting that the THD results can be considered efficacious and long-lasting. However, patients with irreducible external fibrotic piles should be excluded, whereas patients with voluminous fibrous tags could be take in account. Therefore, it should be mandatory to discuss with the patients about the option of removing the skin tags at the end of surgery.

P43

DO WE NEED A TARGETED RESIDENT CURRICULUM PROMOTING COMPASSIONATE PATIENT CARE DURING OUTPATIENT ANORECTAL EXAMINATION IN COLON AND RECTAL SURGERY?

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Purpose: A unique aspect of anorectal examinations and procedures performed in the outpatient setting that can present a patient care challenge is the highly sensitive nature of the perianal anatomic region. Our aim was to assess the need for a targeted curriculum to teach residents how to compassionately prepare patients for and perform invasive, often uncomfortable bedside anorectal examinations and procedures in the outpatient setting.

Methods: A curricular needs assessment was conducted via an anonymous survey directed at surgical residents. The primary aim was to assess attitudes surrounding the need for special sensitivity when caring for and examining patients with anorectal disorders. Perceived procedural ability and ability to identify common anorectal pathology and structural anatomy of the anal canal were also assessed.

Results: There were 24 respondents spanning all years of residency. Most (14) had spent one to two months on a dedicated colorectal service while only two had spent more than six months. All agreed that anorectal pathology is an important part of the general surgery residency. Regarding the primary aim, 91% agreed that anorectal exams required special sensitivity and 70% stated that these exams required specialized skills compared to other procedures. However, only 58% felt they had been given direct instruction and had the opportunity to practice these skills while observed. Furthermore, only 41% felt they had direct instruction regarding special sensitivity and skills in this setting. 90% strongly or mostly agreed they should be able to perform digital rectal exam, flexible and rigid sigmoidoscopy, perianal block, hemorrhoidal banding, and abscess drainage, but most were not confident with these skills (mean 6.5 on a ten-point scale). Images of common anorectal diagnoses were identified correctly 67% of the time. A diagram of the anal canal was correctly labeled by 47% of respondents.

Conclusions: Residents overwhelmingly believe sensitive anorectal care is an important issue. Many feel that they have not had adequate instruction and do not feel confident or competent to practice compassionate bedside care. A significant proportion of respondents could not accurately identify anal canal anatomy or common pathology, suggesting further education is necessary. There is a need for a targeted resident curriculum to teach residents sensitive care during colorectal examinations and procedures in order to enhance the quality of care provided to patients. Further patient assessment regarding specific fears and anxiety surrounding these examinations is necessary in order to guide future directions.

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ENHANCED IMAGING OF ANAL CANAL AND ANAL FISTULAS USING A LINEAR ARRAY 3D ULTRASOUND PROBE.

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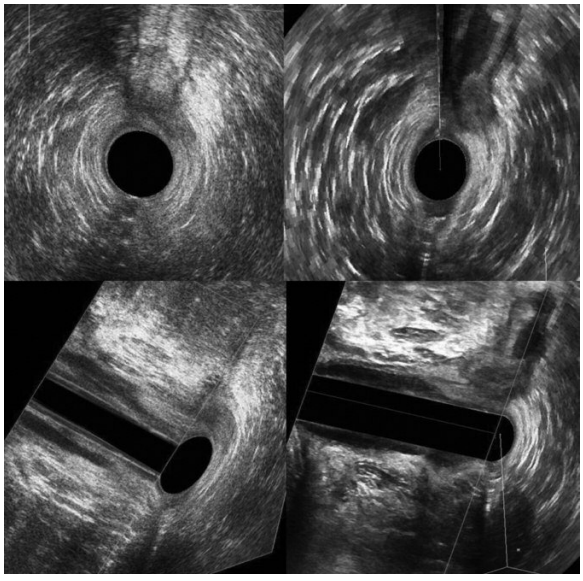
Purpose: The aim of this study is to compare images obtained from the use of a linear array 3D ultrasound probe with that obtained from using the conventional axial 3D ultrasound probe

Methods: Twenty consecutive patients presenting with anal fistulas between 1 Jan 2014 and 31 Dec 2014 were imaged using the BK Medical Flexfocus 500 ultrasound system aided by the 2052 axial and the 8838 linear array probe. The 3D volume rendered images were compared side by side. End points looked at include clarity and resolution of the images in all dimensions. Anatomical structures were also measured e.g. thickness of internal and external sphincter muscle, length of internal sphincter and anal canal. Location of internal opening and the anal fistula track in relation to the anal canal and sphincter complex.

Results: Images obtained using the 2052 axial probe were sharp in the axial view but less so when viewed in the longitudinal plane i.e. coronal and sagittal views. This is expected given that the vovel measures 0.14 x 0.14 x 0.2mm, the latter and larger dimension being the minimum distance between axial cuts used to reconstruct the volume rendered image. In contrast 3D images obtained using the linear array probe is sharper in the longitudinal plane. In the reconstructed axial view, the area closer to the centre of the probe and anal canal is sharper when compared to the periphery, i.e. less pixelated. Hence measurements of the length of the internal sphincter and anal canal are easier to perform as the structures are more well defined using the linear array probe. In the axial view, measurements of the thickness of the internal and external sphincter using the 8838 linear probe is not very different from that obtained using the 2052 axial probe. This is because the structures of interest are close to the centre and less pixelated. The longitudinal layer fascial fibers are also well defined using the linear array probe. This is often seen to penetrate the subcutaneous anal sphincter in bundles.

Conclusions: The linear array 3D ultrasound probe offers enhanced imaging of the anal canal and anal fistulas especially in the longitudinal views. The resolution afforded in the axial views are sufficient in clarity as the areas of interest are close to the centre of the probe.



P45

TRENDS IN THE DIAGNOSIS AND MANAGEMENT OF HORSESHOE ABSCESS AND FISTULA.

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Purpose: Advances in the diagnosis and management of acute and chronic complex perianal infections has lead to several consensus statements regarding best practices. We wish to examine our adherence to recommended practices in imaging, antibiotic use, and surgical techniques for patients undergoing treatment of horseshoe abscess or fistula at our medical institution.

Methods: A retrospective electronic chart review of all patients undergoing surgery for acute and chronic perianal infections at Johns Hopkins Medical Institution between 2009 and October 2105 was conducted. Patients were identified from operative data logs using CPT codes. Complete healing was defined by documentation of an exam demonstrating no remaining drains and the lack of symptoms.

Results: 417 patients, mean age of 40±18 yrs, were identified. Imaging was used preoperatively in 210 (50%) patients and colorectal surgeons provided care in 252 (60%) patients. 43 (10%) patients were identified with horseshoe abscess (HSA) or fistula (HSF). Patients with HSA or HSF were more likely to have imaging studies (36 (84%) vs. 174 (47%, $p < 0.0001$) with no difference in the number treated by a general or colorectal surgeon (28 (65%) vs. 224 (60%), $p=0.5$) than non-HSA or non-HSF patients, respectively. Imaging studies for HSA or HSF included CT in 19 (44%) patients, MRI in 15 (35%) patients, and 2 (5%) patients underwent both. 10 (23%) patients had HSA, 7 (70%) were treated by general surgeons, 5 (50%) had counter lateral drainage/drains and 3(30%) returned to the OR for inadequate drainage. Of the HSA patients, 7 (70%) had extended use of antibiotics and 8 (80%) healed at 1 mo. 1 patient was lost to follow up. 33 (77%) patients had HSF and 24 (73%) were managed by a colorectal surgeon. The surgical management was 28 (85%) patients with seton and/or fistulotomy alone, 1 (3%) patient with an advancement flap, and 4 (12%) patients with an ostomy. In the HSF patients, 16 (48%) had extended antibiotic use and 17 (52%) were healed in an average of 19 months. Of the patients who did not heal in the HSF group, 9 (56%) patients had Crohns disease and were being managed with seton drainage and 2 patients were lost to follow up.

Conclusions: Although several practice guidelines exist for the management of acute and chronic complex perianal infection, adherence to these guidelines among both general and colorectal surgeons is low. Development of hospital specific protocols may improve outcomes for the management of this difficult disease.

P46

TRANSANAL HEMORRHOIDAL DEARTERIALIZATION (THD) AS A COMPARISON TO SUTURE LIGATION OF HEMORRHOIDS IN HIGH-RISK BLEEDING PATIENTS.

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Purpose: Transanal hemorrhoidal dearterialization (THD) has been previously shown to be a safe and effective in the management of symptomatic hemorrhoidal disease. There is paucity of data comparing THD to classic non-excisional suture ligation of internal hemorrhoids. The aim of this study is to compare the efficacy and short-term outcomes of THD to suture ligation.

Methods: This is a single-center, retrospective review of consecutive patients with high risk of bleeding who underwent THD or suture ligation between 2012 and 2015. Patient demographics, post-operative pain, bleeding, urinary retention, re-admission, operation cost and number of clinic visit within 90 days of surgery were evaluated and recorded.

Results: A total 44 patients met the inclusion criteria. Twenty seven underwent THD and seventeen suture ligation. Gender, demographic and types and of anesthesia were similar between the two groups. Compared to suture ligation, THD was associated with significantly longer operative times (41.22 vs.14.7 min; P <0.02), higher post-operative pain (13 vs 2; P <0.05), higher cost ($14227 vs. $ 8330; P <0.0001) and urinary retention (5 vs 0; P <0.05). There were no differences in post-operative bleeding, clinic visits and readmission rate.

Conclusions: THD does not appear to have advantages over suture ligation in the management of bleeding hemorrhoids as it is associated with higher cost, longer operative time, more pain and urinary retention without a reduction in postoperative bleeding, clinic visits and readmission rates.

P47

HEMORRHOIDAL SUTURE LIGATION WITH OR WITHOUT MUCOPEXY COULD BE A COST-EFFECTIVE ALTERNATIVE TO DOPPLER-GUIDED PROCEDURES FOR ADVANCED HEMORRHOIDAL DISEASE.

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Purpose: Ligation of haemorrhoidal arteries with Doppler guidance is an efficacious alternative to traditional open or stapled surgical methods in advanced symptomatic haemorrhoidal disease. However, additional costs associated with Doppler probe have hampered the uptake of this minimally invasive, de-arterialization procedure to wider patient application. The aim of this study was to study the short-term clinical outcomes of suture ligation of haemorrhoidal arteries performed without Doppler guidance for symptomatic and prolapsing haemorrhoids.

Methods: Demographic data and symptomatology of all patients who underwent elective Haemorrhoidal suture ligation (HSL) without Doppler guidance in our hospital between June 2011 and July 2015 were collected retrospectively. HSL was performed with polyglactin 910 suture material using Eisenhammer retractor by an experienced colorectal surgeon and additional mucopexy was performed for prolapsing haemorrhoidal tissue as required. Primary outcomes were recurrence of clinical symptoms and haemorrhoids at third month follow-up visit.

Results: A total of 68 patients (male: female, 37: 31) with median age of 55 (28-76) years underwent HSL procedure during the study period. Forty-five (66.2%) and sixteen (23.5) patients had grade 3 and 4 haemorrhoidal mass respectively and additional seven patients (10.3%) underwent HSL due to failure of injection sclerotherapy or banding procedures previously. Mucopexy of prolapsing pile mass was required in 50 (72%) patients. No immediate postoperative complications such as major bleeding, intolerable pain requiring hospital admission were encountered. One patient (1.5%) had recurrence of haemorrhoids during third month follow-up and required further surgical procedure.

Conclusions: Haemorrhoidal suture ligation without Doppler guidance can be performed successfully in majority of our patients. However, this cost-effective modality has a learning curve and randomized control trials with longer follow-up are needed to assess its role in the management of advanced haemorrhoidal disease.

P48

TREATMENT OF NONHEALING PILONIDAL DISEASE USING TOPICAL 10% METRONIDAZOLE: A 10-YEAR REVIEW.

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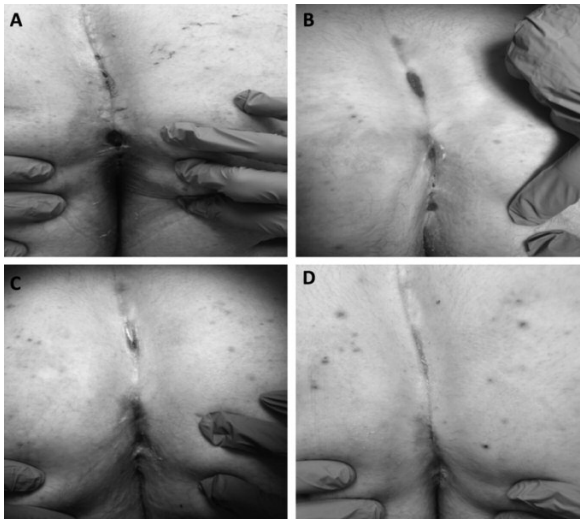
Purpose: Despite adequate surgical therapy, non-healing pilonidal disease remains a common surgical problem and a significant socio-economic burden. Bacteriology studies reveal approximately 64% of chronic pilonidal wounds are colonized with anaerobic organisms. The aim of our study is to evaluate the efficacy of topical 10% metronidazole ("Ortem", SLA Pharma, Leavesden, UK) in the healing of the chronic pilonidal wound.

Methods: A retrospective chart review was performed on patients with non-healing pilonidal disease, from 2005 to 2015. Inclusion criteria included non-healing pilonidal disease after previous surgery. Patients were treated with topical 10% metronidazole BID, applied after shower, soak or sitz bath. Exclusion criteria included incomplete charting and patients lost to follow-up. Primary outcome measured was time to complete healing. Further outcomes measured included recurrence or persistence of disease.

Results: Forty-six patients were identified with complete data and adequate follow-up. Each was treated with topical 10% metronidazole, and follwed every 2 weeks until healing or failure to heal (persistence). Patient demographics included mean age of 29.3 years and male gender 76%. All patients had undergone at least one previous (failed) surgical procedure and thirty-six patients (66%) had undergone more than one surgical procedure. Mean duration of symptoms prior to intervention was 24 months. Thirty-eight patients (82%) underwent in-office depilation and light debridement of the surgical site, prior to initiating treatment. Forty-one patients (86%) demonstrated complete healing at a mean of 37 days of treatment. Recurrence was seen in 7 patients (16%) at a mean of 191 days after initial complete healing. These patients were treated with a repeat course of topical metronidazole. All patents healed in this group, after a mean of 35 days of treatment. Hazard ratio analysis for failure of metronidazole therapy did not reach statistical significance for chronicity of wound prior to therapy, comorbidity, age or gender. On further subset analysis, topical 10% metronidazole was found to be equally efficacious on chronic wounds with duration of symptoms greater than, and less than six months.

Conclusions: Non-healing pilonidal disease is a very common and challenging surgical problem. The current series demonstrates complete healing and epithelialization in 84% of patients in a mean of 37 days. Recurrence of pilonidal disease requiring repeat intervention occurred in 16% of cases at a mean time period of 191 days after complete epithelialization of the initial wound. Topical metronidazole was utilized for repeat therapy in all recurrences, and healed in a similar time-frame as initial treatment. Our study shows that duration of healing of the chronic open pilonidal wound can be accomplished in approximately 35 days, with an acceptebly low rate of recurrences.



Pilonidal disease at presentation (A) and at 2 weeks (B), 4 weeks (C) and 6 weeks (D) of treatment

P49

ROLE OF NONTUBERCULAR MYCOBACTERIA (NTM) IN CAUSATION OF FISTULA-IN-ANO: A NEW DIAGNOSTIC AND THERAPEUTIC DILEMMA.

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Purpose: Non-Tubercular Mycobacteria (NTM) is not known to be associated with fistula-in-ano and has no defined role in its causation. We analyzed our data and tried to find any such association.

Methods: A retrospective analysis was done of 309 consecutive fistula-in-ano patients operated in a referral fistula center between August 2013 to October 2015. The histopathology of anal fistula tract epithelial lining and other relevant reports – Real time- polymerase chain reaction (RT-PCR), Mycobacterium culture etc- of all the patients were analyzed.

Results: Two patients had histopathological features suggestive of Mycobacterial disease. Out of these, one patient had NTM and another had Mycobacterium Tuberculosis (MTB) on real time RT-PCR. Three patients had normal histopathology features but tested positive on RT- PCR (two for NTM and one for MTB). So a total of five patients (5/309= 1.6%) tested for Mycobacterial disease (NTM-3, MTB-2). Mycobacterium culture was done in one patient (NTM positive on RT-PCR, normal histopathology) but it didn't grow any bacteria. Four (NTM-2, MTB-2) out of five patients became alright after operation but had delayed recurrence (6-18 months after complete healing) of fistula. Two of these patients (one NTM & one MTB) were given standard anti-tubercular therapy (ATT) but both patients develop delayed recurrence. One patient (NTM) became alright after he was given an empirical treatment for NTM.(Table-1)

Conclusions: Non-Tubercular Mycobacteria (NTM) can cause fistula-in-ano. It was found in 1 % (3/309) cases. MTB was also found in 0.66% (2/309) patients. All untreated patients had delayed recurrence of fistula (6-18 months after complete healing). NTM association with fistula-in-ano is not known. The findings of this study bring to light a new factor which could be responsible for fistula causation or recurrence. At the same time, it raises several questions and adds to the dilemma of treating fistula-in-ano. 1. Till now, Mycobacterial disease on histopathology (granuloma, caseation necrosis, langerhan's giant cells) were diagnosed as MTB and treated by standard anti-tubercular therapy (ATT). However, NTM is also a possible diagnosis as NTM can also give similar picture on histopathology as MTB. 2. Only RT- PCR and Mycobacterium culture can differentiate between MTB and NTM. But RT-PCR cannot give details about different species of NTM. Only Mycobacterial culture can differentiate between species of NTM but it unfortunately takes a long time (4-6 weeks) and has low yield (low sensitivity). 3. Different species of NTM have different antibiotic sensitivity. In the paucity of any data or guidelines in the literature as which species of NTM cause fistula-in-ano, any treatment (even empirical) is difficult to start.

Table-1: Details of patients with NTM (Non-Tuberculous Mycobacterium) & MTB (Mycobacterium Tuberculosis)

Patient	Histopathology (Anal Fistula Tract lining)	Real time Polymerase chain reaction (RT-PCR)	Delayed Recurrence After operation	Response to Standard Anti-Tubercular therapy	Response to Empirical NTM therapy (Clarithromycin + Sulfonamides)
1	Positive	NTM	Yes	Not given	Currently on therapy
2	Negative	NTM	Yes	Given but failed	Currently on therapy
3	Negative	NTM	No	Not given	Successful
4	Positive	MTB	Yes	Given but failed	Not given
5	Negative	MTB	Yes	Currently on therapy	Not given

NTM- Non-Tuberculous Mycobacterium, MTB- Mycobacterium Tuberculosis

The empirical therapy of NTM given was Clarithromycin + Sulfonamides. This was done as the common NTM species which cause extra-pulmonary abscesses and soft tissue infections (Mycobacterium fortuitum group, M. abscessus, M. chelonae, M. marinum) are responsive to these two antibiotics.

P50

LONG-TERM RESULTS OF FISSURECTOMY WITH ANOPLASTY FOR THE TREATMENT OF CHRONIC ANAL FISSURE: A PROSPECTIVE STUDY.

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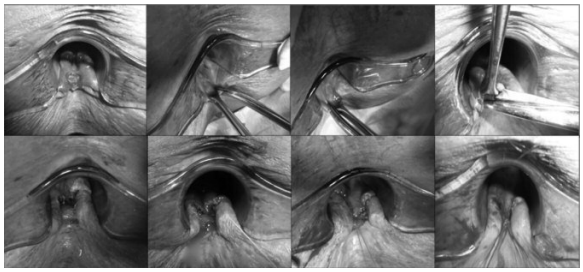
Purpose: Lateral internal sphincterotomy is actually the gold standard treatment of chronic anal fissure (CAF) even if it is associated with fecal incontinence. This prospective study was designed to determine the long-term outcome, recurrence rate and faecal incontinence score after fissurectomy with anoplasty for CAF

Methods: From January 2011 to September 2015 162 patients were consecutively enrolled in the study. Preoperatively, all underwent clinical examination, proctoscopy and a standardized questionnaire to assess faecal incontinence score (Wexner score). Wound site complications, wound healing times, incontinence, satisfactory and recurrence rates were evaluated postoperatively

Results: The median follow up period was 27 months (range 2–48). There were no surgical complications. Only five minor bleeding (3%) were observed and one wound infection (0,6%). Postoperative pain was acceptable. 2 flatus incontinence (1,2%), 5 soiling (3%) and no fecal incontinence. Complete wound healing was 20 ± 2.7 days. 8 recurrences (4.9%) As regards the long-term follow-up, an overall satisfactory rate of 94.3% was achieved without continence impairment

Conclusions: The ideal surgical treatment for CAF must be effective and sphincter-saving. In our experience fissurectomy with anoplasty for chronic anal fissure is effective, safe without surgical complication, no risk of incontinence and a low recurrence rate. These results suggest that fissurectomy with anoplasty as a minimally invasive technique should be routinely considered for patients affected by CAF.



P51

COMPARATIVE STUDY BETWEEN ENDORECTAL TRIDIMENTIONAL ULTRASOUND AND TRANSVAGINAL ULTRASOUND ON THE DIAGNOSIS OF DEEP INFILTRATING ENDOMETRIOSIS WITH RECTAL ENVOLVEMENT.

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Purpose: To compare the findings of the endorectal tridimentional ultrasound (3D ERUS) versus transvaginal ultrasound (TVUS) on staging deep infiltrating endometriosis (DIE) lesions invading rectum.

Methods: Retrospective review of records including 187 women with signs and simptoms of DIE attended on a refference center in Brazil from february 2008 and july 2015. All patients were submitted to 3D ERUS and TVUS after clinical evaluation. 3D ERUS was performed in a B&K Profocus Blue with a 2050 probe 16MHz, acquisition of a cube of informations built with 255 images, 0,25 mm each. The 3D cube were analized without

patients presence in axial, sagital or coronal planes. Three scans of 6 cm of extensions were acquired, starting at 12 to 14 cm from the anal verge. TVUS was performed in a GE Voluson E8 with transvaginal convex probe 4D RIC 6-12-D high resolution 5-9MHz, abdominal probe c1-5D and transitory linear probe ML6-15. A cleaning enema was performed two hours prior to the exams and 20 ml of ultrasonographic gel was infused on the vagina in 3D ERUS. We analized the presence of lesions sugesting endometriosis on both exams and the correlation with the Laparoscopy findings that is considered the gold standard.

Results: The median age was 35 yo (21 to 52 yo). 60 patients were submited to laparoscopy and the results were compared with the exams. In 53(28,4%) patients we identified lesions sugestive of endometriosis. For the 3D ERUS the sensibility, specificity, acuracy, positive predictive value (PPV) and negative predictive value (NPV) were respectively 72%, 97%, 85%, 95% and 79%. The Kappa of the 3D USER compared with laparoscopic confirmation was 0,69, that is considered a substantial agreement. For USTV the sensibility, specificity, acuracy, PPV and NPV were respectively 45%, 100%, 75%, 100% and 68%. The Kappa of the 3D USER compared with laparoscopic confirmation was 0,47, that is considered a moderate agreement.

Conclusions: 3D ERUS and USTV provided informations to the surgical planning for deep infiltrating endometriosis. The ERUS had better sensitivity and kappa correlation than USTV, but both of them had good specificity, acuracy, PPV and NPV.

Sensibility, specificity, acuracy and predictive positive (PPV) and negative (NPV) values.

	3D ERUS (%)	TVUS (%)
Sensibility	72	45
Specificity	97	100
Acuracy	85	75
PPV	95	100
NPV	79	68

P52

THE UTILITY OF THE LIFT PROCEDURE IN INFLAMMATORY BOWEL DISEASE PATIENTS WITH PERIANAL FISTULAS.

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Purpose: The ligation of the intersphincteric fistula tract (LIFT) procedure has been used for transsphincteric fistulas with limited reports in patients with inflammatory bowel disease (IBD). The objective of this study was to analyze the efficacy of our experience with the LIFT procedure in the treatment of patients with a diagnosis of IBD.

Methods: A retrospective review of an IRB-approved prospectively maintained database of all LIFT procedures performed at a single institution was performed. Demographic and disease-specific factors were collected including risk factors for failure. The outcome was predefined as the complete clinical healing of both the external opening and intersphincteric incision with resolution of symptoms, without additional interventions. Phone interviews were performed for patients with <90 days of follow-up.

Results: Between 2010 and 2014, 15 patients (13 male; mean age 41 years, mean BMI 25kg/m2) with a diagnosis of IBD (11 Crohn's disease and 4 ulcerative colitis) underwent 16 LIFT procedures at are our tertiary care academic center. In 87%, perianal abscess was the presenting symptom with an average seton-placement time of 332 days. None of the patients had evidence of active proctitis, perianal ulcerations, or strictures. Twelve patients (80%) were receiving immunosuppressive therapy at the time of surgery. Two patients had been treated with previous fistula plugs and one with a previous LIFT. Follow up was available in all patients at a median of 132 (32-641) days. The success rate of the procedure was 56% (9/16). Most failures (87%) were apparent in the first 90 days following surgery, all of which were along the previous tract. Five of the 7 patients required reoperation, mostly for seton placement, whereas the remaining 2 noted improved symptoms despite persistence of the fistula. No patients reported any concerns of fecal incontinence.

Conclusions: Acceptable success rates can be achieved in the treatment of anal fistulas in patients with a diagnosis of IBD. Appropriate patient selection and preoperative optimization with seton drainage are essential.

P53

TRANSANAL HEMORRHOIDAL DEARTERIALIZATION MAKES HEMORRHOIDECTOMY SAFE WHILE ON ANTICOAGULATION.

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Purpose: Hemorrhoidectomy is a very commonly performed procedure by the colorectal surgeon. However, there is a significant patient population that is elderly with multiple cormorbidities requiring anticoagulants. There is always the dilemma to ask their vascular surgeons or cardiologist when it is safe to hold anticoagulants for hemorrhoidectomy. With transanal hemorroidal dearterialization (THD) and mucopexy, its technique theoretically makes hemorrhoidectomy safe while a patient is on anticoagulation. We report data from a single surgeon's experience on THD with patient's continuing their anticoagulants.

Methods: From 2012 to 2015, we captured 104 patients who underwent THD by a single surgeon. Of these, 28 patients were on some form of anticoagulation including aspirin, plavix, effient, and coumadin while they underwent their procedure. With doppler guidance, the feeding arteriole is suture ligated. These patients were seen in follow up and inquired about postoperative bleeding.

Results: Of the 104 patients who underwent THD, 28 patients were on anticoagulants. 24 patients were on aspirin only, 1 patient was on coumadin, 1 patient was on aspirin and effient, 1 patient was on aspirin and plavix, and 1 patient was on aspirin and xarelto while undergoing their procedure. We report no instances of postoperative bleeding requiring an intervention. We had 2 patients who complained of minimal bleeding during their 2 week postoperative visit. However, no intervention was required and their symptoms resolved when questioned during subsequent visits.

Conclusions: THD makes hemorrhoidectomy safe, even when performed on patients on anticoagulation.

P54

HOW DOES RECTAL ENDOMETRIOSIS APPEAR ON TRIDIMENTIONAL ENDORECTAL ULTRASOUND?

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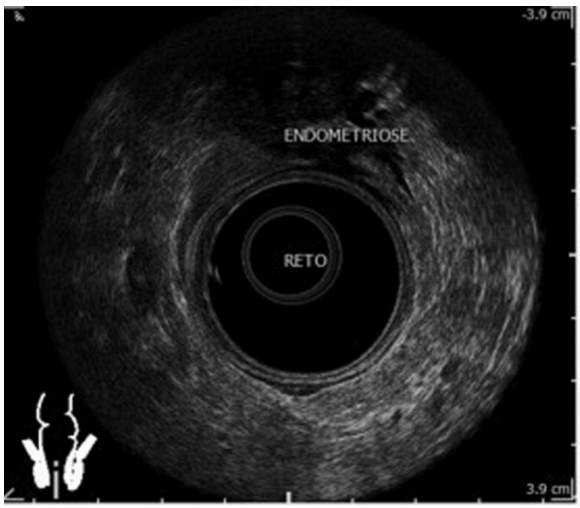
Purpose: To improve knowledge about the findings and correctly staging deep infiltrating endometriosis (DIE) lesions afecting rectum and provide better informations necessary to plan the adequate ressection, using endorectal tridimentional ultrasound (3D ERUS).

Methods: Retrospective review of records including 187 women with signs and simptoms of DIE attended on a refference center in Brazil from february 2008 to july 2015. All patients were submitted to 3D ERUS after clinical evaluation. 3D ERUS was performed in a B&K Profocus Blue with a 2050 probe, acquisition of a cube of informations built with 255 images, 0,25 mm each. The 3D cube can be analized without patients presence in axial, sagital or coronal planes. An cleaning enema was performed two hours prior to the exam and 20 ml of ultrasonographic gel was infused on the vagina. Three scans of 6 cm of extensions were acquired, starting at 12 to 14 cm from the anal verge. We analized the presence of lesions sugesting endometriosis, the diameters of the lesions, the percentual of the rectal circunference involvement, the relationship between the lesions and uterus, vagina, other adjacent organs, the distance between the distal margin of the lesion and the posterior vaginal fornix and the pelvic floor.

Results: The median age was 35 yo (21 to 52 yo). In 53(28,4%) patients was identified lesions sugestive of endometriosis. 60 patients were submited to laparoscopy, most of them that had positive on 3D ERUS. The others had intense simptoms of pain or infertility. The lesions were caracterized by an hipoechoic anterior or anterolateral image, infiltrating the rectal wall from the serosa up to the submucosa. The median latero-lateral diameter was 18 mm (5 to 34 mm) x 9,25 mm deep (2 to 35 mm) x 16,5 (6 to 36 mm). The median percentual of the wall circunference involvement was 14,5 % (7,5 to 26,6%). The median distance from the distal margin of the lesion to posterior vaginal fornix was 12,5 mm (0 to 44 mm) and the median distance from the lesion to the pelvic floor was 50,5 mm (10 to 90 mm). The sensibility, specificity, acuracy, positive predictive value and negative predictive value were respectively 72%, 97%, 85%, 95% and 79%. The Kappa of the 3D USER compared with laparoscopic confirmation was 0,69, what is considered a substantial agreement.

Conclusions: 3D ERUS gives important informations for the surgical planning that can provide adequate preparation of the patient and surgical team, with a good sensitivity, specificity acuracy, positive and negative predictive value and a substantial Kappa agreement.



Endometriosis lesion seen on the anterior rectal wall infiltrating up to the muscularis propria.

P55

SHORT-TERM OUTCOMES OF WOMEN UNDERGOING COLORECTAL RESECTIONS FOR ENDOMETRIOSIS: AN ACS-NSQIP REVIEW.

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Purpose: Endometriosis as the primary indication for colorectal resection is rarely discussed in the literature, but is indicated in select cases. We aim to describe the rate of colorectal resection in the United States and the short-term outcomes of these patients.

Methods: Analysis of the ACS-NSQIP database of all elective colorectal resections for endometriosis was performed from 2005-2013. The proportion of resections was compared over time using a Cochran-Armitage test for trend. Chi-square, Fisher's exact, and Wilcoxon rank sum test were used for univariate analysis.

Results: Of 82,708 women undergoing elective colorectal resections, 212 (0.26%) were performed for a diagnosis of endometriosis. The proportion of endometriosis as the indication for resection increased over time (Figure). Mean age was 43.3 ± 8.6 years with 73.6% non-Hispanic white and 13.7% black or African American. Median BMI was 25.8 [IQR 22.9, 31.2]. Overall, patients were healthy (84.0% ASA I or II, 2.8% diabetic, and 19.3% with HTN). Mean LOS was 5.1 ± 3.1 days and 15.6% suffered any complication, with 9.0% having a minor complication (12 superficial SSIs and 7 UTIs) and 8.5% having a major complication (5 sepsis, 7 organ space infections, 2 deep incisional infection, and 10 other). There was no 30-day mortality, however 2.8% (6) required a return to the operating room (OR) and 6.7% were readmitted within 30 days. The majority of cases (96.3%) were performed by a general/colorectal surgery team and the remainder by gynecologists. Forty-one (19.3%) underwent concurrent hysterectomy. Comparing open (n=105) to laparoscopic approaches (n=107) revealed no difference in age, BMI, race, ASA class, or comorbidities (all p>0.05). However 50.5% of open cases involved the rectum compared to 34.6% of laparoscopic cases (p=0.019). There was no difference in total operative time, readmission rates, minor or major complications, or return to the OR between groups (p>0.05), however LOS was longer in the open group (5.86 ± 3.64 vs 4.27 ± 2.32, p<0.001).

Conclusions: Endometriosis is a rare but increasing indication for colorectal resection at NSQIP hospitals. The short-term outcomes after colorectal resection in this young and healthy population are acceptable. The results of this study should be used to inform surgeons who may be asked to perform this operation and for preoperative counseling.

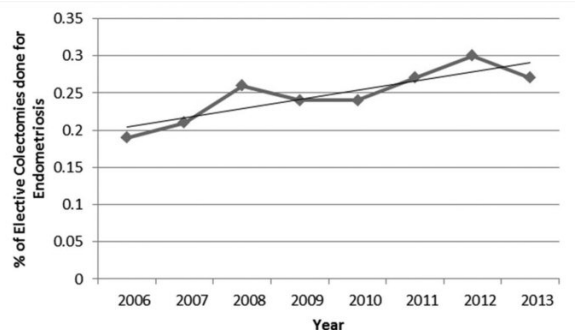

Figure. Endometriosis as the indication for colorectal resection increased from 0.19% in 2006 to 0.27% of all elective colectomies in 2013 (R^2=0.74).

P56

SINGLE-INCISION LAPAROSCOPIC INTERVAL APPENDECTOMY FOR PERIAPPENDICEAL ABSCESS.

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Purpose: Nonoperative management followed by interval appendectomy is a commonly used treatment of perforated appendicitis with abscess formation. Laparoscopic appendectomy was rapidly accepted as an adequate option for uncomplicated appendicitis and single-incision laparoscopic surgery (SILS) is being increasingly used to treat a variety of conditions. To our knowledge, there are no reports of single-incision laparoscopic interval appendectomy for periappendiceal abscess (PAA) in adult patients. Herein, we report our initial experience of this procedure using multi-channel single port with or without 2-mm needlescopic instrument.

Methods: The study group included 18 patients who underwent a single-incision laparoscopic interval appendectomy for adult patients with PAA with or without needlescopic grasper between July 2014 and August 2015.

Results: the median interval between discharge from conservative management and interval appendectomy was 6.5 weeks (4–11 weeks). The duration of use of intravenous antibiotics during conservative management was a median of 7 days (4-11). 6 patients (33.3%) required percutaneous drainage and drainage tube was removed median of 5 days (5-7) after the initial treatment. Two patients (11.1%) required a 5-mm port insertion because of the severe adhesions. Types of SILS included 10 pure SILS (55.62%) and 6 SILS+2-mm needlescopic instrument (33.3%). The median total operation time was 65 min (50-155). A drainage tube was placed in 7 patients (38.9%). The median total length of incision was 2.5 cm (2.0-3.0).

The median times to soft diet and length of stay were 2 days (1-3) and 3 days (2-5). 3 patients (16.7%) developed postoperative complications; one patient developed wound site bleeding, one developed surgical site infection, and one developed voiding difficulty.

Conclusions: Conservative management followed by single-incision laparoscopic interval appendectomy for PAA in adult patients using multichannel single port is feasible and safe. However, further large-scale comparative studies are needed to prove the advantages of this procedure.

Patient characteristics and perioperative outcomes

Patient number	18
Sex, n (%)	
Male	8 (44.4)
Female	10 (55.6)
Age (years), median (range)	70 (35-82)
Body-mass index (kg/m2), median (range)	24.7(17.5-28.1)
Duration of symptoms prior to diagnosis	10 (2-26)
Interval of operation (weeks), median (range)	6.5 (4-11)
PCD, n (%)	6 (33.3)
Duration of PCD (days), median (range)	5 (5-7)
Duration of PCD (days), median (range)	
SILS	10 (55.6)
SILS+2mm needle instrument	6 (33.3)
SILS+5mm additional port	2 (11.1)
Total operation time (min), median (range)	65 (50-155)
Type of appendicitis, n (%)	
Suppurative appendicitis	12 (66.7)
Gangrenous appendicitis	6 (33.3)
Adhesion, n (%)	
Moderate	6 (33.3)
Severe	8 (66.7)
Periappendical fluid collection, n (%)	4 (22.2)
Periappendical fluid collection, n (%)	7 (38.9)
Total length of incision (cm), median (range)	2.5 (2.0-3.0)
Days to 1st soft diet(day), median (range)	2 (1-3)
Hospital stay, median (range)	3 (2-5)
Complications, n (%)	3 (16.7)
Wound site bleeding	1 (5.6)
Surgical site infection	1 (5.6)
Voiding difficulty	1 (5.6)

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ENDOSCOPIC RESECTION CAN BE A SAFE ALTERNATIVE IN GIANT SESSILE AND PEDUNCULATED COLORECTAL POLYPS.

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Purpose: Although endoscopic resection of large colorectal polyps is minimally invasive and organ sparing, outcomes of this modality are not clearly established especially in technically challenging "giant" polyps. Aim of this study was to evaluate the safety and immediate clinical outcomes of endoscopic resection of large colorectal polyps measuring 3 cm or more in our advanced endoscopic unit.

Methods: All patients with colorectal polyps measuring ≥ 3 cm who underwent endoscopic or surgical treatment in our hospital from 2009 to 2015 were included in the study. Patient demographics, polyp characteristics, procedural and surgical outcomes and histology and follow-up data were collected from endoscopic and hospital database retrospectively.

Results: Over six year period, seventy-one patients (median age: 72 years) were identified and complete data available for sixty six patients. Median colorectal polyp size was 4.0 cm (range: 3 - 16 cm,18 right colon and 53 left colon) and majority of them were sessile Paris type 1s polyps. Forty-five polyps (45/71, 63%) were removed by endoscopic mucosal resection (EMR) or piece meal technique. Of these 13 patients (13/71, 18%) needed more than one EMR session for the complete removal of the polyp. Nine of the removed polyps (9/45, 20%) contained carcinoma or high-grade dysplasia and subsequently underwent further surgical resection. Eleven procedure-related adverse events (11/71, 6.1%) occurred (9 minor bleeding and 2 major bleeding requiring transfusion and no incidence of bowel perforation). Twenty-one polyps (21/71, 30%) were deemed not suitable for EMR due to location of the polyp in the initial assessment and required surgical resection.

Conclusions: endoscopic resection for colorectal polyps of ≥ 3 cm can be performed safely at experienced endoscopy centers with a low rate of complications. EMR offers a non-surgical option of management of large colorectal lesions especially in the elderly patients.

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MEDICAL VERSUS SURGICAL TREATMENT OF DIVERTICULITIS: HOW THE RISE OF LAPAROSCOPY MAY TIP THE BALANCE.

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Purpose: Diverticulitis is an increasingly prevalent disease process in the United States. Despite publication of the ASCRS Practice Parameters for the Treatment of Sigmoid Diverticulitis in 2006 and 2014, controversy exists regarding the indications for elective colon resection. This study was designed to analyze the outcomes and cost effectiveness of medical management versus open and laparoscopic surgery for diverticulitis.

Methods: A retrospective analysis of 183,179 admissions with a primary diagnosis of diverticulitis from 2009 to 2012 was performed using data from Nationwide Inpatient Sample (NIS), Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality. Cases were selected based on International Classification of Diseases (ICD-9-CM) diagnosis codes 562.11 Diverticulitis of colon without mention of hemorrhage and 562.13 Diverticulitis of colon with hemorrhage. Complicated diverticulitis was defined by ICD-9-CM codes for intestinal perforation, peritonitis, abscess, bowel obstruction, stricture, fistula, sepsis, and shock. Surgery was defined by non-endoscopic ICD-9-CM procedure codes for colorectal resection, colostomy and ileostomy formation, colorectal anastomosis and reversal or revision of an enterostomy. Admissions in which the patient underwent a surgical procedure which was not directly related to the treatment of diverticulitis were excluded from analysis. The primary outcomes investigated were in-hospital mortality, mean length of stay (LOS), and mean total charges.

Results: Overall, 73.7% of admissions were medical and 26.3% were surgical. Of the surgical cases, 38.3% involved the use of laparoscopy. Taken as a whole, including both complicated and uncomplicated diverticulitis, medical admissions had significantly lower mortality (0.3% v 1.2%), LOS (3.7 vs 8.15 days), and total charges ($20,464 v $69,040), p-values all <0.001. The differences between medical admissions and elective surgical admissions (mortality 0.3%, LOS 5.8 days, total charges $50,762) were less pronounced. The outcomes for medical admissions for uncomplicated disease versus elective laparoscopic surgical admissions were even more similar, mortality 0.2% vs 0.1%, LOS 3.4 vs 4.7 days, and total charges $18,852 vs $47,774. As noted, the in-hospital mortality associated with elective laparoscopic surgery was less than the mortality of medical admission.

Conclusions: These results suggest that elective surgical treatment of diverticulitis is safe with only slightly longer lengths of stay compared to medical management. Laparoscopic surgery affords shorter lengths of stay and lower charges. From the standpoint of cost, it may be reasonable to consider elective laparoscopic colon resection after two episodes of uncomplicated diverticulitis which require inpatient admission.

P60

FAP – WATCHING THE CHILDREN..!

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Purpose: Work up of children of a parent with familial adenomatous (FAP) polyposis begins when they are symptomatic or reach puberty. Yearly colonoscopy establishes the severity, distribution and evolution of the polyposis, which help determine timing and type of prophylactic surgery. In young children, colonoscopy is done under general anesthesia and any polyp that looks suspicious or is larger than 5mm is removed. Issues in children's colonoscopies include the bowel preparation and the sedation. Here

we report a series of children affected with FAP to describe the way in which colonoscopy is used to inform surgical decision making.

Methods: An IRB approved data registry of FAP patients was queried for children having surveillance colonoscopy. Children were defined as age below 19 years. FAP surveillance usually began at puberty and continued every year if the prior colonoscopy revealed adenomas, and every two years if it did not. Absolute indications for surgery included any severe dysplasia, multiple polyps >1cm diameter, and polyp counts >1000.

Results: 83 children received 215 colonoscopies; 2.6 per child and 54% were females. 11 children had one exam, 13 had 2, 14 had 3, 6 had 4, 2 had 5 and 10 had from 6 to 12. 74 had a family history of FAP. 172 received bowel preparation & 146 (85%) of these had either a good or excellent bowel result. Out of 43 who didn't receive bowel prep [age range 8 – 15 years] 39 had good or excellent bowel preparation. The cecum was intubated in all 215 cases; 68% were done under general anesthesia and the rest under conscious sedation. The average age at first scope was 14 range (8-18) where 20, 50, & 9 children were ≤ 10, 11-15, and > 15 years old. Average length of follow up was 3 years, and range of number of scopes was 1-12. On first scope, 63 children had between 0 & 100 polyps, 12 had >100-1000 polyps & 4 had > 1000 polyps; one had high grade dysplasia in an adenoma and was operated on. No patient developed cancer. 10 scopes done in 7 patients found ≥1000 polyps; all of them had surgery [5 IRA & 1 IPAA]. 160 scopes done in 66 patients found 0 – 100 polyps; 12 had IRA, mostly for large or symptomatic polyps. 36 scopes in 22 patients found 100-1000; 8 had IRA & 1 had IPAA. Average age at surgery was 13 years (range 10 – 17 years). Indications for surgery included polyp number (52%), size (40%), 3 with high grade dysplasia (11%), and worrying evolution (10%). Usually a sample of polyps, and all the larger polyps removed, were sent for biopsy. The most common pathology was tubular adenoma (145/215) but others included normal mucosa and lymphoid follicles. Average size was 6.2 mm (range 2-47 mm) There were no post- procedure complications and no procedure related events. No patient developed cancer.

Conclusions: Surveillance colonoscopy in children with FAP is feasible, effective in triaging for surgery, and safe.

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STAGED TOTAL COLECTOMY WITH INITIAL LOOP ILEOSTOMY FOR SLOW TRANSIT CONSTIPATION MAY PREVENT UNNECESSARY COLECTOMY.

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Purpose: Total colectomy with ileorectal anastomosis has been shown to be effective in the treatment of slow transit constipation. Initial success rates have been tempered by undiagnosed global bowel motility disorders that mimic slow transit constipation but are not adequately treated by total colectomy. In this study, staged colectomy with initial loop ileostomy has been utilized to better identify appropriate patients for total colectomy prior to committing to this irreversible procedure. The purpose of this study was to determine if loop ileostomy improved success rates of total colectomy for slow transit constipation, and to monitor the outcomes of patients that underwent initial loop ileostomy.

Methods: Consecutive patients from October 2011 to June 2015 with a diagnosis of slow transit constipation that underwent a total colectomy or ileostomy were identified. Patient demographics, preoperative evaluation, and postoperative outcomes were documented. Patients were grouped according to whether initial loop ileostomy was performed prior to total colectomy. Outcomes were compared using student's t-test or Fisher's exact test ($p<0.05$ significant).

Results: Thirty-five patients underwent loop ileostomy with intent to proceed to total colectomy. Twenty-two (62.8%) of these patients proceeded with total colectomy 3 months (range 2-5) after loop ileostomy and improved from 0.11 ± 0.07 BMs/day to 4.26 ± 2.10 BMs/day. Of the thirteen patients who did not proceed to total colectomy, five did not improve with ileostomy, seven improved but declined further surgery, and one was lost to follow-up. Fifteen patients underwent total colectomy without initial loop ileostomy and improved from 0.34 ± 0.77 BMs/day to 3.54 ± 1.98 BMs/day. There was no significant difference between baseline or post-colectomy BM frequency with or without initial loop ileostomy. Seven of the 35 (20%) loop ileostomy patients were admitted for ileus or dehydration during their ileostomy period. After total colectomy, a few patients had persistent constipation symptoms and were diagnosed with pelvic floor dysfunction. One (4.5%) of the loop ileostomy patients and two (13.3%) of the total colectomy alone patients had subsequent permanent ileostomy due to persistent constipation after colectomy.

Conclusions: There was no significant difference in bowel frequency, success rate, or need for permanent ileostomy with or without initial loop ileostomy prior to colectomy. Over one-third of patients undergoing initial loop ileostomy did not proceed to total colectomy. We conclude that a trial loop ileostomy does not predict success of those that proceed to total colectomy, but may spare some the morbidity and risk of total colectomy by having a loop ileostomy initially. A further prospective study is warranted.

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MORTALITY RISK FACTOR ANALYSIS IN COLONIC PERFORATION:WOULD RETROPERITONEAL CONTAMINATION INCREASE MORTALITY IN COLONIC PERFORATION?

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Purpose: Colonic perforation is a lethal condition presenting high morbidity and mortality in despite of emergent surgical treatment. This study investigates the surgical outcome of patients with colonic perforation associated with retroperitoneal contamination, evaluating the effect of retroperitoneal contamination in postoperative mortality.

Methods: We retrospectively analyzed 30 patients diagnosed with colonic perforation caused by either inflammation or ischemia and underwent emergent surgical treatment from Jan. 2005 to Dec. 2014. Patient characteristics were analyzed to find risk factors increasing postoperative mortality. Using Physiological and Operative Severity Score for the Enumeration of Mortality and Morbidity (POSSUM) audit system which estimates the mortality and morbidity risk in surgical patients, physiological and operative scores were calculated, and the mortality and morbidity rates were estimated to verify our surgical outcome. Retroperitoneal contamination was defined by the presence of retroperitoneal air in the preoperative abdominopelvic computed tomography. Patients with retroperitoneal contamination were compared to those without retroperitoneal contamination.

Results: Eight (26.7%) out of thirty patients with colonic perforation were dead after emergent surgical treatment. Factors associated with mortality included age, ASA class, and the ischemic cause of colonic perforation. P-POSSUM physiological and operative scores as well as the mortality predicted were significantly higher in the deceased patient group than those were in the living. CR-POSSUM physiological score and mortality were also significantly higher in the deceased. Three (50%) out of six patients who presented retroperitoneal contamination were deceased. Albeit the patients with retroperitoneal contamination did not show significant increase in the mortality rate, they showed significantly higher ASA class than those without retroperitoneal contamination did. P-POSSUM physiological and operative scores as well as the mortality predicted were higher in the patients with retroperitoneal contamination.

Conclusions: Patients presenting colonic perforation along with retroperitoneal contamination demonstrated severe co-morbidity. However, retroperitoneal contamination did not influence the mortality rate. POSSUM audit system is a valuable method predicting mortality rate in patients with colonic perforation.

Table 1. Mortality risk factor analysis.

Variables		Mortality (-)	Mortality (+)	*p*-value
Age		71.0±12.1	80.4±6.8	0.049
BMI (Kg/m2)		23.5±3.1	23.4±6.1	0.943
Sex	Male	6 (75.0%)	2 (25.0%)	1.000
	Female	16 (72.7%)	6 (27.3%)	
ASA class	I/II	15 (93.8%)	1 (6.3%)	0.012
	III/IV	7 (50.0%)	7 (50.0%)	
Perforation site of colonic segment	Right	4 (66.7%)	2 (33.3%)	0.645
	Left	18 (75.0%)	6 (25.0%)	
Degree of fecal peritonitis	Localized	15 (83.3%)	3 (16.7%)	0.210
	Diffuse	7 (58.3%)	5 (41.7%)	
Retroperitoneal contamination	(-)	19 (79.2%)	5 (20.8%)	0.300
	(+)	3 (50.0%)	3 (50.0%)	
Cause of colon perforation	Inflammation	22 (84.6%)	4 (15.4%)	0.003
	Ischemia	0 (0.00%)	4 (100.0%)	
Operative procedure	Hartmann's operation	15 (68.2%)	7 (31.8%)	0.721
	Resection and anastomosis	5 (83.3%)	1 (16.7%)	
	Loop colostomy	1 (100%)	0 (0.0%)	
	Primary repair	1 (100.0%)	0 (0.0%)	
P-POSSUM physiological score		31.9±7.1	39.5±5.6	0.011
P-Operative score		21.3±2.0	24.6±2.2	0.001
P-POSSUM morbidity		90.4±18.3%	99.1±0.7%	0.192
P-POSSUM mortality		45±25.3%	77.3±14.5%	0.002
CR-POSSUM physiological score		12.2±2.9	14.4±2.2	0.064
CR-POSSUM Operative score		15.5±0.6	15.9±0.4	0.154
CR-POSSUM mortality		43.7±21.0%	62.5±15.6%	0.029

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SURGICAL INFECTION IN PENETRATING COLON AND RECTAL INJURIES: DO ANTIBIOTICS AND DIVERTING OSTOMIES OFFER PROTECTION?

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Purpose: Trauma remains the prime cause of death in patients during their most productive years of life. Peritoneal contamination after penetrating hollow viscus injury remains a significant cause of post-operative infections. Further, Colorectal Surgeons may be called on by their General Surgery colleagues to aid in the management of penetrating colon and rectal injuries. Current guidelines recommend only 24 hours of prophylactic antibiotics, but this has been a source of controversy over the last decade.

Methods: To date, this is the largest prospectively collected database of colon and rectal penetrating trauma focusing on infectious outcomes. Patients presented at a large Level I trauma center, staffed by surgeons from multiple academic institutions. Data was collected on injury type, antibiotic usage, use of ostomy, infection type, blood loss, and time to presentation. Data was statistically analyzed using a Chi-squared analysis.

Results: From 2011-2015, 124 patients presented with penetrating colon and/or rectal injuries. 40 (32%) developed an infection (ranging from superficial to deep space infections) during their stay during their stay, of those that developed infections 85% (34) initially received antibiotics >24 hours compared to 15% (6) that had antibiotics stopped at 24 hours (p=0.0002). Of the 3 cases of C. diff in the entire series, all received antibiotics >24 hours. Use of ostomies showed no difference in rates of infection in colon and rectal injuries (p= 0.43). This was also not significant when colon and rectal injuries were examined independently (p=0.56 and p=0.53). In addition, the guideline of <24 hours of prophylactic antibiotics was not followed for 61% (76) of the patients.

Conclusions: In our study, 61% of the patients received prophylactic antibiotics >24 hours, which is more than the current guidelines recommend. In addition, our results showed that a longer duration of prophylactic antibiotics after penetrating colon and rectal injuries did not decrease the rate of infections. Concern exists that the unnecessary use of antibiotics in a busy trauma center is leading to the rise of superinfection and paradoxical increases in SSI rates. We also found that the use of ostomies did not decrease infection rates in penetrating rectal injuries, while this is underpowered, it is possibly because our institutional standard is for the use of pre-sacral drainage for rectal injuries. Further analysis will be done on infecting organism type, blood loss, time to arrival, injury velocity, and wound closure related to infection rates.

Antibiotic Duration and Infection

	Infection	No infection	Total
>24 hours antibiotics	34	42	76
<24 hours antibiotics	6	42	48
Total	40	84	124

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IS COLONOSCOPY NECESSARY FOR PATIENTS PRESENTING WITH HEMATOCHEZIA UNDER THE AGE OF 40?

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Purpose: Per rectal bleeding is a common presention in the young population at outpatients clinic. Most centres offer sigmoidoscopy to evaluate the distal colon, with the possible risk of missing proximal lesions. Colonoscopy offers a complete evaluation, with higher complication rates with possible low yield. There are currently no definative guidelines regarding the level of colonic evaluation in this young group of patients. This study aims to assess the literature as well as analysis of colonscopy findings in our centre for patients younger than 40 years old

Methods: Literature search was performed using MEDLINE and relevant references. A retrospective analysis of colonoscopies performed in our centre over a 2 year period was carried out using a prospectively collected database. Patients with family history of colorectal cancer or genetic disorder, previous colonic evaluation or imaging were excluded. Patients' demographics, indication, findings and histology were included. The study popuation was divided into 2 age groups for analysis; age <30 years old and 30 – 39 years old.

Results: 6 relevant studies were identified, mostly recommending sigmoidscopy being sufficient. 453 patients were included in our analysis, 115 were age <30 years old and 338 were 30 – 39 years old. The majority of patients have haemorrhoids. The overall incidence of polyps was 6.5%; which was significantly higher in the 30 – 39 than the <30 age group (7.9% vs 1.7%, p = 0.026). There were 2 cases of advanced polyps and malignancy. While marjority of the polyps were distally based, proximal polyps were found in the older age group. There is 1 case of colonic perforation.

Conclusions: Colonic polyps are more prevalant and likely to be adenomatous in the older age group, even in the younger population. A colonoscopy is recommended for patients over the age of 30 with rectal bleeding to exclude proximal lesions, while a sigmoidoscopy is sufficient for those yonger than 30 years old.

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ACUTE DIVERTICULITIS WITH MICROPERFORATION. SHOULD IT BE TREATED THE SAME AS ACUTE UNCOMPLICATED DIVERTICULITIS?

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Purpose: The use of Computed Tomography imaging (CT scan) has enabled clinicians to identify a subset of patients with acute diverticulitis who present with microperforation. Microperforation is defined as the development of focal contained collections appearing as small extraluminal pockets of air or extravasation of contrast material. The goal of our study is to determine if both groups are similar with respect to response to initial medical therapy, morbidity and mortality.

Methods: A retrospective analysis was conducted on 141 patients with a primary diagnosis of acute uncomplicated diverticulitis with or without microperforation via CT scan, when treated with antibiotics alone. The data was obtained from Hahnemann University Hospital Medical Records dating from 2008-2015. Radiology reports were evaluated for the presence of acute colonic diverticulitis with microperforation. A Radiolgist reviewed all CT scans and a definitive diagnosis was made. The major outcome variable was readmission within 30 days of discharge with similar or worsened symptomatology. In addition to demographic data, data was also collected on mortality within 30 days of diagnosis, antibiotic course, blood pressure, fever, leukocytosis, abdominal pain, and smoking status. Exclusion criteria included: prior colorectal surgery, significant comorbidities that could interfere with diagnosis or treatment (colitis, IBS etc.), nonspecific CT findings (diverticulitis vs. colitis), CT findings with the presence of complicated acute diverticulitis, and antibiotic noncompliance.

Results: The sample included 141 patients diagnosed with acute diverticulitis, 32 of which had a diagnosis of microperforation, and an overall 30-day readmission rate of 6.38%. Of the 141 cases of acute uncomplicated colonic diverticulitis, 32 were found to have microperforation. There was no mortality. The overall readmission rate was 6.38%, 6.25% for microperforation, and 6.42% for patients without microperforation. Univariate analysis of readmission rates between patients diagnosed with acute diverticulitis with microperforation and without microperforation revealed an odds ratio of 0.97, 95% CI (0.19-4.93, p=0.97). There was no statistically significant difference between the length of antibiotic therapy between groups (P>0.05). Male patients with diverticulitis were 3 times more likely to have microperforation than female patients (OR: 3.09, 95% CI 1.37-6.96, P=0.0065). The overall median length of stay was 3 days, microperforation was 4 days, and readmission was 2 days (P>0.05). Groups did not differ in regards to BMI, median age, fever or leukocytosis (P>0.05).

Conclusions: Acute diverticulitis with microperforation is not associated with an increased rate of readmission or need for surgery when compared to patients diagnosed with acute diverticulitis without microperforation.

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OBSERVATION AFTER NONOPERATIVE MANAGEMENT OF DIVERTICULAR ABSCESS.

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Purpose: Complicated diverticulitis is a common and morbid condition. In recent years, a shift towards initial non-operative management of diverticular abscesses has reduced rates of emergent colectomy. Some patients remain unfit or unwilling to undergo elective colectomy following successful non-operative management. We aimed to characterize the long-term outcomes of these patients.

Methods: A retrospective review of patient records from January 2009-December 2011 was conducted after obtaining IRB approval. Only patients initially managed non-operatively for complicated diverticulitis who subsequently did not undergo elective colectomy were included. Patient demographics, hospital information, 30 day morbidity, mortality, and follow up information were recorded. Univariate analysis was performed using χ^2, p values < 0.05 were considered significant.

Results: Forty seven patients were identified, 96% with sigmoid involvement. Median abscess diameter was 3 cm (range 1-14cm), and 97% were Hinchey I (n=27) and II (n=16). Thirty seven patients (79%) had significant medical comorbidities and 11 (23%) were immunosuppressed. Sixteen patients (34%) underwent CT guided drainage initially; the remaining patients were managed medically. Median duration of drainage was 27 days [range 3-180]. Seven patients had less than three month follow up, the remaining 40 patients were followed for an average of 41 months, with a 15% rate of recurrence. All recurrences were uncomplicated diverticulitis, managed with antibiotics. Univariate analysis identified a lack of percutaneous drainage as the only significant predictor of recurrence (0% vs 24%, p=0.04). One patient died related to recurrent diverticular disease.

Conclusions: Observation after successful non-operative management of diverticular abscess is associated with a low risk of recurrence when percutaneous drainage is utilized.

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ROBOTIC SURGERY FOR DIVERTICULITIS - IS IT COST EFFECTIVE?

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Purpose: The incidence of diverticulitis in the United States is on the rise, with a 29% increase in elective operations from 1998-2005. Treatment for recurrent or complicated diverticulitis is surgical resection. Despite the benefits of laparoscopy, only 25% of colorectal surgery is done laparoscopically, with conversion rates up to 20-25%. This is largely due to the steep learning curve and difficult dissection in the pelvis. Robotic surgery overcomes many of these challenges by allowing better visualization and movement in the narrow pelvis. However, there has been controversy regarding its use because of financial costs. We performed a retrospective analysis to compare outcomes and cost between robotic and laparoscopic surgery for the treatment of diverticulitis at a single university medical center.

Methods: Retrospective review of robotic surgery performed at Rutgers RWJ for diverticulitis from 11/2010 to 10/2015. Financial analysis and length of stay were evaluated for laparosopic and robotic surgery for diverticulitis, using search codes for these parameters. Individual chart review for patient characteristics, conversion rates, and complications was done for robotic cases only. The Mann Whitney test was used for statistical analysis.

Results: 63 patients had robotic surgery and 42 laparoscopic surgery. In the robotic arm, there was 1 conversion to open. Indications for surgery included recurrent diverticulitis, diverticulitis with abscess, colovaginal, colouterine, colofallopian and colovesicular fistula. 65% of the patients were female and 35% male. Average BMI was 29.7 +/-6. Average age was 53+/-11 years. ASA classification: 1 – 2 patients; 2 – 52 patients; 3 – 8 patients. Splenic flexure mobilization was performed in 20 patients. OR time 264+/-57 minutes. EBL 133+/-150 ml. In hospital complications included 1 wound infection, 1 abscess, 2 patients with ileus, 1 patient who developed ARDS and AKI, 1 with AKI, 1 with urinary retention, and 1 developed a post operative stroke. After discharge, there was 1 small bowel obstruction treated non-operatively, 5 wound infections, 5 extraction site hernias requiring elective surgery, and 1 UTI.

Conclusions: Robotic colon resection for diverticulitis can be performed safely and effectively, with acceptable complication and conversion rates. Despite much criticism regarding cost, financial analysis at our institution revealed no statistically significant difference in total cost between laparoscopic and robotic surgery for the treatment of diverticulitis, even when depreciable costs, which include the up front cost of the robot and yearly maintenance, are incorporated. Though OR costs were statistically higher for robotic surgery, this was outweighed by the statistically significant decreased length of stay seen with robotic surgery, therefore making total costs the same between the two groups. Robotic surgery merits strong consideration for the surgical treatment of diverticulitis.

Financial Analysis - Laparoscopic vs. Robotic Surgery

Surgery	OR cost	Direct cost	Total cost	LOS (days)
Robotic	4,859+/-2,709	12,283+/-3012	21,144+/-5,026	3.9+/-2.0
Laparoscopic	3,530+/-1,246	14,189+/-8118	23,149+/-12,570	7.2+/-6.8
p	.0006	0.35	.073	.0032

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SILS COLECTOMY IS ASSOCIATED WITH SIGNIFICANTLY REDUCED LENGTH OF STAY COMPARED TO LAPAROSCOPIC COLECTOMY.

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Purpose: Single-incision laparoscopic surgery (SILS) is one of several minimally invasive techniques increasingly offered to patients with colorectal disease. It has shown similar short-term outcomes to multi-port laparoscopic surgery, but multi-institutional data according to standardized definitions are lacking.

Methods: A national outcomes database, ACS-NSQIP, which incorporates data from over 500 hospitals in the USA, was used to analyze outcomes of minimally invasive colorectal surgery. All patients undergoing laparoscopic, or single-incision laparoscopic (SILS) colon and rectal resection in 2012 and 2013 were identified. The primary outcome was postoperative length of surgical stay. Multivariable logistic regression analysis was performed to identify the independent effect of operative approach whilst adjusting for patient and operative factors.

Results: A total of 18, 436 procedures were completed laparoscopically and 122 SILS. Regarding diagnosis, significantly more patients undergoing SILS had IBD (30.3%) compared with laparoscopic surgery (7.6%) and the proportion of patients undergoing surgery for malignancy was greater in the laparoscopic group compared to SILS (40.7% vs. 27.0%) (p<0.0001). All patient demographics analyzed, including ASA, BMI and other comorbidities were similar, except for age, diabetes, hypertension and steroid use. Fewer SILS patients were given mechanical bowel preparation, but significantly more had pre-operative oral antibiotics (p<0.03). A greater proportion of patients undergoing laparoscopic surgery had a prolonged length of stay (≥6 days= 75th percentile) (24.5%) compared to SILS (15.6%), (p<0.02). Mean length of stay was also different (4 and 3 days respectively) (p=0.001). All other outcomes, including post-operative ileus, anastomotic leak, surgical site infection, re-admission and re-operation were not statistically significantly different. After adjusting for confounders, including procedure, SILS remained independently associated with reduced odds of prolonged length of stay. Other factors associated with prolonged length of stay were increasing age, steroid use, ASA 4 and emergency surgery. A 1:1 propensity score matched analysis comparing laparoscopic to SILS groups was confirmatory, with prolonged length of stay more likely following laparoscopy (p=0.001).

Conclusions: In this selection of mainly academic hospitals, SILS is shown to be safe and with similar post-operative outcomes to the more established multi-port laparoscopic approach, but with a significantly reduced length of stay. The value-based benefits of each operative approach should include a balance of the cost of surgical instruments against hospital bed occupancy in view of similar 30-day outcomes.

Demographic, operative and post-operative characteristics of patients undergoing laparoscopic or SILS colorectal resection

	Laparoscopy n=18,436	SILS n=122	p-value
Patient characteristics:			
Age, median (range)	61 (18-89)	54 (18-88)	<0.0001
Sex (male), n (%)	8824 (47.9)	52 (42.6)	0.51
BMI ≥ 30, n (%)	6079 (33)	33 (27)	0.17
ASA, n (%): I II III IV	644 (3.5) 9844 (53.4) 7276 (39.4) 659 (3.6)	1 (0.8) 64 (52.5) 55 (45.1) 2 (1.6)	0.43
Operation, n (%): Colectomy	13655 (74.6)	106 (86.9)	0.001
Proctectomy	4780 (25.9)	16 (13.1)	0.001
Indication, n (%):			<0.0001
Malignancy	7502 (40.7)	33 (27.0)	
Inflammatory Bowel Disease	1394 (7.6)	37 (30.3)	
Co-morbidities, n (%)			
Diabetes	751 (4.1)	0 (0)	0.02
Prior sepsis	459 (2.5)	4 (3.3)	0.58
Chronic steroid use	1448 (7.9)	29 (23.8)	<0.0001
Hypertension	8594 (46.6)	43 (35.2)	0.01
Operative characteristics:			
Mechanical bowel preparation, n (%)	10,669 (71.1)	66 (61.7)	0.03
Oral antibiotic preparation, n (%)	4688 (30.9)	63 (57.8)	<0.0001
Emergency, n (%)	594 (3.2)	4 (3.3)	0.97
Operating time, mins Mean +/- std	172 (86.2)	133 (56.7)	<0.0001
Post-operative complications, n (%):			
Postoperative ileus	1633 (8.9)	10 (8.2)	0.79
Anastomotic leak	542 (3.0)	2 (1.6)	0.39
Superficial SSI	780 (4.2)	4 (3.3)	0.60
Deep SSI	128 (0.7)	0 (0)	0.36
Organ space SSI	584 (3.2)	3 (2.5)	0.67
Return to OR	726 (3.9)	2 (1.6)	0.19
Prolonged length of stay	4522 (24.5)	19 (15.6)	0.02
30-day mortality	119 (0.6)	0 (0)	0.24

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IS THERE A SELECTIVE ROLE FOR NONOPERATIVE MANAGEMENT OF RENAL TRANSPLANT PATIENTS WITH ACUTE DIVERTICULITIS? A REVIEW OF OUTCOMES.

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Purpose: The optimal management of patients who present with acute diverticulitis post-renal transplant is unclear. Many surgeons advocate having a low threshold for surgical intervention. This study aims to evaluate the clinical outcomes of these patients.

Methods: Patients with a functioning renal transplant who were admitted with computed tomography (CT) evidence of acute diverticulitis were identified from a prospectively maintained database between April 2002 and August 2014 at a single, large, academic transplant center. Patient demographics, number of previous episodes of diverticulitis, kidney function, physiologic disease severity measured by the Simplified Acute Physiologic Score II (SAPS II), and radiographic disease severity graded by the Ambrosetti and modified Hinchey classification were recorded. Primary outcomes were rates of surgical intervention, graft failure, and death. The relationship between patient outcomes and clinical factors reported in this study were analyzed.

Results: 1222 patients with a history of a renal transplant were reviewed yielding 12 patients (1%) who were admitted for acute diverticulitis. Median follow-up from time of diagnosis was 38 months (range 6-132). No patients underwent an operation during their initial admission for acute diverticulitis. 3 patients (25%) underwent an operation during a subsequent admission due to incomplete symptom resolution with non-operative therapy. 9 patients (75%) had complete symptom resolution with non-operative therapy; 4 underwent an elective operation because they had at least 1 episode of diverticulitis previously. No patients died or experienced graft failure as a complication of diverticulitis. Patient characteristics and their relationships to operative outcome are summarized in the Table.

Conclusions: A trial of non-operative management is safe for a majority of renal transplant patients with acute diverticulitis. However, these

patients need to be carefully followed since some will fail to improve and require surgery. Further studies are needed to better characterize which clinical factors, if any, may predict failure of non-operative therapy.

Table

	All patients (n=12)	Non-operative (n=9)	Operative (n=3)	P value
Age (years), mean (±SD)	52.8 (±13.9)	52 (±15.8)	55.3 (±6.5)	0.736*
Gender, n (%) Male Female	6 (50) 6 (50)	5 (56) 4 (44)	1 (33) 2 (67)	1.000+
Body Mass Index (kg/m2), mean (±SD)	30.9 (±8.2)	31.7 (±8.5)	28.4 (±8.1)	0.561*
Previous Episodes of Diverticulitis, n (%) 0 1 2	7 (59) 4 (33) 1 (8)	5 (56) 3 (33) 1 (11)	2 (67) 1 (33) 0	0.827+
Creatinine Clearance (mL/min), mean (±SD)	42.7 (±18.2)	43.8 (±19.7)	39.4 (±15.5)	0.732*
SAPS II Score, mean (±SD)	17.8 (±6.6)	17.1 (±5.4)	20 (±10.4)	0.535*
Predicted Mortality (%)	3.6	3	5.4	0.303*
Ambrosetti Classification, n (%) Moderate Severe	7 (59) 5 (41)	6 (67) 3 (33)	1 (33) 2 (67)	0.523+
Modified Hinchey Classification, n (%) 1a 2 3	7 (58) 2 (17) 3 (25)	6 (67) 1 (11) 2 (22)	1 (33) 1 (33) 1 (33)	0.547+

* Unpaired t-test, +Chi-squared test

P70

ENDOSCOPIC MUCOSAL RESECTION FOR CURATIVE EXCISION OF LARGE COLON POLYPS.

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Purpose: To evaluate the success of curative excision of large colon polyps endoscopically.

Methods: Out of 140 patients with histologically proven benign polyps of the colon, two centimeters or over, 124 patients were deemed suitable for curative endoscopic excision after careful selection process over a 54 month period. Eight patients underwent lap-assisted colonoscopic excision of polyps and were excluded from the study. The polyps were four centimeters or larger in 40 patients. The age range of this group of 116 patients is 25 to 83 years. The polyps were located in the left colon in 64 percent of the patients. Polyps of the rectum were excluded from this study. In 94 percent of the patients, the procedure was performed in the operating suite with IV sedation, using propofol given by anesthesiologist. The rest were performed in an ambulatory surgical center. Both small and large snares were used in all patients. The polyp excision was achieved with submucosal lift using saline and overlapping multiple passages of the snare. Piecemeal excision with snare was used for larger polyps. The snare was held tight at the polyp base for one to two minutes, depending on the size of the polyp segment that was caught. Wide fulguration of the surrounding mucosa was then performed. Submucosal injection of epinephrine was used around the polyp base at the end of the procedure. All patients were discharged after two hour stay in the recovery room.

Results: No immediate or delayed perforations occurred. One patient had immediate bleeding following excision, controlled with hemoclip, requiring the lone admission to the hospital overnight. In four patients we were unable to excise the polyp curatively at initial colonoscopy. One patient age 83 had opted not to do anything further. One patient had another attempt at endoscopic excision at another institution, which also failed, resulting in laparoscopic resection. The other two patients underwent laparoscopic resection. Of patients with successful excision, four patients required colon resection due to invasive carcinoma extending to the margin of resection. Five patients had superficial invasive cancer, 5-20% of the volume of the polyp without submucosal involvement. Ten patients had high grade dysplasia. All patients were followed with another colonoscopy at three months and at one year, and three years hence, colonoscopies were negative. Three patients had recurrences at excision site requiring successful re-excision and fulguration at three months without further recurrences. One patient had recurring polyp with high-grade dysplasia at four years from initial excision and required colon resection due to inability to remove polyp curatively.

Conclusions: Large polypoid lesions of the colon can be successfully curatively excised using endoscopic mucosal resection in the vast majority of cases.

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OPERATIVE SAFETY AND FUNCTIONAL OUTCOME AFTER RESTORATIVE PROCTOCOLECTOMY.

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Purpose: Restorative proctocolectomy has become the procedure of choice for patients with familial adenomatous polyposis (FAP) and ulcerative colitis (UC). The majority of patients obtained satisfactory result but there are still troublesome morbidities can lead to pouch failure and eventually pouch excision. The aim of this study is to investigate morbidities after restorative proctocolectomy and identify morbidity associated factors.

Methods: From January 2006 to December 2014, a total of 49 patients who underwent restorative proctocolectomy were enrolled in this study and their medical records were reviewed retrospectively. The variables included in the analysis were as follow: patients' factors (age, gender, body mass index (BMI), American society of anesthesia (ASA) grade, underlying disease and presence of cancer) and surgical factors (laparoscopic surgery, diverting ileostomy, combined operation, duration of operation, blood loss during surgery and transfusion). Relatively frequent morbidities were selected and categorized for the statistical analysis.

Results: Of 49 enrolled patients, 31 patients (63.3%) were diagnosed as ulcerative colitis (UC), 16 patients (34.7%) as familial adenomatous polyposis (FAP) and 2 patients (4%) as colorectal cancer. In the aspect of surgical modality, 34 patients (69.4%) underwent laparoscopic surgery and 15 (30.6%) patients underwent open surgery. Diverting ileostomy was performed in 40 patients (81.6%) and it was skipped in 9 patients (18.4%). There were 8 patients (16.3%) of leakage related morbidities (anastomotic leakage, pouch stump leakage and ileovaginal fistula) and function related morbidities (intractable diarrhea more than 10 times per day and incontinence), respectively. Pouchitis related morbidities (pouchitis and pouchitis induced stricture) were showed in 8 patients (16.3%). Analyzing the association between these factors and morbidities, patients with ASA grade 2 and 3 showed higher risk of function related morbidity than grade 1 (odd ratio [OR]=9.9; 95% confidence intervals [CI]: 1.1-87.9; p=0.04) and patients who received blood transfusion during operation showed increased risk of pouchitis related morbidities (OR=7.2; 95% CI: 1.4-38.3; p=0.02). Other factors did not show statistically significant result including underlying disease entity (UC or FAP), presence of cancer and surgical modalities (laparoscopic surgery or open surgery and diverting ileostomy formation or not).

Conclusions: Present study showed increased ASA grade was associated with poor functional outcome and blood transfusion during operation was associated with the occurrence of pouchitis. Also, disease entity (UC, FAP and presence of cancer) and surgical modality (laparoscopic surgery, skipping diverting ileostomy) were not associated with pouch related morbidities.

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MULTIFOCAL DIVERTICULITIS: A GENETICALLY BASED DISEASE REQUIRING EXTENDED SURGICAL RESECTION.

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Purpose: The entity we term multifocal diverticulitis (MFD), defined as synchronous or metachronous diverticulitis occurring in different locations within the colon, has not been previously studied. The hypothesis of this

study is that MFD represents a more severe form of diverticulitis that has a genetic predisposition. This study characterized patients with MFD, identifying factors suggesting a genetic basis for this disease as well considerations in its surgical management.

Methods: Abdominal CT and contrast enema studies associated with an ICD-9 code for diverticulitis (2004-2014) were reviewed. Measured clinical variables included age of onset, gender, BMI, comorbidities, family history of diverticulitis, smoking status, pan-diverticulosis, number of episodes, surgical management including the extent of resection and pathology. The presence of pan-diverticulosis, defined as diverticulae extending from the sigmoid to the right colon, and postoperative recurrence of diverticulitis that was remote from the anastomosis was recorded. The splenic flexure defined right versus left-sided disease/surgery. Statistical significance was assessed using Fischer's exact test.

Results: Twenty-eight patients with MFD were identified from 405 cases of radiographically documented episodes of diverticulitis. Mean follow-up since last diverticulitis episode was 42+/-6.5 months, with a mean age of 51+/-2.5 years. MFD patients demonstrated a high incidence of pan-diverticulosis (50%), a positive family history for diverticulitis (25%) and right-sided diverticulitis (25%). Coexisting conditions present among MFD patients, suggesting a possible underlying connective tissue or immunologic disorder, included Ehlers-Danlos (n=1), sarcoidosis (n=2), celiac artery aneurysm (n=1), idiopathic neutropenia (n=1), polymyositis (n=1) and small bowel diverticulae (n=3). All patients had sigmoid diverticulitis plus either left-sided (75%) or right-sided diverticulitis (25%). Nineteen patients (68%) underwent one surgical resection while 3 patients (11%) underwent two surgical resections at separate anesthetics. Pan-diverticulosis was associated with a higher postoperative recurrence rate than those without right-sided disease (60% vs. 25%, p=0.19). Patients initially managed with a segmental resection had a higher recurrence rate (64%), compared to those who underwent an initial extended or sub/total colectomy (20%, p=0.017).

Conclusions: MFD occurs in young patients and is commonly associated with pan-diverticulosis, a positive family history and right-sided diverticulitis, suggesting a genetic basis for MFD. Extended resections were associated with lower postoperative recurrence rates. Patients presenting with MFD and other predisposing clinical features (youthful onset, pan-diverticulosis, positive family history) may require consideration for sub/total colectomy as their initial surgery.

	N (%)	Recurrence rate (%)
Average age of onset	51+/- 2.5	
Gender M/F	10/18	
BMI mean	30+/-0.9	
Pan-diverticulosis	14 (50%)	
Family history	7 (25%)	
Average number of episodes	2.7	
Right-sided episode	7 (25%)	
One surgery	19 (68%)	
Two surgeries	3 (11%)	
Segmental		64%
Sigmoid	10	6
Ileocolic	1	1
Extended resection		20%
Left	9	2
Right	1	0
Sub/total	4	0%

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USING MODIFIED FRAILTY INDEX TO PREDICT SAFE DISCHARGE WITHIN 48 HOURS OF ILEOSTOMY CLOSURE.

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Purpose: Enhanced Recovery Pathways (ERP) allow for safe discharge and optimal outcomes within 48 hours following ileostomy closure surgery. While seemingly straightforward, some ileostomy closure patients have prolonged hospitalized stays. We have previously shown the Modified Frailty Index (MFI), which accounts for comorbidities could help predict patients who will fail discharge after laparoscopic colorectal surgery. We hypothesized MFI could reliably predict safe early discharge following ileostomy closure.

Methods: We performed a retrospective review of 272 patients undergoing ileostomy closure. All patients followed a standardized ERP, and were stratified into early (within 48 hours) versus delayed discharge. The MFI was calculated with a score between 0 and 11 based on the presence or absence of 11 different co-morbidities. Patients were then stratified based on an MFI score of 0, ≤1 or ≤2 as different cut-offs. Logistic regression was performed to identify the relationship between MFI and early discharge.

Results: Overall mean length of stay was 3.64 days (+/-3.23), with 114 patients (42%) discharged within 48 hours, and 158 beyond 48 hours. Gender, mean age, and ASA scores were similar between the early discharge group and delayed discharge group (P>0.2). Univariate logistic regression demonstrated that an MFI=0 was an independent predictor for early discharge within 48 hours (p=0.034), while MFI≤1and MFI≤2 were not. Among all patients, 3 (1.1%) patients needed an ICU stay, 39 (14.3%) patients developed postoperative complications, 1 patient died secondary to peritonitis and 15 (5.5%) patients were readmitted within 30 days. There were 43 (15.8%) minor and 5 (1.8%) major complications for patients overall, with no significant predictive correlation with MFI. Readmission rate within 30 days was 3.2% with an MFI=0, 6.1% for MFI<1, and 5.9% for MFI<2, which was not significantly predictive based on univariate logistic regression (MFI=0: p=0.128; MFI<1: p=0.550; MFI<2: p=0.530).

Conclusions: Patients undergoing ileostomy closure with an MFI=0 are more likely to be suitable for discharge within 48 hours of ileostomy closure surgery than those with a higher MFI without higher readmission rates. This information can be helpful to better manage patient expectations on the duration of inpatient recovery.

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DOES CONVERSION ADVERSELY IMPACT THE CLINICAL OUTCOMES FOR PATIENTS WITH COMPLICATED APPENDICITIS?

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Purpose: The aim of this study was to evaluate the impact of conversion in complicated appendectomy

Methods: Between January 2005 and April 2012, among the 1699 patients older than 16 years who underwent an appendectomy, CA defined as operative findings of gangrenous or perforated appendix with or without abscess formation was confirmed in 207 patients. Patients were divided into three groups; open (OG), laparoscopy (LG), and converted (CG) group. Perioperative outcomes were compared between the three groups.

Results: Thirty-eight patients underwent open surgery. Among the 169 patients who initially tried by laparoscopic surgery, 20 patients (11.8%) were converted. Operation time was significantly longer and estimated blood loss was higher in CG than the others. Overall complications were lower and length of hospital stay (LOH) was shorter in LG than OG and CG. However, there was no difference in overall complication rate and LOH between OG and CG. The operation method was the only factor associated with postoperative morbidity in multivariate analysis.

Conclusions: Meanwhile completion by laparoscopy demonstrated better outcomes than the other two procedures at all levels, open conversion did not increase overall morbidity or LOH compared with open appendectomy. Laparoscopic appendectomy could be used as a first option in the management of CA.

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SAFETY OF LAPAROSCOPIC APPENDECTOMY IN PREGNANCY: MULTI-CENTRE STUDY.

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Purpose: The purpose of this study was to compare the perioperative and obstetric outcomes of pregnant women between laparoscopic surgery and open surgery.

Methods: We included pregnant women who underwent appendectomy between January 2008 and June 2015 at 6 hospitals affiliated to Hallym University.

Results: Of 80 evaluated patients, 24 underwent laparoscopic appendectomy (LA) and 56 underwent open appendectomy (OA). There were no significant differences in the patients' demographic characteristics between the two groups. Gestational age at surgery was similar in both groups. Operation time, time to flatus, and time to soft food intake were similar in both groups. The length of stay was shorter in the LA group than in the OA group (5.1 vs 8.1 days, $P = 0.044$). Gestational age at delivery, birth weight, and delivery type were similar in both groups. There were no significant differences in the rates of preterm delivery, fetal loss, or both obstetric outcomes combined ($P = 1.000$, $P = 0.350$ $P = 0.516$). Multivariable analysis revealed that fever > 38 °C ($P = 0.022$) and maternal age ($P = 0.044$) were independent predictors for poor obstetric outcomes.

Conclusions: This study shows that LA was associated with shorter length of stay compared with OA, but perioperative and obstetric outcomes were similar with both procedures. LA can be safely performed in pregnant women in any trimester.

Predictive factor of obstetric poor outcome

	Univariate analysis		Multivariate analysis	
Variable	OR (95% CI)	P	OR (95% CI)	P
Age > 35 years	2.533 (0.653-9.831)	0.227	5.951 (1.049-33.774)	0.044
BT > 38℃	5.357 (1.369-20.962)	0.010	7.265 (1.331-39.652)	0.022
WBC count > 2 x 103/Ul	2.213 (0.500-9.784)	0.374	3.576 (0.591-21.619)	0.165
Neutrophil > 84%	2.114 (0.531-8.407)	0.356	1.122 (0.207- 6.079)	0.894
CRP > 38 (mg/L)	1.136 (0.275-4.690)	1.000	0.584 (0.105-3.262)	0.540
Complicated appendicitis	1.469 (0.428-5.044)	0.531	1.584 (0.331-7.578)	0.565
Operation time > 60 min	1.307 (0.356-4.796)	0.735	0.598 (0.106-3.388)	0.561
Laparoscopic surgery	1.579 (0.458-5.441)	0.516.	2.011 (0.451-8.963)	0.360

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PERIOPERATIVE COLONIC MOTILITY DEFINED BY HIGH-RESOLUTION MANOMETRY AFTER INTESTINAL SURGERY.

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Purpose: The peri-operative period is associated with profound disturbances in gastrointestinal motility, and can manifest clinically as an ileus. Traditionally, the term ileus is used to describe an absence or reduced intestinal peristalsis, however it is based on very little objective data. This study aims to investigate peri-operative distal colonic motility patterns using high-resolution colonic manometry.

Methods: High-resolution colonic manometry recordings were obtained using a fiber-optic catheter containing 36 sensors spaced at 1cm intervals. The catheter was placed into the sigmoid colon on the morning of surgery via a flexible sigmoidoscopy. Manometry recordings were taken pre-, intra-, and for 18 hours post-operatively. Motor patterns were identified visually. The frequency, amplitude, extent and velocity of these events were calculated using a custom-designed software (PlotHRM). Comparison of variables across the three recording periods was performed using one-way analysis of variance.

Results: We obtained recordings from four patients undergoing right hemicolectomy and one patient undergoing diverting loop ileostomy. The observed changes in motility patterns were consistent across all five patients. Cyclic motor patterns at 2.5-4 cycles/minute were found to be the most dominant motor pattern occupying 19.7% of the pre-operative, 47.4% of the intra-operative, and 89.1% of the post-operative periods. The extent and the amplitude increased significantly after the commencement of surgery and continued post-operatively in both antegrade and retrograde directions ($p<0.001$).

Conclusions: Cyclic motor patterns represent the vast majority of post-operative activity in the distal colon. There is an increase in occurrence, amplitude and extent starting from the intra-operative through to the immediate post-operative period. This suggests an increase in distal colon motor activity rather than paralysis from intestinal surgery.

Features of cyclic motor patterns in the pre-, intra-, and post-operative periods

	Pre-operative	Intra-operative	Post-operative	p-value
Antegrade				
Velocity (cm/s)	1.62±0.99	1.78±1.98	1.52±1.05	0.33
Extent (cm)	5.64±1.66	6.94±1.95	7.29±2.64	<0.001
Amplitude (mmHg)	23.05±15.44	43.96±30.96	32.23±21.75	<0.001
Retrograde				
Velocity (cm/s)	1.49±1.42	1.67±1.27	1.51±0.99	0.41
Extent (cm)	5.98±1.64	7.92±3.55	7.84±2.9	<0.001
Amplitude (mmHg)	23.29±17.07	48.02±32.62	36.87±25.53	<0.001

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PREDICTIVE FACTORS OF OPTIMAL OUTCOMES FOR DIVERTICULAR-ASSOCIATED COLOVESICAL AND COLOVAGINAL FISTULAS.

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Purpose: Colovesical and colovaginal fistulas are complications that can arise from diverticular disease of the colon. Predictors of optimal outcomes remain unclear. We sought to analyze factors associated with successful single stage surgery for these fistulas to better understand the disease process and best management strategy.

Methods: A retrospective review of all patients operated on for diverticular disease in the last 8 years at a county teaching hospital. Those patients with evidence of colovesical or colovaginal fistula were identified for our study. Data abstracted included demographics, presentation, and treatment.

Results: There were 152 patients operated on in the study period with diverticular disease. Forty-eight (32%) patients had an associated colovesical fistula, and 7 (5%) had a colovaginal fistula. Of the patients presenting with colovesical fistula: 98% had evidence of urinary tract infection, 87% had pneumaturia, 72% fecaluria, 39% hematuria, and 31% dysuria. Surgical outcome was assessed by comparing patients that were diverted for any reason (32%), against those that had a primary anastomosis without diversion (68%) (Table). Of the patients requiring diversion, 5(28%) were diverting ostomies to protect a low anastomosis, while the remaining 13(72%) were end ostomies. There were no major complications in either group. Thirteen percent of all fistulas were unable to be taken down, reasons being emergent presentation and extensive sigmoid, bladder, and rectal involvement.

Conclusions: A majority of the fistula patients underwent resection and primary anastomosis without fecal diversion. Factors associated with requiring diversion included patients presenting urgently with complicated disease, having a colovaginal fistula, and requiring en bloc resections. Patient demographics and a history of diverticulitis, pelvic abscess, or intraluminal stricture were not predictive of requiring diversion. Our review suggests that elective surgery particularly for colovesical fistulas can be amenable to a single stage operation with excellent outcome.

	All patients n=55	Patients with Primary anastomosis n=37	Patients with diversion n=18	P-Value
Type of fistula, n(%)				.03
Colovesical fistula	48(87%)	35(95%)	13(72%)	
Colovaginal fistula	7(13%)	2(5%)	5(28%)	
Demographics				
Age, median(SD)	52.7(13.1)	51(12)	56(15.5)	.45
Male sex, n(%) (colovesical fistula only)	32(58%)	24(69%)	8(62%)	.74
BMI, median(SD)	29(5.4)	29(5.5)	29(5.4)	.94
Presentation				
Months from diagnosis to surgery, mean(SD)	19(26)	20.1(27.5)	16.5(24.3)	.63
History of pelvic abscess, n(%)	24(44%)	14(39%)	10(56%)	.26
Previous admission for diverticulitis, n(%)	35(64%)	24(65%)	11(61%)	1.0
Incomplete colonoscopy due to stricture, n(%)	25(45%)	17(46%)	8(44%)	1.0
Complicated presentation*, n(%)	7(13%)	0	7(39%)	**<.05**
Surgical Treatment, n(%)				
Low anterior resection	11(20%)	8(22%)	3(17%)	1.0
Sigmoidectomy	40(72%)	30(81%)	10(55%)	.06
Minimally invasive approach**	7(13%)	6(16%)	1(6%)	.40
Conversion to open (if applicable)	5(71%)	4(67%)	1(100%)	1.0
En bloc resection of additional organs†	9(16%)	2(5%)	7(39%)	**<.05**

* Includes patients with peritonitis or large bowel obstruction that had an urgent operation
** There were 3 cases attempted laparoscopically and 4 robotically
† Includes small bowel, uterus, ovaries, and vagina

Table, Characteristics of surgical outcome

P78

IMPROVED OUTCOMES FOR *CLOSTRIDIUM DIFFICILE* COLITIS IN PATIENTS WITH PRE-EXISTING OSTOMY: BAG TO DIFFER?

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Purpose: Recent literature suggests alternatives to total colectomy for treating severe *Clostridium difficile (C. diff)* colitis. We hypothesized that the presence of a pre-existing ostomy improves outcomes for patients with *C. diff* infection.

Methods: Utilizing the 2008-2012 National Inpatient Sample (NIS), we examined patients with *C. diff* colitis to evaluate the effects of an ostomy on mortality, length of stay (LOS), occurrence of septic shock, and need for total colectomy. Patients with the diagnosis of *C. diff* were stratified into ostomy vs. no ostomy groups. The ostomy group was further stratified into patients with an ileostomy and colostomy. Univariate and multivariate analyses were performed for the 4 outcomes while accounting for 11 characteristics and 3 ostomy statuses.

Results: A total of 359,099 patients were identified as having *C. diff*, of which 3,714 patients had a pre-existing ostomy (945 ileostomy and 2,769 colostomy). Certain clinical characteristics between the groups were modestly different (Table 1). Univariate analyses showed that patients with pre-existing ostomy were hospitalized shorter (9.79±12.0 vs 12.18±15.7 days, p<0.001), had lower rate of total colectomy (0.14% vs 0.47%, p=0.001), had decreased rates of septic shock (7.14% vs 8.08%, p=0.034), and had lower mortality (4.42% vs 8.42%, p<0.001). Adjusted odds (aOR) of mortality favored patients with pre-existing ileostomy (aOR=0.47, p<0.001) and colostomy (aOR=0.57, p<0.001) as compared to those without any ostomy. LOS was shorter in both ileostomy (-2.98±0.49 days, p<0.001) and colostomy (-2.96±0.29 days, p<0.001) groups as compared to the no ostomy group. Patients with a colostomy had a significant reduction in odds (aOR=0.232, p=0.012) of undergoing a total colectomy when compared to patients without an ostomy. A similar non-significant trend was observed among ileostomy patients (aOR=0.451, p=0.262). There was a non-significant reduction in odds for incidence of shock for both ileostomy (aOR=0.775, p=0.062) and colostomy groups (aOR=0.882, p=0.089) compared to the no ostomy group. We performed a sensitivity analysis by removing 2,610 patients with a history of remote bowel resection: no significant impact on analyses was seen and conclusions remained robust.

Conclusions: Presence of a pre-existing ostomy is associated with significantly better outcomes in *C. diff* colitis when compared to patients without an ostomy. Patients with a stoma had less incidence of death, shorter LOS, less incidence of septic shock, and were less likely to need total colectomy during their hospitalization. Further studies based on more accurate data sources are needed to validate the seemingly protective effects of stomas in the setting of *C. diff* colitis.

Table 1. Univariate analysis of C. diff patient characteristics and outcomes separated by ostomy status.

	No Ostomy	Ostomy	P-value
No. of Patients with C. diff	355,385	3,714	
Age in years(mean ± SD)	67.5 ± 19	63.6 ± 18	<0.001
Sex (% female)	57.89%	54.15%	<0.001
Admission Type (% elective)	12.76%	10.08%	<0.001
Preop Comorbidities (mean ± SD)	6.24 ± 3.3	6.95 ± 3.0	<0.001
Smoking (no. of patients [%])	28,460 (8.01%)	394 (10.61%)	<0.001
Total Colectomy (no. of patients [%])	1,667 (0.47%)	5 (0.14%)	0.001
LOS in days (mean ± SD)	12.18 ± 15.7	9.79 ± 12.0	<0.001
Death (no. of patients [%])	29,903 (8.42%)	164 (4.42%)	<0.001
Septic shock (no. of patients [%])	28,729 (8.08%)	265 (7.14%)	0.034

P79

THE VANCOUVER OUTPATIENT ILEOSTOMY CLOSURE SUITABILITY (VOICES) SCORE: A PREDICTIVE MODEL TO FACILITATE OUTPATIENT CLOSURE ILEOSTOMY SURGERY.

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Purpose: The majority of patients who undergo elective ileostomy closure do not experience any form of postoperative complication. Thus, the need for admission to hospital has been questioned. Current readmission rate after ileostomy closure is approximately 15% based on large case series. The purpose of this study is to develop a predictive model to identify patients who are candidates for day-case surgery after ileostomy closure that would not lead to substantially higher readmission to hospital or serious complication.

Methods: All consecutive patients who underwent elective ileostomy closure at a single quaternary colorectal surgery hospital between January 2007 and May 2015 were identified retrospectively. We identified patients who appeared safe for discharge on the day of surgery (DDS) if they met the following criteria: length of stay of less than five days, no post-operative complication, no postoperative ileus and no readmission. Using demographic and surgical data, we performed stepwise backward elimination logistic regression to identify the predictors of the outcome and build a simplified predictive model. Receiver operating characteristic (ROC) curves were created with these criteria and a scoring model to maximize specificity; in other words, the score targeted a predicted hospital readmission rate as close to the current rate of 15% reported in the literature.

Results: During the study period, ileostomy closure was performed on 495 patients of which 228 met all DDS criteria. Regression analysis identified 6 variables predictive of DDS: age less than 70, ASA 1/2, non-IBD pathology in original surgery, pelvic pouch surgery, operative time < 75 minutes and absence of significant adhesions at surgery. The model created has a Brier score of 0.065, and a C statistic of 0.636. A 10-point scoring system was developed where a score of 8 or higher was associated with an expected readmission rate of approximately 19%.

Conclusions: The VOICeS score was developed with the objective to correctly identify patients who would benefit from an outpatient ileostomy closure procedure by excluding patients at risk of a complicated post-operative course. The next step is to validate this score in another cohort of closure ileostomy patients.

P80

IMPACT OF PRIOR SURGERY ON SHORT-TERM OUTCOMES OF COLORECTAL SURGERY.

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Purpose: Previous surgery is currently not listed in determinants of severity of illness but likely influence surgical complexity and hence outcomes following colon resection. **Aim:** To evaluate the influence of previ-

ous surgical procedures on peri-operative outcomes in terms of complications for colorectal resection.

Methods: Patients who underwent colorectal resection from August 2006 – August 2015 were identified from an outcomes database. Clinicopathological, intra-operative and peri-operative outcomes were compared for patients who underwent colorectal resection without (group A) and with (group B) a history of previous abdominal procedures.

Results: Of 642 patients, 280 did not have previous abdominal surgery (group A) while 362 (group B) had previous abdominal operations. Median age of the groups (A = 67 vs 79 years, p = 0.272) was similar but more patients in group A were male (59% vs 41.7%, p < 0.001) and underwent laparoscopic surgery (81.4% vs 41.7%, p < 0.001). Conversion rate was higher in group B (B: 22.9% vs A: 9.4%, p < 0.001) patients undergoing laparoscopy. Median blood loss (A = B: 100 ml, p = 0.727), and risk for enterotomy (A: 2.2% vs B: 4.8%, p = 0.083) were similar. Post-operatively, ileus (A: 19.3% vs B: 21.3%, p=0.536), anastomotic leak (A: 1.1% vs B: 1.1%, p=0.968), and mortality (A: 0.7% vs B: 1.1%, p=0.61) were similar. Group B had significantly greater rates of intra-abdominal abscesses (A: 0.4% vs B: 3%, p = 0.013), superficial wound infections (A: 0.7% vs B: 5%, p = 0.002) and postoperative septic episodes (A: 1.8% vs B: 4.7%, p = 0.044). Group B patients also had significantly longer hospital stay (A: 2 vs B: 15 days, p =0.002). There was no difference in the rate of re-admission (p=0.396).

Conclusions: Previous surgery significantly impacts postoperative outcomes after colorectal resection. Unless previous operation is factored into determinants of operative severity, current assessments of outcomes and quality that could determine reimbursement and reputation will negatively impact individuals and institutions that participate in a high proportion of complex reoperative surgery.

P81

CROHN'S COLITIS: WHAT IS THE PREFERRED MANAGEMENT? SEGMENTAL, SUBTOTAL OR TOTAL COLECTOMY: AN ANALYSIS OF OUTCOMES AND RECURRENCE.

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Purpose: The objective of this study is to evaluate short-term and long-term outcomes including recurrence rates in patients with colonic Crohn's disease who underwent segmental, subtotal and total colectomies.

Methods: We retrospectively analysed the medical records from 171 patients admitted to our institution between 1995-2013 with the diagnosis of Crohn's colitis. Patients with indeterminante colitis and who had Crohn's disease in other parts of the intestine were excluded. Patients were identified by searching the Crohn's disease and surgical procedure database of our institution. Comparison is made between those who were surgically managed (segmental, subtotal and total colectomies) and their perioperative and long term outcomes including recurrence and quality of life (QOL). QOL assessment is performed using the validated Cleveland Global Quality of Life score, which includes 3 items: current QOL, current health (QOH), and current level of energy, each measured on a scale of 0 to 10 (0 worst,10 best). The scores are added and the final Cleveland Global Quality of Life utility score is obtained by dividing the resulting number by 30 (range 0-1); 0 worst, 1 best. Patients who underwent reoperation for recrudescence were regarded as having a recurrent disease.

Results: 171 patients underwent surgery. 57% were females, with a mean age for all patients of 44+/-15.0 years old, mean BMI 24+/-7.8 kg and the mean follow up period was 28 months. Location of Crohn's colitis were: rectum 16%, right colon 12%, left colon 18%, transverse 6%, pancolitis 28% and perianal 20%. Comparison was made between the types of operations (segmental resections, subtotal colectomies + ileorectal, and total colectomy + End Ileostomy) as shown in table. Forty nine (29%) patients underwent segmental resections, 33 (19%) patients underwent total colectomy with end ileostomy and 89 (52%) underwent subtotal colectomy with ileorectal anastomosis. 2.9% had surgical recurrence (3 patients from the segmental and 2 from the STC+IRA) which was not statistically significant ***(p=<0.06)***. We compared the CC Global scores among these 3 groups which includes scores quality of health, energy and life which had an mean overall score of 0.62+/-0.24 and was not statistically significant ***(p=<0.52)*** as shown in table.

Conclusions: All 3 procedures produce similar quality of life scores for colonic Crohn's disease. Even though surgical recurrence was higher among segmental resections this did not achieve statistical significance. All 3 procedures were equally effective in treating Colonic Crohns's with similar peri-operative and long term outcomes. If feasible, segmental resection is justified for Crohn's colitis.

Demographics, Recurrence, and Quality of life among 3 different surgeries

Factor	Total (N=171)	Segmental resection (N=49)	Total colectomies (N=33)	Subtotal colectomies (N=89)	p-value
Gender					0.53
Male	74 (43.3%)	24 (49%)	15 (45.5%)	35 (39.3%)	
Female	97 (56.7%)	25 (51%)	18 (54.5%)	54 (60.7%)	
Site					<0.001
Right Colon	20 (11.7%)	12 (24.5%)	5 (15.2%)	3 (3.4%)	
Transverse	10 (5.8%)	1 (2%)	6 (18.2%)	3 (3.4%)	
Left Colon	31 (18.1%)	21 (42.9%)	7 (21.2%)	3 (3.4%)	
Rectum	28 (16.4%)	4 (8.2%)	2 (6.1%)	22 (24.7%)	
Pancolitis	48 (28.1%)	2 (4.1%)	11 (33.3%)	35 (39.3%)	
Perianal	34 (19.9%)	9 (18.4%)	2 (6.1%)	23 (25.8%)	
Time between 1st operation and recurrence (yrs)	2.6±2.2	3.1±2.6	4.0±3.2	2.0±1.4	0.1
Surgical Recurrence	5 (2.9%)	3 (6.1%)	0 (0%)	2 (2.2%)	0.06
Dietary restriction					0.16
No	71 (54.6%)	18 (46.2%)	11 (45.8%)	42 (62.7%)	
Yes	59 (45.4%)	21 (53.8%)	13 (54.2%)	25 (37.3%)	
Social restriction					0.82
No	91 (70%)	27 (69.2%)	15 (65.2%)	49 (72.1%)	
Yes	39 (30%)	12 (30.8%)	8 (34.8%)	19 (27.9%)	
Work restriction					0.95
No	79 (62.2%)	22 (61.1%)	15 (65.2%)	42 (61.8%)	
Yes	48 (37.8%)	14 (38.9%)	8 (34.8%)	26 (38.2%)	
Sexual restriction					0.58
No	82 (66.1%)	27 (73%)	14 (63.6%)	41 (63.1%)	
Yes	42 (33.9%)	10 (27%)	8 (36.4%)	24 (36.9%)	
Quality of health (QOH)	6.7±2.1	6.6±2.1	7.1±2.2	6.6±2.1	0.59
Energy level	5.8±2.1	5.8±2.0	6.2±2.1	5.7±2.3	0.62
Quality of life (QOL)	7.0±2.1	6.8±2.4	7.1±2.3	7.2±1.9	0.73
Cleveland Clinic Global Score	0.62±0.24	0.62±0.23	0.67±0.21	0.60±0.25	0.52

P82

IMPACT OF PREOPERATIVE TACROLIMUS ON THE POSTOPERATIVE COURSE IN PATIENTS WITH ULCERATIVE COLITIS.

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Purpose: Tacrolimus (TAC), a calcineurin inhibitor, is an immunosuppressive agent used for the treatment of corticosteroid-refractory ulcerative colitis (UC). TAC has excellent short-term efficacy; however, nearly 50% of patients eventually require surgery. The purpose of this study was to evaluate the influence of pre-operative TAC on surgical complications after restorative total proctocolectomy for UC.

Methods: Seventy-five patients underwent restorative total proctocolectomy with mucosectomy for UC at Hiroshima University Hospital between January 2009 and December 2014. Thirty-six patients who underwent total colectomy as initial surgery (3-stage surgery) were enrolled in the study retrospectively. Patient demographics, peri-operative factors, and post-operative complications were reviewed. The patients who were treated with TAC pre-operatively (TAC+ group) were compared to patients who were not treated with TAC (TAC- group).

Results: This analysis included 23 men and 13 women. The median age at the time of surgery was 51 years (range, 19-73 years). The median pre-

operative Mayo score was 10 (interquartile range [IQR], 8.75-12), and the median serum albumin level was 2.5 mg/dl (IQR, 1.9-3.2 mg/dl). The median pre-operative dose of corticosteroids was 20 mg/day (IQR, 6.25-47.5 mg/day) and the median total dose of corticosteroids was 3580 mg (IQR, 1292-5000 mg). Of the 36 patients, 11 (30.6%) received TAC before the initial surgery and 1 patient received a infliximab in the TAC- group. There were no differences between the two groups with respect to pre-operative characteristics and clinical activity. The median operative times, blood loss, and length of post-operative hospitalization in the TAC+ and TAC- groups were 161 and 156 min, 190 and 100 ml, and 16 and 21 days, respectively. In the TAC+ group, surgical site infections, abdominal abscesses, and small bowel obstruction occurred in 3 patients each (27.3%). There were no statistically significant differences in the post-operative complications between the TAC+ and TAC- groups.

Conclusions: The pre-operative administration of TAC did not have a negative impact on the post-operative course in patients with UC who underwent a total colectomy.

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PREOPERATIVE OPTIMIZATION OF PATIENTS WITH INFLAMMATORY BOWEL DISEASE UNDERGOING GASTROINTESTINAL SURGERY: SYSTEMATIC REVIEW.

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Purpose: Surgical management of inflammatory bowel disease (IBD) is a challenging task. The aim of preoperative optimization (PO) is to ensure that the patient can get the maximum benefit and the minimum risk upon surgical intervention. Only few reviews addressed the issue of PO in IBD patients. These studies lacked clear-cut guidelines and recommendations. The purpose of this study was to review and grade the available evidence, attain clear recommendations and point out the needed studies in the future.

Methods: Studies were identified searching electronic databases (MEDLINE, Embase and Cochrane library), scanning of reference lists in relevant papers and corresponding with experts in the field. All studies published between 1th of January 2005-31st of July 2015 considering PO of IBD patients were included. Ten PO factors were studied.

Results: Management of IBD patient is a multidisciplinary task. All IBD patients admitted to a surgical ward should be screened for malnutrition and treated accordingly. Thrombosis prophylaxis should be given prior to surgery and four weeks after operation. All patients with sepsis should be investigated to determine and treat infection focus. Percutaneous drainage is the preferred treatment for intra-abdominal abscesses. Single dose prophylactic antibiotics one hour prior to surgical intervention is golden standard however antibiotics can be beneficial if given preoperatively. Smoking cessation is advisable. Continuity in patient-doctor relationship is highly recommended. Mechanical bowel preparation is not supported by evidence. Steroids withdrawal should be attempted and steroid stress dose is not recommended. Thiopurines appear to be safe but it may be prudent to plan the procedure remotely from the last dose of an anti-TNF agent. Comorbidities must be treated accordingly prior to surgical intervention.

Conclusions: There is strong evidence regarding few elements of PO but better designed studies are needed for other elements.

Summary of recommendations and evidence level for optimizing IBD patients to surgical intervention

Preoperative optimization	Recommendation	Level of evidence
Nutrition	• Screening for malnutrition with a validated screening test for example NRS-2002. • Nutrition care plan for those at risk. Preferably EN if possible. • The goal for nutrition support is NRS-score ≤ 2.	III
Thrombosis prophylaxis	• Anticoagulants should be given to all patients with no obvious risk of bleeding. • If possible anticoagulants should be given four weeks postoperatively • Compression stockings should be used as long as the patient is immobilized unless there is peripheral vascular disease.	III
Treatment of preoperative sepsis	• Intra-abdominal abscess should be drained percutaneous using ultra-sound or CT guidance. • Surgical intervention should be postponed until the patient is out of the sepsis condition.	III
Prophylactic antibiotics	• Preoperative use of antibiotics 24-72 hours prior to operation • Single dose combined antibiotics one hour prior to surgical intervention.	Ia for single dose, III for longer duration
Smoking cessation	• Smoking stop is advisable when the patient is booked for elective surgery.	III
Psychological intervention	• Establishing a continuity in patient-doctor relationship is recommended.	IV
Mechanical Bowel preparation	• Not supported by evidence.	III
Pharmacological considerations	• Steroid withdrawal is highly recommended. • Steroid stress dose is not recommended. • Thiopurines appear to be safe. • For elective surgeries, it may be prudent to plan the procedure remotely from the last dose of an anti-TNF agent, although the recommended duration of such delay is unclear.	Ia for steroid withdrawal, Ib for steroid stress dose, IIb for cessation of other medications.
comorbidity	• Must be investigated and treated accordingly prior to surgery.	III
Multi-disciplinary team approach	• Highly recommended	III

P84

DO RESULTS OF SALVAGE ILEOANAL J-POUCH SURGERY IMPROVE OVER TIME.

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Purpose: The objective of this study was to evaluate the outcomes of abdominoperineal salvage attempts for ileoanal J-pouch related complications.

Methods: A retrospective review of a prospectively maintained, IRB-approved database was performed for all patients with an abdominal, perineal, or combined approach to a salvage procedure for an ileoanal J-pouch. Cases were identified by CPT codes. Exclusion criteria included patients in whom the original pouch was resected with no attempt at salvage or in whom a new ileoanal J-pouch was placed. Demographic, disease-specific and procedural variables were collected. The primary outcome was based on the patient-centered variable of pouch-salvage without permanent end-stoma. Secondary outcomes included the need for and number of post-salvage procedures.

Results: 61 patients, 52% female, of a mean age 32 years presented with pouch-related complications necessitating an abdominal or perineal salvage procedure between 1992 and 2014. 53 (87%) patients had an initial diagnosis of ulcerative colitis, of whom 15 (28%) patients were diagnosed as Crohn's disease following pouch salvage; the remaining 8 (13%) patients had a diagnosis of Familial Adenomatous Polyposis. The most common indication for surgery was pouch-related fistula in 64% of patients, of whom 8 (13%) had a pouch-vaginal fistula; anastomotic and pouch-related strictures occurred in 13 patients (21%). The most common procedure was pouch advancement (62%), followed by pouch revision (38%). 9 abdominal procedures were performed laparoscopically. A "perineal-only" approach was performed in 18 patients (30%), whereas a combined abdominoperineal or abdominal-only approach was necessary in 36 (59%) and 7 (11%) of patients, respectively. The presence of pouch-related fibrosis or abscess was more significantly associated with requiring an abdominal incision ($p<0.002$). A rectal mucosectomy was performed in 44% of patients. A repeat procedure was necessary in some patients, varying from an instilla-

tion of glue in a residual tract to re-advancement of the pouch. The overall success rate of treatment was 71%. A significant increase in the success rate was demonstrated over the study cohort when comparing earlier with later procedures performed (**Figure 1**; 57% vs. 84% p=0.02). In a multivariate analysis, procedures performed after 2007 were predictive of success of salvage surgery (OR 11.1, 1.5-83.4; p=0.03).

Conclusions: Salvage procedures to conserve the original pouch in patients with an ileoanal J-pouch are associated with improved success rates over time, increasingly allowing for the avoidance of a permanent ileostomy.

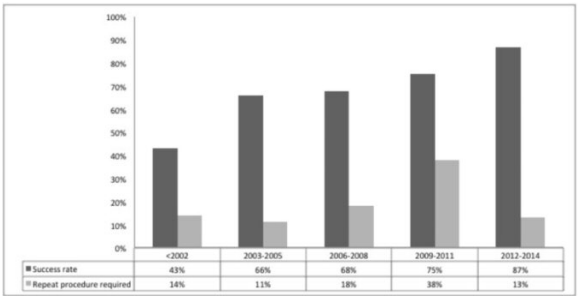

Figure 1. Trends in success rates for ileoanal J-pouch salvage procedures. An increasing trend over time was noted (p=0.02).

P85

IS MODERN MEDICAL MANAGEMENT CHANGING ULTIMATE PATIENT OUTCOMES IN INFLAMMATORY BOWEL DISEASE?

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Purpose: Medical management of inflammatory bowel disease (IBD) is constantly evolving to achieve the goal of avoiding surgery. The medication armamentarium expanded in the last decade with the approval and widespread use of biologic medications. What remains unclear is the ultimate impact of modern medical management on disease progression and surgical necessity. We hypothesized that surgery rates have decreased while surgical outcomes have worsened due to operating on "sicker" patients since the introduction of biologic medications.

Methods: The Nationwide Inpatient Sample (NIS; 2003-2012) and ICD-9-CM codes were used to identify inpatient admissions for Crohn's disease (CD) and ulcerative colitis (UC). Linear regression analysis was performed to determine the ratio of admissions to surgeries over the study period. Subgroup analyses were performed to determine rates of poor nutritional status ("abnormal loss of weight," "underweight," "adult failure to thrive," and "malnutrition") at the time of surgery and rates of postoperative complications (anastomotic leak, wound disruption, other postoperative infection).

Results: Out of 191,743 admissions for IBD during the study period, 120,044 had CD and 71,699 had UC. IBD surgery rates decreased over the study period, from 18% of admissions in 2003 to 15% in 2012 (P<0.001). This held true in both CD (18% vs. 15%; P<0.001) and UC (17% vs. 15%; P<0.001). The overall rate of poor nutritional status increased 76% between 2003 and 2012 (6.6% in 2003 vs. 11.3% in 2012; P<0.001), and was higher in those patients who underwent surgery (11.8% vs. 8.5%; P<0.001). Poor nutritional status in surgical patients increased by 73% (8.6% in 2003 vs. 14.9% in 2012; P<0.001), with a 67% increase (9.3% in 2003 vs. 15.4% in 2012) in UC and an 83% increase (8.6% in 2003 vs. 14.9% in 2012) in CD. Rates of postoperative anastomotic leak (10.2%-13.9%) and wound disruption (1.0%-1.7%) fluctuated, but were overall unchanged over the years. Rates of "other postoperative infection" were stable over the time period, ranging from 4.6% to 6.8%; P>0.1. These trends were similar in all groups, although CD had higher overall rates of leak (11.9% VS 10.4%; P<0.001) and lower overall rates of wound disruption (1.1% vs 1.7%; P<0.001) and "other postoperative infection" (5.0% VS 6.4%; P<0.001) than UC.

Conclusions: Rates of IBD surgery have decreased, and postoperative surgical and infectious complications have remained stable or decreased since the implementation of biologic therapies . Nevertheless, we have seen a significant increase in poor nutritional status in the entire cohort, to include patients who ultimately require surgery. Additional research is needed to determine the nature of the link between modern medical management and poor nutrition in IBD patients, as well as the overall impact on patient livelihood.

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DOES PREOPERATIVE CLOSTRIDIUM DIFFICILE INFECTION AFFECT POUCH OUTCOMES IN PATIENTS WITH ULCERATIVE COLITIS WHO UNDERGO ILEAL POUCH-ANAL ANASTOMOSIS?

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Purpose: The operation of choice for patients with ulcerative colitis (UC) is restorative proctocolectomy and ileal pouch-anal anastomosis (IPAA).Pouchitis is the most common pouch related postoperative complication, and while the etiology is not well understood, the majority of patients respond to antibiotic therapy suggesting an infectious or inflammatory etiology.*Clostridium difficile* infection (CDI), occurs more frequently in UC patients than the general population and can lead to disease flares and higher rates of colectomy We sought to determine the contribution of pre-colectomy CDI to post IPAA pouchitis.

Methods: IRB approval was obtained for retrospective review of patients undergoing IPAA at a quatenary referral center between 2000-2015.Patients with a diagnosis of CDI within 90 days of colectomy who underwent IPAA comprised the study cohort.The primary outcome measure was the presence of pouchitis following IPAA.Secondary outcomes included post-operative pouch morbidity including stricture, fistula, sinus tract, anastomotic leak, and pelvic abscess. Univariate analysis was used to determine differences within preoperative, operative and postoperative variables. A Cox proportional hazard model was used to model time to pouchitis versus other variables individually.

Results: 53 study patients and 53 case control patients were included.On univariate analysis, there was no significant difference in demographics, tobacco use, presence of primary sclerosing cholangitis,anastomotic leak, early pouch failure, or pouch excision However, patients with pre colectomy CDI were younger (p=0.005), more likely to have medically refractory disease (p<0.001), used biologics prior to colectomy (p<0.001), and have 3 versus 2 surgical stages for IPAA (p=0.001).CDI of the pouch was not found to be different (p=0.5) among study patients and control patients with a rate of 14.3% and 6.7%, respectively.The primary outcome variable "CDI within 90 days of colectomy" was not significantly associated with increased risk of pouchitis following IPAA (hazard ratio [95% CI] = 1.291 [0.758, 2.200]) The median time to pouchitis among patients with pre colectomy CDI versus without was 453 and 783 days respectively In order to achieve 80% power to prove a negative association between pre colectomy CDI and presence of pouchitis following IPAA, more than 200 cases and nearly 1000 controls would be necessary.

Conclusions: Our findings suggest there is no relationship between preoperative CDI and post-IPAA pouchitis.This is reassuring given a high proportion of patients presenting for elective, urgent or emergent colectomy in the setting of UC have concomitant CDI.A clinical trial to 'prove' a negative association would be unrealistic given the number of patients required to power such a study.

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PROGNOSIS OF ULCERATIVE COLITIS ASSOCIATED COLORECTAL CANCER COMPARED TO SPORADIC COLORECTAL CANCER: PROPENSITY SCORE MATCHING ANALYSIS.

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Purpose: Ulcerative colitis (UC) harbor high risk of UC-associated colorectal cancer (UCCC). Which is the first and foremost important cause for morbidity and mortality in patients with inflammatory bowel diseases (IBD). UC patients are known to have higher rates of multifocal tumors, and mucinous or signet ring cell carcinomas which is associated with poor prognosis. However, because of the low prevelance, little is known about prognosis differences between sporadic colorectal cancer (SCC). In this study, we compared UCCC and SCC in term of long-term outcome and recurrence rate with using propensity score matching analysis.

Methods: Propensity score matching was done with 32 cancer associated-UC patients in 1:2 matching method. Sex, age, body mass index, tumor stage, histology, preoperative CEA level and adjuvant treatment status were matched each other. Total sixty-nine patients retrieved from our database in retrospective manner between 2003 and 2014. These patients had undergone either oncological segmental resection or total proctocolectomy in both sporadic or colitis associated colorectal cancer.

Results: Out of 96 patients, 64 (66.6%) patients developed sporadic cancer (SC), whereas 32 (33.3%) patients had UC associated colitis cancer (UCCC). Patient's characteristics, age, sex, pathological stage and MSI were similar in both groups. Tumor size ranged from (4.4 ± 2.6) in SC to (4.73 ± 2.4) in UCCC arm without significant differences. Adjuvant chemotherapy has given equally to both groups. Majority of cancer location found in rectum, rated at 21 (32.8%) and 16 (50%) respectively. Most patients presented with stage III cancers, reported at 21 (32.8%) and 14 (43.8%) in SC and UCCC respectively. Greater rate of total harvested lymph nodes retrieved in UCCC rated at (42.5 ± 45.4) compared to (28.9 ± 25) in SC (p =0.130). However, positive lymph node counts were similar in both arms (p=0.806). Relatively higher overall recurrence rate shown in UCCC reported at 21.9% vs. 18.8% in SC group without statistical significance. (p=0.717). However, there were no significant differences between both arms, neither in 5-year disease free survival (74.8% vs 79.7%, p=0.933) nor 5-year overall survival. (78.1% vs 86%, p=0.135)

Conclusions: Despite UC associated cancer may have more considerable underlying risk factors, with relatively higher recurrence rate, overall survival and disease free survival were similar with sporadic colorectal cancer. As this study is experience of single institution, further study may be needed.

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CONTEMPORARY INDICATIONS AND LONG-TERM OUTCOMES OF ILEORECTAL ANASTOMOSIS VS. INTENTIONAL ILEAL POUCH-ANAL ANASTOMOSIS FOR CROHN'S DISEASE: ARE THEY REALLY ALTERNATIVES?

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Purpose: Total abdominal colectomy with ileorectal anastomosis (IRA) is the traditionally accepted restorative surgical option for diffuse Crohn's disease (CD) colitis in the presence of a suitable rectum. Intentional ileal pouch-anal anastomosis (IPAA) has been proposed for a select group of patients having diffuse colorectal CD without anoperineal or ileal disease. The aim of this study was to evaluate the contemporary indications and outcomes of IRA compared with intentional IPAA.

Methods: Patients undergoing IRA vs. intentional IPAA with preoperative CD diagnosis identified from institutional databases between 1992 and 2013 were compared with respect to demographics, clinical variables, functional outcomes, and quality of life. Rates of surgical recurrence, indefinite stoma diversion, and proctectomy/pouch excision with end ileostomy were assessed using the Kaplan-Meier method and log-rank test.

Results: Seventy five patients underwent IRA and 32 patients underwent intentional IPAA. The overall median follow-up of all patients was 3.49 (interquartile ratio [IQR], 1.19-8.78) years. Patients undergoing IRA were older and had longer interval between diagnosis and surgery than those receiving IPAA. There were also significant differences with regard to indication for surgery, preoperative use of immunomodulators, and postoperative use of biologics. The number of hospital admissions following intentional IPAA was significantly increased when compared with IRA albeit during a significant longer follow-up (7.95 (IQR, 1.8-12.18) vs. 2.92 (IQR, 1.14-6.2), P=0.001 for IPAA and IRA, respectively). While functional defecatory outcomes were comparable, reported quality of life 3 years after surgery was significantly better in IPAA patients than in patients with IRA (0.9 (IQR, 0.76-0.96) vs. 0.63 (IQR, 0.53-0.8), P=0.002). Patients with intentional IPAA were associated with significantly lower cumulative rates of surgical recurrence (HR=0.28; 95% CI: 0.09-0.84; P=0.017), indefinite stoma diversion (HR=0.35; 95% CI: 0.13-0.99; P=0.039), and pouch excision with end ileostomy (HR=0.27; 95% CI: 0.07-0.96; P=0.030) than those with IRA (table).

Conclusions: There are substantial differences between contemporary patients selected to have IRA vs. intentional IPAA for CD, which are rarely realistic alternatives. Long-term follow-up confirms intentional IPAA as an acceptable option in selected patients with CD.

Demographics, clinical characteristics and outcomes

Variables	IRA, N=75	IPAA, N=32	P value
Male	36 (48.0%)	12 (37.5%)	0.32
Age at Surgery	41.9± 5.0	34.3±11.9	0.018
Disease Duration	12.5±10.3	7.5±7.0	0.017
Body mass index	29.9±24.7	23.6±3.4	0.12
Current smoking	17 (22.7%)	7 (29.2%)	0.18
Family history of IBD	12 (16.0%)	7 (28.0%)	0.24
Extraintestinal manifestations	11 (14.7%)	4 (16.0%)	0.99
Prevailing indication for surgery			
Medically refractory disease	22 (29.3%)	23 (74.2%)	<0.001
Stricturing or penetrating disease	43 (57.3%)	7 (22.6%)	
Dysplasia or cancer	10 (13.3%)	1 (3.2%)	
Stapled anastomosis	65 (86.7%)	27 (87.1%)	0.99
Postoperative use of biologics	27 (36.0%)	3 (9.7%)	0.011
Postoperative use of steroids	39 (52.0%)	14 (45.2%)	0.52
Number of hospital admissions*	0 (0-1)	1.5 (0-3.25)	0.001
IRA or pouch-associated hospital admissions#	22 (29.3%)	16 (50.0%)	0.043
Cleveland Global Quality of Life Scores (Overall scores)			
1 year	0.7 (0.6-0.8)	0.8 (0.7-0.8)	0.25
3 year	0.6 (0.5-0.8)	0.9 (0.7-0.9)	0.002
5 year	0.7 (0.47-0.8)	0.8 (0.7-0.9)	0.022
Most recent	0.7 (0.5-0.8)	0.8 (0.6-0.9)	0.1
Functional outcomes			
Pads (Rarely/never)	8 (47.1%)	16 (72.7%)	0.11
Fecal Incontinence (Rarely/never)	4 (30.8%)	11 (52.4%)	0.22
Urgency to defecation (Rarely/never)	12 (57.1%)	19 (82.6%)	0.07
Bowel movement total	5 (4-7)	5.5 (3-7.8)	0.92
Bowel movement daytime	4 (2-5)	4 (3-5.8)	0.77
Bowel movement night	2 (1-2.8)	1.5 (0-2.8)	0.64

Data are presented as median (interquartile range), mean ± SD or number (%).*Includes small bowel obstruction, perianal disease, pelvic disease, and disease recurrence. #Due to perianal disease, pelvic disease or disease recurrence.

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CROHN'S DISEASE: COMPLICATION RATES AND OUTCOMES OF ILEOCOLIC RESECTION VS. ILEOCOLIC RESECTION WITH A CONCOMITANT PROCEDURE.

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Purpose: To compare the rates of short-term septic complications and overall complications following ileocolic resection compared to ileocolic resection with a concomitant procedure in patients with Crohn's disease (CD).

Methods: After institutional review board approval, the data from all patients with CD who underwent an ileocolic resection from 2004 to 2015 were retrospectively reviewed. A concomitant procedure was defined as

any additional surgical procedure performed at the time of ileocolic resection. The primary outcome was postoperative septic complications defined as a clinical or radiologic leak, intra-abdominal abscess, or wound infection. Secondary outcomes included overall 30-day complications, medical complications, and length of stay. A multivariate logistic regression model was constructed to control for confounding variables and to predict postoperative septic complications.

Results: 147 patients of a mean age of 43 (51% male) underwent ileocolic resections, 68 of whom also had a concomitant procedure [fistula takedown (n=29), small bowel resection (n=19), colon resection (n=14), strictureplasty (n=6), and other procedures (n=17)]. 89% of patients had a previous ileocolic resection. On univariate analysis, patients with a concomitant procedure had significantly longer operative time (201min vs. 139min, $p< 0.001$), increased blood loss (200mL vs 100mL, $p=0.015$), increased pre-operative treatment with antibiotics (26% vs. 13%, $p=0.034$), and decreased use of a laparoscopic approach (63% vs. 78%, $p=0.047$). Patients with a concomitant procedure were more likely to have fistulizing disease (50% vs 8%, p<0.001), however other surgical indications were similar in both groups [refractory to medication (13% vs 24%), stricture (67% vs 82%), abscess (18% vs 14%) and hemorrhage (0%vs 4%)]. There was no significant difference in septic complications (18% vs.16%, $p=0.848$) and overall complications (40% vs. 33%, $p=0.394$) between the two groups, however patients with a concomitant procedure had a significantly greater incidence of abscess formation (0% vs. 6%, $p=0.029$) and medical complications (22% vs. 9%, $p = 0.026$). Length of stay was also not significant between the groups (7 days for both groups). On multivariate analysis, after controlling for confounders, the odds of septic complications for patients with concomitant procedures was not significantly higher than for resection-only patients [OR 1.25 (95% CI 0.67-2.32)].

Conclusions: Patients with CD who underwent a concomitant procedure at the time of an ileocolic resection were not at increased risk of postoperative septic or overall complications.

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SURGICAL TREATMENT FOR ELDERLY ULCERATIVE COLITIS PATIENTS BY MULTICENTER ANALYSIS IN JAPAN –SURGICAL INDICATION, OPERATIVE PROCEDURE, PROGNOSIS.

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Purpose: Elderly patients with ulcerative colits(UC) have many extraintestinal complications such as cardiac, diabetes mellitus and the incidence of surgeryfor them is gradually increasing for medical failure or colitic cancer recently . This study was conducted to identify the feature and prognosis of the elderly UC patients with surgical treatment by the multicenter analysis as a study of IBD research group by Japanese Ministry of Welfare and Labor.

Methods: Elderly patients were defined as those who undertook initial surgical treatment at over 70 years old. Clinical data of 143 patients (male:100, female:43) was collected from 2004 to 2013 and was analyzed retrospectively. Onset of UC was 68 years old and age at initial surgery was 75 years old in average. Clinical data included surgical indication, preoperative treatment, surgical procedures, postoperative complications (early: within 1 month, late : over 1 month) and postoperative prognosis

Results: 1) Surgical indications were severe disease in 38% of the patients, medical intractability in 49% and colitic cancer in 23%. 2) Preoperative medical treatment just before surgery was administration of presnisolone in 69%, azothioprine in 14%, cyclosporine in 2%, infliximab in 1.4% and tacrolimus in 8%. 3) Preoperative complications were found in 84% and the common disease was cardiac disease(29%), diabetes mellitus(17%). 3) Main surgical procedure was total proctcolectomy in 49%, stapled ileal pouch anal anastomosis in 15.3%, total colectomy with Hartmann operation in 11.2%.4) Postoperative complications were found in 54% of the patients as early complications and 16% as late complications. Among the early complications, wound infection was the most common complication (26%) and pneumonia in 18%, sepsis in 13%. Among late complications, pneumonia was found only in 1%. Postoperative mortality rate was 15%(22/143) and surgery were thought to have some correlation with the 64% of the patients (14/22) by non surgical complications in which pneumonia was most common(86%:12/14). 6) Postoperative functional results were good in the 26 patients with stapled IPAA(bowel movement: 6 times/day, ratio of soiling :12%) and 76 patients with permanent ileostomy (difficulty of management: 1.4%). Seventy nine % of the patients returned to normal life (67/85).

Conclusions: Elderly patients with ulcerative colitis who need surgery should be performed surgery without any delay because of high morbidity and mortality rate by long preoperative intensive medical treatment and good postoperative quality of life in the patients who tolerated the surgery. Postoperative pneumonia should be prevented and treated to have good results after surgery.

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THE EFFECT OF PREOPERATIVE NARCOTIC USE ON OUTCOMES OF LAPAROSCOPIC SURGERY FOR CROHN'S DISEASE.

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Purpose: Laparoscopic surgery for Crohn's disease is widely practiced on a patient population whose chronic narcotic use is increasingly common. There is limited data on the impact of preoperative narcotic use on outcomes of laparoscopic surgery.

Methods: All patients with preoperative outpatient narcotic use undergoing laparoscopic surgery in a single institution between January 1998 and June 2014 were identified from a prospectively collected database. Preoperative narcotic use was defined as any outpatient narcotic use within 1 month before surgery. Patients were case-matched to a control group undergoing laparoscopic surgery without preoperative narcotic use based on age (±5 years), gender, Montreal classification and previous bowel resection for Crohn's disease. Main endpoints were 30-day postoperative morbidity and hospital stay.

Results: Out of 535 patients with Crohn's disease undergoing laparoscopic surgery, 37 patients (6.9%) receiving preoperative narcotics were case-matched to 53 counterparts without preoperative narcotic use. Patient groups had similar postoperative morbidity including rates of anastomotic leakage, surgical site infection, fascial dehiscence, small bowel obstruction, ileus, and thromboembolism. Reoperation and readmissionrates were also comparable (table). The difference in length of hospital stay did not reach statistical significance (9.1±0.9 if previous narcotics vs.7.1±0.8 if no previous narcotics, P=0.11).

Conclusions: Preoperative outpatient narcotic use does not adversely affect postoperative outcomes in Crohn's patients undergoing laparoscopic surgery. Our study might be underpowered to detect an adverse effect of preoperative narcotic use on hospital stay.

Postoperative outcomes of patients using narcoticsvs. nopreoperative narcotic use

Variable	Odds Ratio (95% CI)	P Value
Reoperation	1.7(0.5-5.5)	0.41
Readmission	2.8 (0.7-10.9)	0.15
Overall morbidity	1.4 (0.5-3.4)	0.53
Anastomotic leak	0.5 (0.1-4.5)	0.50
Surgical Site Infection	2.2 (0.8-6.3)	0.14
Fascial dehiscence	2.6 (0.2-29.1)	0.45
C. Difficileinfection	0.6 (0.1-7.0)	0.69
Small bowel obstruction	0.5 (0.1-5.4)	0.61
Ileus	0.5 (0.1-2.0)	0.31
Thromboembolism	2.3 (0.4-14.1)	0.37

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INCREASE IN HOSPITAL ADMISSIONS DUE TO INFLAMMATORY BOWEL DISEASE IN CHILE BETWEEN 2001 AND 2012.

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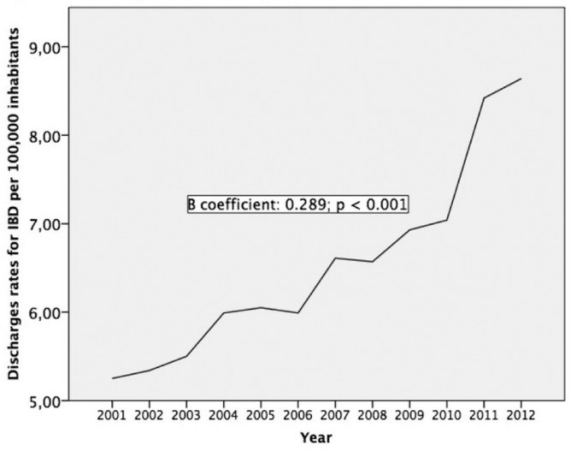
Purpose: In Chile there are no records of incidence or prevalence rates that allow us to establish the magnitude of the problem of inflammatory bowel disease (IBD). Objective: To describe the evolution of the hospitalizations for IBD in a developing country in the last decade.

Methods: Descriptive study. Data were obtained from the website of the Department of Health Statistics and Information, Health Ministery of Chile (www.deis.cl). All hospital discharges (19,513,655 cases) from 2001 to 2012 were included. The study group included patients who were diagnosed according to the ICD-10 for UC (K51) or CD (K50). The following variables were analyzed: gender, age, length of stay, hospital mortality and eventual surgical procedure. Data are presented as descriptive statistics. The coefficient B was calculated to establish the significance of the annual trend. A p value of less than 0.05 was considered significant.

Results: There were 13,001 hospital discharges related to IBD, corresponding to 0.067% of all hospital discharges. Within this discharges, 31.2% were CD and 68.8% were UC. During hospitalization, at least one surgical procedure was performed in 12.9% of all IBD cases (63.7% of them in patients with diagnosis of UC). During the analyzed period there was a significant increase in the annual rate of hospital discharges from 5.25 in 2001 to 8.64 per 100 thousand inhabitants in 2012 ($p < 0.001$, figure 1). This increase was from 1.68 to 3.11 in patients with CD ($p < 0.001$) and from 3.58 to 5.53 in those with UC ($p < 0.001$). However, in the period a decrease was observed in the median of the length of stay (from 7 to 4 days, $p < 0.001$), need of any surgical treatment (from 17.7% to 12.2%, $p < 0.001$) and hospital mortality (from 0.98% to 0.40%, $p = 0.002$).

Conclusions: From 2001 until 2012 there has been a significant increase in hospital discharges for IBD in Chile, associated to a decrease in length of stay, need of surgery and in-hospital mortality. These data could be used to establish incidence or prevalence rates of these diseases and development of health policies for proper diagnosis and treatment.

Figure 1: Discharges rates for IBD per year in Chile



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THE RISK FACTOR FOR THE DEVELOPMENT OF POUCHITIS AFTER TOTAL PROCTOCOLECTOMY AND ILEAL POUCH-ANAL ANASTOMOSIS IN PATIENTS WITH ULCERATIVE COLITIS; META-ANALYSIS.

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Purpose: Despite the advance in medical therapeutics, substantial proportions of patients with ulcerative colitis (UC) still require surgical treatment. Total proctocolectomy and ileal-pouch anal anastomosis (IPAA) is the standard surgical treatment of choice for those patients. Although the quality of life after IPAA is largely satisfactory, pouchitis plagues the patients who underwent IPAA. Several risk factors such as the presence of extra intestinal manifestation, primary sclerosing cholangitis, preoperative severity of UC and smoking habits were reported. We previously reported that the presence of extra intestinal manifestations was an independent risk factor for the development of pouchitis. However, controversy exists among the cohorts. In order to better understand the risk factors for the development of pouchitis, we conducted a meta-analysis study.

Methods: Literatures investigating the preoperative risk factors for the development of pouchitis were searched by pubmed using the keywords "pouchitis, ulcerative colitis) AND english[Language]." To avoid the duplicates, we selected one most suitable literature for meta-analysis from each institution in case there were multiple publications from one institute. We have updated our own data from our institutions and incorporated them in the analysis. Random effect model was used.

Results: No randomized controlled trials were retrieved regarding the risk factors. Finally 7 and 13 cohort or case-control studies including our updated cohort were selected for the analysis of chronic pouchitis and acute+chronic pouchitis, respectively. We only included the studies in which the pouchitis was diagnosed both clinically and endoscopically. The presence of extra intestinal manifestations was an independent risk factor for both chronic pouchitis (odds ratio 2.2702 [1.5612; 3.3011] P0.0001) and acute+chronic pouchitis (odds ratio 1.7784 [1.4755; 2.1434] P< 0.0001).

Conclusions: The presence of extra intestinal manifestations was a significant risk factor for the development of pouchitis after IPAA. Such high-risk patients may benefit from preoperative and postoperative counseling.

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PREOPERATIVE ANEMIA AND SHORT-TERM OUTCOMES IN PATIENTS UNDERGOING SURGERY FOR INFLAMMATORY BOWEL DISEASE.

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Purpose: Anemia is considered one of the most common extra-intestinal manifestations in patients with inflammatory bowel disease (IBD), and recently it has been linked to increased severity of the disease and worsening quality of life. The aim of the study was to assess the impact of preoperative anemia in patients with IBD on short-term post-operative outcomes by using the National Surgical Quality Improvement Program (NSQIP) database.

Methods: We retrospectively reviewed all patients with Crohn's disease (CD) and Ulcerative Colitis (UC) from the NSQIP database who required an operative intervention over a 8 year period (2005-2012). Patients were grouped based on the presence of preoperative anemia as defined by the World Health Organization (Hg < 13 g/dl for men, Hg < 12 g/dl for women). Univariate and multivariate analysis was performed to assess the impact of preoperative anemia on postoperative 30 day morbidity, mortality and increased length of stay.

Results: A total of 15,761 patients met our inclusion criteria. The mean age was 43 years and the majority had CD (n = 8,545, 54.2%). Partial colectomy with removal of terminal ileum (CPT = 44160) and laparoscopic total abdominal colectomy with ileal pouch-anal anastomosis and loop ileostomy (CPT = 44211) were the most frequently performed operations for CD and UC patients respectively. Half of the patient population were

anemic upon presentation (n = 7,847, 49.8%). Anemic patients were more likely to have a recent history of steroid use (44.0% vs. 36.9%, p < 0.001), present with sepsis (13.6% vs. 4.9%, p < 0.001), require an emergency surgery (9.7% vs. 4.3%, p < 0.001) and receive a blood transfusion (11.3% vs. 2.5%, p < 0.001). In multivariate analysis, anemia was a significant predictor of postoperative complications, including overall morbidity (OR = 1.3, 95% CI: 1.2 - 1.4, p < 0.001), serious morbidity (OR = 1.2, 95% CI: 1.0 - 1.3, p = 0.008) and increased length of stay (OR = 1.7, 95% CI: 1.6 - 1.9, p < 0.001). There was no statistically significant impact of anemia on mortality.

Conclusions: Anemic patients with IBD are more likely to present with sepsis and require emergency surgery compared to their peers. In addition, anemia serves as an independent predictor of overall complications, serious morbidity and increased length of stay following abdominal operations.

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UTILITY OF LONG-TERM INDWELLING DRAINING SETONS IN TREATMENT OF COMPLEX CROHN'S FISTULA-IN-ANO.

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Purpose: Fistulizing perianal disease affects up to one third of patients with Crohn's disease and incontinence rates due to cutting seton therapy can be as high as 58%. Indwelling draining seton has been described to be successful in alleviating symptoms in complex fistulas as well as a bridge to definitive therapy. Sphincter saving alternative procedures such as advancement flaps, Ligation of fistula tract (LIFT) and fecal diversion are not possible in all patients. Although leaving the seton for a longer duration to control local sepsis has been demonstrated as a feasible option, the studies were small. We did a large retrospective single center observational study to look at this.

Methods: Retrospective chart review of Crohn's disease patients with complex fistulas treated by colorectal surgeons at Thomas Jefferson University over a period of 17 years was done. Demographic data, details of the intervention and follow up were studied. The analysis did not use a control group for comparison. The primary outcome of the study was duration of indwelling seton. The rates of recurrence, subsequent seton placement, incidence of either definitive closure or diversion surgery were secondary outcomes.

Results: A total of 57 patients with Crohn's disease underwent insertion of draining seton. The mean duration of seton placement was 298.2 ±277.3 days. Additional seton placement was required in 26 patients (45.6%), of whom 15 patients had recurrence. The remaining 31 patients did not have recurrence or progression of fistulous disease. In patients with no recurrence, the mean seton duration was 280.3±213.3 days, while in patients with recurrence, the setons were in place for a mean 145±59.8 days. This difference however was not statistically significant. 9 patients failed seton treatment (15.78%) of whom eight patients needed to be diverted and one patient died of sepsis.

Conclusions: Our study is the single largest study looking at the utility of draining setons for fistulizing perianal Crohn's disease and shows that draining setons can be maintained for an average of 10 months. In previous studies this ranged from 3.8 months to 13 months. The recurrence rate in our study was 26.3% after removal of setons while this was 38-40% in previous studies. In a study by Thornton et al, 21% developed new fistula with seton in situ while in our study this occurrence was 8.8%. In our study, seton failure as defined by progression of existing fistula was seen in 10.5%, while 31.3% of patients had uncontrolled sepsis in a study by Takesue et al . Although our study did not look at the impact of biologic treatment upon fistula healing with setons, the success rate with this combined modality has been reported to be 87.7% at a median interval of 12.4 months form start of therapy. In conclusion, long term indwelling draining seton is a viable option in treating fistulizing perianal Crohn's disease with a good success rate.

Outcomes after intial Seton placement

Patients requiring second seton (n/%)	26 (45.6%)
New fistula	5 (8.8%)
Progression of existing fistula	6 (10.5%)
Recurrence	15 (26.3%)
Interval before recurrence(mean±SD days)	324.5±273.6
Definitive closure operation (n/%)	5 (8.8%)
Diversion operation (n/%)	8 (14%)
Death (n/%)	1 (1.8%)

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A 60-YEAR -OLD MALE WITH ACUTE SUPERIOR MESENTERIC ARTERY THROMBOSIS AFTER RESTORATIVE PROCTOCOLECTOMY WITH ILEAL POUCH-ANAL ANASTOMOSIS FOR CHRONIC ULCERATIVE COLITIS: REPORT OF A CASE.

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Purpose: It is widely known that patient's with inflammatory bowel disease (IBD) are at risk for thromboembolic events. The vast majority of occlusions are venous in nature. Arterial thrombosis is far less common in Chronic Ulcerative Colitis (CUC) or Chron's diseae (CD) and has been described in the aorta, abdominal and limb arteries. Arterial occlusion of the splanchnic vessels occurs with extreme rarity with only 10 reported cases in the literature. The morbidity and mortality of this disease is very high with 4 of the 10 above mentioned cases resulting in death. The reported cases thus far have been in IBD patients before any surgical intervention. To our knowledge, this is the first reported case of an acute thrombosis of the superior mesenteric artery in the immediate post operative period of a patient suffering from CUC after a proctocolectomy with ileal pouch anal anastomosis.

Methods: A 60-year-old morbidly obese male with a BMI of 47.8 and a history of type 2 diabetes mellitus, hypertension, dyslipidemia and coronary artery disease presents with a history of CUC that was refractory to medical management. The patient's primary complaints were abdominal pain, hematochezia and fecal urgency. He underwent an uneventful proctocolectomy with ileal pouch anal anastomosis and diverting ileostomy. The patient was doing well and having bowel activity and developed atrial fibrillation which was treated with antiarrythmics. On post-operative day 9 he developed acute abdominal pain with leukocytosis. Radiographic evaluation with computed tomography revealed an acute occlusion of the superior mesenteric artery. The patient's stoma was of good color and still had function so anticoagulation was started. The patient improved and was discharged home without the need for surgical intervention. The patient went on to have his ileostomy closed without complication. He is currently 6 years status post surgery and continues to do well with a functional pouch and excellent quality of life. His BMI is still 47.6.

Results: above.

Conclusions: In review of the literature we have come across a total of ten reports of SMA thrombosis in patients with IBD. Because of its rare occurrence, SMA thrombosis is often times overlooked in the clinical setting of acute abdominal pain in a patient with a history of chronic ulcerative colitis (CUC). We believe what makes this case report especially novel is not only the location of the thrombosis but also that the thrombosis occurred on post-operative day 9 after elective restorative proctocolectomy with ileal pouch anal anastomosis for CUC treatment; the first incident of post-operative SMA/arterial thrombosis to our knowledge.

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C. DIFFICILE INFECTION IN PATIENTS ADMITTED FOR A FLARE OF IBD COLITIS: AN OPPORTUNITY FOR COLECTOMY OR FOR PATIENCE?

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Purpose: Patients with inflammatory bowel disease (IBD) harbor many risk factors for *C. difficile* infection (CDI), though the incidence of CDI in the

general IBD population remains surprisingly low. For the subpopulation of IBD patients requiring admission for a flare of IBD colitis, many surgeons assume the development of CDI indicates the need for colectomy, though there is limited data to guide expectations or treatment decisions in this scenario. The primary aim of this study was to evaluate whether colectomy rates for patients admitted for a flare of Crohn's colitis or ulcerative colitis was higher among those who also developed CDI.

Methods: After IRB approval, a retrospective review of an institutional database (June 2005-August 2015) identified patients admitted to the authors' institution for the treatment of flares of IBD colitis. From this population, all patients with a positive *C. difficile* nucleic acid amplification test resulted within 72 hours of admission were also identified, from which IBD and IBD-CDI populations were constructed. Data collected included patient demographics, chronic co-morbidities and the use of IBD maintenance therapies including ASA preparations, immunomodulators and biologic agents. Given the small sample size, only univariate analyses were performed. The primary study outcome was colectomy during admission, with secondary outcomes including mortality, length of stay and 30-day readmissions.

Results: During the study period, a total of 110 patients required urgent admission for a flare of IBD colitis. Of these, 34 (33%) were diagnosed with CDI. Mean ages were similar between the two groups (IBD: 34 years vs. IBD-CDI 40 years). There was no significant difference in the number of chronic comorbidities between the two groups. Colectomy rates were similar between the two groups (IBD: 24 vs. IBD-CDI: 6; p=0.12) as were mean lengths of stay (IBD: 5.4 days vs. IBD-CDI: 5.7; p= 0.5). Additionally, there was no statistically significant difference between the cohorts with respect to 30-day readmissions or mortality. ASA, immunomodulators and biologic agents as outpatient maintenance therapy were not associated with colectomy rates. Among IBD and IBD-CDI patients who did require colectomy, there was no statistically significant difference in readmissions or mortality

Conclusions: While *C. difficile* infection is reported to be surprisingly uncommon among IBD patients as a group, its incidence is comparatively high among IBD colitis patients admitted for a disease flare. Despite concerns that this second insult to the large intestine might signal the need for surgery, this study suggests that a significant number of IBD-CDI patients can be expected to be safely discharged without colectomy or early readmission.

P98

ARE THE SURGICAL MANAGEMENT AND LONG-TERM OUTCOMES OF COLORECTAL CANCER ASSOCIATED WITH ULCERATIVE COLITIS CHANGING?

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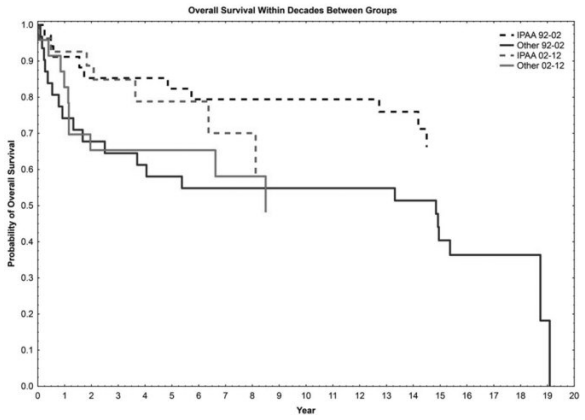
Purpose: Patients with chronic ulcerative colitis (UC) are at high risk of colorectal cancer (CRC). Such patients are challenging because of the need to cure the cancer, treat the colitis, preserve per anal defecation, and deal with the side effects of the chronic illness and the agents used to treat it. The purposes of this study are to assess surgical strategies in patients with UC and CRC, determine if strategies have changed with time, and review long-term oncological outcomes and quality of life (QOL).

Methods: Data on all patients with CRC complicating UC who underwent surgery were evaluated from a prospective institutional database. Type of surgery, oncological outcomes, and QOL were evaluated across 2 decades (1992-2002 and 2002-2012). Patients with Crohn's disease, indeterminate colitis and cancer of IPAA were excluded.

Results: There were 152 patients; 74 from 1992-2002 and 78 from 2002-2012, with a male predominance (first decade 60.8%, second 56.4%, p=0.58). Mean age of first decade patients was 49.9 years ±12.5, vs. 53.0 ±16.2 for the second. Patients in the first decade had a lower BMI than patients in the second (22.6±14.4 vs 27.2±6.3, p=0.012). 69 (45%) cancers were rectal (31 first decade, 38 second decade), and 83 (55%) were in the colon (48 proximal to the splenic flexure and 35 distal) with no difference between decades. 10 patients (6.5%) had a diagnosis of sclerosing cholangitis. There was no significant difference in cancer stage or differentiation between decades (Stages I/II 60% vs 48%; Stages III/IV 41% vs 52%) ***(p=<0.35)***. Neoadjuvant chemoradiation was given to 15% of patients in the first decade, and 23.5% in the second (p>0.05). Postop radiation was given in 16.1% and 11.4% during first and second decades respectively, and postop chemotherapy in 42.6% and 26.1% (p=0.041). 90 (59%) patients underwent restorative proctocolectomy with ileal pouch anal anastomosis (RP/IPAA), 42 (56.8%) in the first decade and 48 (61.5%) in the second (p=0.14). 59.6% of IPAA were stapled in the first decade compared to 81.7% in the second. (p = 0.06). Other surgeries included total proctocolectomy with end ileostomy (40 (26%) and colectomy with ileorectal anastomosis (15 (10%). Overall survival by type of operation and decade is shown in the Kaplan-Meier graph (figure 1). Pouch patients had better survival. Local recurrences were also better after IPAA, especially in the second decade. Quality of life was lower in the second decade than the first (CGQOL 8.1±1.8 vs 7.5±1.8, p=0.11) with higher work and sexual restrictions (work 20.8% vs 39.2%, p=0.026; sexual 20.5% vs 37.7%, p=0.033).

Conclusions: We noted more use of neo-adjuvant therapy for patients with cancer in UC over time, and more pouches with a stapled IPAA. Recent patients are older and bigger, with more advanced cancers. Their slightly worse quality of life is offset by their better overall survival.



P99

OUTCOMES OF LAPAROSCOPIC VS. OPEN TOTAL ABDOMINAL COLECTOMY FOR CROHN'S DISEASE: AN ACS-NSQIP ANALYSIS.

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Purpose: Laparoscopy has been increasingly used in the management of Crohn's disease, supported by evidence that it decreases length of hospital stay and minor complications. However, studies to date have predominantly included ileocolic resections, with little data on outcomes of laparoscopic total abdominal colectomies for Crohn's disease. The aim of this study was to examine the impact of a laparoscopic approach on short-term outcomes following total abdominal colectomy for Crohn's disease.

Methods: After Institutional Board Review approval, patients with Crohn's disease who underwent elective total abdominal colectomies between 2005-2013 were identified from the American College of Surgeons National Surgical Quality Improvement Program database. The main outcomes of interest were length of postoperative hospital stay, operative time, intraoperative blood transfusions, superficial surgical site infections, major morbidity and 30 day mortality. Multivariate linear and quantile regression were used.

Results: Of 954 patients with Crohn's disease who underwent total abdominal colectomies, a laparoscopic and open approach were used for 358 (37.5%) and 596 (62.5%) patients, respectively. Patients who underwent a laparoscopic approach were younger (40.6 vs. 46.9 years, $p < 0.0001$) and

more likely to be Caucasian (p = 0.009). In addition, patients who had a laparoscopic colectomy were more likely to be on steroids (56.7% vs. 46.8%, p= 0.003), and were less likely to be hypertensive (15.1% vs. 24.7%, p < 0.0001), diabetic (5.0% vs. 8.9%, p=0.028) or functionally dependant (1.7% vs. 4.4%, p=0.026). On multivariate regression, a laparoscopic approach was associated with a significantly lower rate of superficial surgical site infections (OR = 0.425, 95% CI: 0.248 – 0.730), shorter length of hospital stay (-0.97 ± 0.51 days, p<0.0001) and longer operative time (55.261 ± 14.31 minutes p<0.0001) as compared with an open approach. Laparoscopy did not influence the rates of intraoperative transfusion, major morbidity or 30 day mortality.

Conclusions: To our knowledge, this is the largest study to date that has compared laparoscopic and open total abdominal colectomies for Crohn's disease. A laparoscopic approach was a significant predictor of decreased length of hospital stay and superficial surgical site infections following total abdominal colectomy for Crohn's disease.

P100

MODIFIED J-ILEUM POUCH: EQUIVALENT OUTCOMES OF ILEAL J-POUCH ANAL ANASTOMOSIS FOR PATIENTS WITH ULCERATIVE COLITIS OR FAMILIAL ADENOMATOUS POLYPOSIS.

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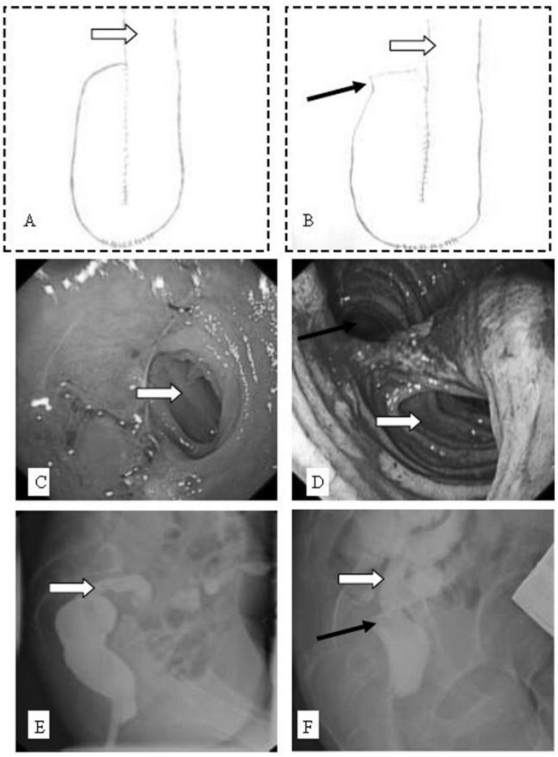
Purpose: Ileal J-pouch anal anastomosis (J-IPAA) is the operative approach for patients requiring restorative proctocolectomy due to familial adenomatous polyposis (FAP) or ulcerative colitis (UC). While J-ileal pouch was formed by folding loops of the ileum thus forming a reservoir, and varies pouch related complications including ileal pouch stump leakage/fistula can occur. We herein modified J-pouch and report the results of an improved D-ileal pouch-anal anastomosis (D-IPAA) after total proctocolectomy which eliminated ileum stump, and compare the results with J-IPAA.

Methods: Clinical data were gathered by retrospective review of patients undergoing ileal pouch-anal anastomosis at our institution since January 1st 2013 to March 31st 2015. Operation time, pouch constructed time, volume of pouch, intraoperative estimated blood loss (EBL), length of hospitalization was recorded. Complications were defined as any event prolonging hospitalization or requiring readmission and were included in the analysis up to six months after final surgery. Functional performance was assessed as of the last clinic visit. Data were compared with Student's t-test and chi-squared analysis.

Results: A total of 34 patients with FAP (n=9) and UC (n=26) received either J-IPAA (n=24) or D-IPAA (n=11) after proctocolectomy was identified. The J-IPAA group and D-IPAA group were found to be statistically comparable in terms of patient generic characteristics, as well as intraoperative variables including operation duration, pouch constructed time, pouch volume, and EBL. Follow-up was shorter in the D-IPAA group because of its more recent introduction (8.9 months vs.20.5 months mean follow-up). Clinical outcomes after IPAA were equivalent in terms of the number of bowel movements (4.6±1.7 *Vs*. 4.9±2.2, *P*>0.05). However prevalence of fecal incontinence in patients with D-pouch was better than those with J-pouch (Wexner incontinence scores 3±2 *Vs*. 5±2, *P*<0.05). One female patient with FAP recieved D-pouch suffered anal anastomosis vagina leakage on 21 day post operation. In patients with J-pouch, there were 1 percutaneous pouch fistula, 1 primary sclerosing cholangitis and 1 severe pouchitis. Those three patients were excluded due to persistent diverting ileostomy.

Conclusions: Ileal D-pouch anal anastomosis is functionally equivalent to the traditional ileal J-pouch anal anastomosis protocol in terms of clinical outcome and it could be an alternative pouch constructed model for the treatment of UC and FAP.



P101

INTRAPERITONEAL RECTAL STUMP-RELATED COMPLICATIONS FOLLOWING TOTAL ABDOMINAL COLECTOMY IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE.

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Purpose: To evaluate rectal stump related complications after total abdominal colectomy and creation of an intraperitoneal Hartmann's rectal stump in patients with colitis secondary to inflammatory bowel disease.

Methods: A retrospective chart review of patients with inflammatory bowel disease that underwent total abdominal colectomy for colitis from 2004 to 2014 at a tertiary care, teaching hospital was performed. Demographic information, disease course, including medical therapy, operative details and post-operative complications were abstracted. Post-operative outcomes were evaluated with a focus on rectal stump related complications.

Results: 74 patients with ulcerative colitis, Crohn's colitis and indeterminate colitis underwent total abdominal colectomy, creation of a Hartmann's rectal stump and end ileostomy were identified. Patients' average age at surgery was 39.4 years. Average duration of disease was 8.6 years. At the time of operation, 89% of patients were on corticosteroids, 39% were on azathioprine, 12% were on mercaptopurine and 65 % were on a biological agent for immunosuppression. No patient had the rectal stump placed in the subcutaneous tissues of the midline wound and all patients had the rectal stump closed with a linear stapling device. Three patients (4%) developed a pelvic abscess and a wound infection occurred in seven patients (9.5%). Two patients required percutaneous drainage for a pelvic abscess, and one patient was treated with antibiotics only. No patient required re-operation for a rectal stump leak, while two patients required re-operation for wound-related complications.

Conclusions: Intraperitoneal placement of the rectal stump after colectomy for severe or toxic colitis is associated with a low rate of rectal stump leakage. Patients that do develop a pelvic abscess can be managed with-

out need for re-operation. This management strategy for the rectal stump may be considered a safe alternative to subcutaneous placement or mucous fistula formation.

P102

INFLUENCE OF HISPANIC ETHNICITY IN CLINICAL PRESENTATION OF INFLAMMATORY BOWEL DISEASE.

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Purpose: Incidence and treatment of inflammatory bowel disease (IBD) is increasing among immigrants and minorities in North America and Western Europe. Epidemiologic studies suggest differences in presentation and severity of IBD among ethnic populations. However, data is conflicting as to whether these differences are due to factors other than genetic variation. This study aimed to compare clinical presentation of IBD between Hispanic and non-Hispanic patients.

Methods: Following IRB approval, 5137 patients treated at a single tertiary center for mucosal ulcerative colitis (MUC) or Crohn's disease (CD) between Jan/2005 and Dec/2014 were identified from a prospectively maintained database. Review of medical records identified 421 (8.2%) patients as Hispanic. Patients were queried regarding race/ethnicity and classification of Hispanic followed standards for the Classification of Federal Data on Race and Ethnicity**.** 296/421 (70.3%) patients were excluded due to incomplete/unavailable data since initial presentation. Hispanic and non-Hispanic patients were matched 1:1 by diagnosis and gender**.** Demographics, symptoms, disease location and extent, and extra-intestinal manifestations were compared. Continuous variables were assessed using independent T tests or Mann-Whitney U, based on Gaussian distribution. Categorical variables were compared with Chi-square analyses.

Results: 125 Hispanic patients [CD: 58(46.4%), 29 females, mean age at diagnosis: 28.9 years; MUC: 67(53.6%), 38 females, mean age at diagnosis: 36.4 years] were matched with 125 non-Hispanic patients [CD: 58(46.4%), 29 females, mean age at diagnosis: 34 years; MUC: 67(53.6%), 29 females, mean age at diagnosis: 37.7 years]. There were no differences between the groups for either CD (p=0.11) or MUC (p=0.65) patients regarding age at diagnosis. The most prevalent symptoms in both groups were diarrhea (78.8%), melena/rectal bleeding (73.6%) and abdominal pain (68.4%). In CD patients, there were no significant differences for any symptoms between the groups. In MUC patients, diarrhea was more prevalent in Hispanic (92.5%) vs non-Hispanic (80.4%) patients (p=0.04). CD patients had similar disease patterns/location in both groups. Ileocolonic disease was the most common form of presentation in both groups, with frequent association to perianal disease (39.6% Hispanic and 44.8% non-Hispanic, p=0.57). In CD patients, both groups had similar colonic disease distribution, the majority presenting with extensive disease (p=0.85). Similarly, MUC patients had extensive colonic involvement in both groups (p=0.56). Extra-intestinal disease pattern was similar between the two groups in both CD and MUC patients.

Conclusions: Presentation of IBD did not significantly differ between Hispanic and non-Hispanic patients, suggesting that social and environmental factors may play a more important role than genetics in disease presentation.

P103

TRANSANAL PROCTECTOMY FOR ILEAL POUCH-ANAL ANASTOMOSIS: AN INITIAL COMPARATIVE EXPERIENCE.

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Purpose: Transanal proctectomy using transanal minimally invasive surgery (TAMIS) is an alternative access modality for completion proctectomy for ileal pouch anal anastomosis (IPAA). The objective of this study is to report our initial experience with TAMIS proctectomy for IPAA and compare short-term outcomes with a traditional, trans-abdominal approach.

Methods: Data on the first 5 consecutive patients undergoing TAMIS completion proctectomy and IPAA were examined and compared to 10 cases of trans-abdominal completion proctectomy and IPAA, all performed by a single surgeon.

Results: There was no significant difference in patient gender (male: 7 Vs 2, P: 0.329), age at the time of surgery (34.8±4.5 Vs 42.3±6.0 years, P: 0.349), body mass index (22.3±1.0 Vs 24.5±1.7 Kg/M^2, P: 0.247), operative time (169.9±8.4 Vs 194.0±14.0 min, P: 0.142), estimated blood loss (132.0±34.3 Vs 86.0±21.1 mL, P: 0.388), time between total colectomy and completion proctectomy/IPAA (6.8±1.5 Vs 2.4±0.3 months, P: 0.060), post-operative complication rate (4 Vs 1, P: 0.580), length of stay (5.3±0.8 Vs 5.6±1.6 days, P: 0.853) or maximum post-operative pain score on days 1 to 3 between patients who underwent a trans-abdominal or TAMIS completion proctectomy prior to IPAA. There were no conversions from a minimally invasive approach in either group.

Conclusions: TAMIS proctectomy for IPAA is a feasible and safe technique with comparable peri-operative outcomes to trans-abdominal proctectomy. Further studies on functional outcome are required.

P104

IMPACT OF PREOPERATIVE STEROID USE ON SHORT-TERM OUTCOMES FOLLOWING COLECTOMY IN CROHN'S DISEASE PATIENTS.

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Purpose: Previous retrospective studies evaluating the impact of preoperative steroids on postoperative outcomes for Crohn's patients undergoing surgery are biased by lack of clear standardized definitions. The purpose of this study is to evaluate the impact of steroid therapy prior to colectomy in Crohn's patients on postoperative septic and colectomy-specific outcomes using the American College of Surgeons (ACS) - National Surgical Quality Improvement Program (NSQIP) targeted colectomy database.

Methods: All patients undergoing open or laparoscopic partial and total colectomy with an underlying diagnosis of Crohn's Disease were retrieved from the 2012-13 NSQIP targeted database, which contains data accrued by trained data abstractors using standardized definitions for all variables and outcomes. 30-day postoperative septic and colectomy specific outcomes were compared for patients who were on steroids or immunosuppressants within the 30 days prior to colectomy to the others using univariable and multivariable analyses.

Results: Of 2208 CD patients, 1387 (62.8%) were on steroids / immunosuppressants (SI). Patients in the SI group were younger (36 vs 44 years, p=0.024), less likely female (52.1% vs 56.3%, p=0.059) and a greater proportion underwent laparoscopic surgery compared to patients in non-SI group (47.9% vs. 43.5%, p=0.046). Steroids / immunosuppressants were associated with a higher rate of sepsis (7.6% vs. 5.2% p=0.034), septic shock (1.1% vs. 0.2% p=0.029), anastomotic leak (5.6% vs. 3.5% p=0.027), and return to operating room (6.8% vs 3.3% p<0.0001). Other complications were similar. On multivariable analysis, SI remained independently associated with sepsis [OR=1.61, 95% CI 1.10-2.34] and leak [OR=1.63, 95% CI 1.06-2.54].

Conclusions: These results, based on an analysis of standardized perioperative data and outcomes provide strong evidence that steroid or immunosuppressive use within 30 days of colectomy is associated with a higher rate of sepsis and septic shock and anastomosis leak in Crohn's disease patients undergoing colectomy. With-holding SI prior to surgery, when feasible, or the selective use of an ostomy to mitigate the consequences of a leak and hence sepsis need due consideration prior to and during surgery in CD patients.

Short-term post-operative outcomes of Crohn's disease patients in the ACS-NSQIP targeted colectomy

	Preoperative steroid / immunosuppressant use		P value
	YES	NO	
Age (years) median	36	44	0.024
Female	723(52.1%)	462(56.3%)	0.059
ASA classification 1,2	905 (65.3%)	511 (62.5%)	0.181
ASA classification 3,4	481 (34.7%)	307 (37.5%)	
Open Surgery	723(52.1%)	464(56.5%)	0.046*
30-day mortality	3(0.2%)	3(0.4%)	0.515
Superficial SSI	100(7.2%)	56(6.8%)	0.730
Deep incisional SSI	26(1.9%)	10(1.2%)	0.239
Organ space SSI	111(8.0%)	51(6.2%)	0.119
Wound dehiscence	12(0.9%)	7(0.9%)	0.975
Anastomotic Leak	78(5.6%)	29(3.5%)	0.027*
Sepsis	105(7.6%)	43(5.2%)	0.034*
Septic shock	15(1.1%)	2(0.2%)	0.029*
Prolonged post-operative ileus	224(16.1%)	136(16.6%)	0.871
Urinary tract infection	31(2.2%)	16(1.9%)	0.652
Pneumonia	32(2.3%)	10(1.2%)	0.070
Return to operating room	95(6.8%)	27(3.3%)	<0.0001*
Venous thromboembolism	24(1.7%)	11(1.3%)	0.478
Renal Failure	9(0.6%)	6(0.7%)	0.821

*P value < 0.05 considered significant

P105

INFLIXIMAB AS INPATIENT "SALVAGE" THERAPY FOR SEVERE ULCERATIVE COLITIS: EFFECTIVE, DANGEROUS OR NEITHER?

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Purpose: Patients with severe pan-ulcerative colitis (UC) often require inpatient treatment with high dose steroids, with a significant number of these patients eventually requiring an urgent total colectomy (TC) during the same admission. There is recent interest in providing inpatient infliximab as an alternative to surgery for those with disease refractory to inpatient steroids, though the data on this intervention is extremely limited. The aim of this study was to compare colectomy rates and other short-term outcomes among UC patients admitted to an IBD center for severe colitis whose salvage therapy included either high-dose steroids alone versus the use of infliximab as an alternative to colectomy.

Methods: Using ICD-9 codes, medical records were reviewed (January 2008-October 2015) to identify patients admitted to the authors' institution for treatment of severe UC. These patients received either high-dose steroids as medical therapy (HDS), or they received 5 mg/kg of infliximab after a failing steroid regimen (INF). The primary study outcome was incidence of colectomy; secondary outcomes included mean length of stay, 60-day readmissions, complication rates regardless of need for surgery, and total cost (defined as the amount paid by the insurance company or patient) for hospital care. Fisher's exact tests were used to compare the groups due to the small number of patients in the INF cohort.

Results: A total of 173 patients (76 females, 44%) required admission for severe UC during the study period. The HDS group was slightly older than the INF group (HDS: 46.8 ± 16.3 years vs. INF: 35.9 ± 15.7 years; p = 0.012). Of the entire study population, 18 (10%) patients underwent treatment with infliximab as an inpatient. Of these, 14 (82%) required TC during that admission versus 81 (52%) of the patients who received steroids alone (p=0.046). Of the four patients who received infliximab but no surgery on that admission, two were readmitted in less than 60 days for emergent TC. Readmission rates, superficial, deep and organ space surgical-site infections, return to the operating room, and all-complication rates for TC were similar between the cohorts (p>0.05). Among patients who required TC, hospital cost was 27% higher in the infliximab group, though due to the small size of the INF cohort this difference did not reach statistical significance.

Conclusions: The inpatient use of infliximab for severe UC does not avoid the need for colectomy in patients who fail steroid therapy. Though the outcomes following surgery were equivalent between the steroid and infliximab treatment groups, the additional cost and length of stay associated with infliximab in this setting suggest that infliximab is unlikely to be a reliable alternative to surgery for inpatients with steroid-refractory UC.

Table 1: Post-operative outcomes after total colectomy

	High-dose steroids	Infliximab after failing steroids	p value
Patients who underwent total colectomy	81 (52%)	14 (82%)	p=0.046
Mean length of stay after colectomy	7	9	p=0.93
Sixty day readmission after colectomy	15 (18%)	2 (15%)	p=0.68
Total Cost	$14,492	$19,880	p=0.53
Post-operative complication rates	10%	21%	p=1.00
Superficial SSI	1 (1%)	0 (0%)	p=1.00
Deep SSI	3 (3%)	1 (7%)	p=1.00
Organ space SSI	4 (4%)	1 (7%)	p=1.00
Fascial dehiscence	2 (2%)	1 (7%)	p=1.00

P106

REDUCED PORT LAPAROSCOPIC SURGERY FOR SEVERE ACUTE ULCERATIVE COLITIS - EARLY EXPERIENCE SHOWS PROMISING RESULTS.

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Purpose: Minimally invasive surgery (MIS) has become increasingly used in the surgical management of ulcerative colitis (UC), primarily in the elective setting. In the emergency setting, the operation of choice is a total abdominal colectomy with end ileostomy (TAC). Patients with severe acute UC (saUC) present a unique challenge. Often these patients are malnourished, anemic, have colonic superinfections and are on combinations of maximal immunosuppression. This coupled with the surgical challenge of the very ill patient and the friability of the colon have historically led to for their emergent surgeries to be done in an open (OS) fashion. Laparoscopic (LS) TAC has been studied in this subset of patients and found to be a safe alternative to open surgery. We aimed to see if our early experience with reduced port Laparoscopic surgery (SILS +1) compared favorably to OS and LS TAC.

Methods: From 2007 to 2015, consecutive patients with saUC who underwent emergency TAC were included in this study. LS was defined as standard multiport where the extraction site was either the ileostomy aperture or through a separate incision. SILS +1 was defined as those where a multiport access system was placed in the ileostomy aperture with an additional 5mm port placed in the LLQ. The extraction site was the ileostomy aperture. 54 patients were identified who met criteria. 24 in the OS group, 21 in the LS group and 11 in the SILS +1 group.

Results: There was no difference in patient demographics between the 3 groups (age, sex, BMI). There were no differences in length of stay (days) between the 3 groups (7.5 OS, 9 LS, 8.6 SILS +1). There were no differences in post op infectious complications, readmissions or re-operations between the 3 groups. There were significantly less obstructions in the SILS + 1 group (3 OS, 9 LS and 0 SILS +1). Time to IPAA surgery (days) was shorter with SILS +1 but this was not statistically significant (116 OS, 143 LS, 103 SILS + 1). Patients who had SILS + 1 TAC were subsequently more likely to have LS or SILS + 1 IPAA surgery (1/24 OS, 8/21 LS, 10/11 SILS + 1).

Conclusions: Our early results with SILS +1 shows that this technique can be performed safely in patients with saUC. One early patient in the SILS + 1 group suffered iatrogenic colonic perforation during ileostomy site extraction. This led to an unfavorably long LOS and infectious complications. Despite this outlier, SILS +1 fared comparatively to OS and LS in all measured post TAC outcomes. As well, SILS + 1 TAC patients were much more likely to have MIS IPAA surgery. These early results suggest that further experience with this technique may yield additional advantages over OS and LS TAC.

P108

ONE STAGE RESTORATIVE PROCTOCOLECTOMY WITH A STAPLED ILEAL POUCH-ANAL ANASTOMOSIS USING HAND-ASSISTED LAPAROSCOPIC SURGERY (HALS) FOR ULCERATIVE COLITIS.

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Purpose: The aim of this study was to evaluate the effectiveness of hand-assisted laparoscopic surgery (HALS) for one stage restorative proctocolectomy with a stapled ileal pouch-anal anastomosis in patients with ulcerative colitis (UC).

Methods: The medical records of 183 patients who had undergone primary surgery for UC between 2007 and 2014 in our institution were retrospectively reviewed. We have selected one stage surgery for intractable UC without severe rectal or anal disease. One stage (without diverting ileostomy) restorative proctocolectomy with a stapled ileal pouch-anal anastomosis was performed in 82 patients (45%) in the same period. From 2007, we mainly choose hand assisted laparoscopic surgery (HALS) (67 patients) for one stage surgery, and conventional open surgery (OS) (15 patients) was used for patients with comorbidity, or patients who had an emergency surgery. Patients were divided into two groups according to surgical procedures. Outcomes were compared between groups.

Results: The length of skin incision was significantly shorter in the HALS group (7.6 vs 12.9 cm; $P < 0.01$), and the median operative time was significantly longer in the HALS group (312 vs 249 minutes; $P < 0.01$). There were no significant difference regarding blood loss (403 vs 319 g; $P = 0.170$), surgical complications within 30 days postoperatively (10 vs 1 patients; $P = 0.160$), and hospital stay after surgery (22 vs 23 days; $P = 0.758$).

Conclusions: Although the operative time was elongated, HALS was safe and easy with minimal skin incision for one stage restorative proctocolectomy for UC.

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TOTAL ABDOMINAL COLECTOMY AND ILEORECTAL ANASTOMOSIS (IRA) FOR CROHN'S DISEASE (CD) SINCE THE INTRODUCTION OF BIOLOGIC THERAPY.

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Purpose: Previous studies looking at the duration and efficacy of ileorectostomy for Crohn's Disease (CD) were conducted prior to the introduction of biologic therapy. At that time, the probability of having a functioning ileorectal anastomosis at 5 years was 74%, and only 64% of CD patients with ileorectostomy had acceptable functional results. We sought to determine if these rates have improved since the FDA approval of infliximab for CD in 1998.

Methods: Between January 2003 and January 2015, 59 patients underwent total colectomy and ileorectal anastomosis for Crohn's colitis at a quatenary referral center. Patient's records were reviewed retrospectively. Conversion to permanent ileostomy, with or without proctectomy, was considered a failure of the procedure. Data collected included indication for operation, pathology found at operation, complications, recurrence, and failure rate at 1 and 5 years.

Results: The main indications for surgery were medically refractory disease (56%; n = 33), dysplasia (22%; n=13), and adenocarcinoma of the colon (8%; n=5). At the time of colectomy, 7 patients (12%) had dysplasia and 6 (10%) were found to have adenocarcinoma. Of the 6 patients with adenocarcinoma, 5 had disease longer than 20 years. There was no 30-day postoperative mortality. The 30-day anastomotic leak rate was 8.5% (n=5), all of whom required diversion. Thirty-seven patients (63%) developed recurrent CD: 57% had recurrence in the rectum, 32% had recurrence at the ileorectal anastomosis only, and 11% had recurrence in the small bowel alone. Of the 37 patients with recurrence, all were maintained on steroid and/or biologic therapy with 20 patients requiring both. One year IRA failure rate was 3% (n=2), resulting in permanent end ileostomy. Thirty two of the 59 patients are currently 5 years post op and of these, 3 had failure of IRA requiring proctectomy and end ileostomy. Thus, the five year IRA failure rate is 16% (n=5). All of these late failures had recurrence of medically refractory disease at the anastomosis (n=2) or in the rectum (n=3).

Conclusions: We found that since the introduction of biologic therapy, the rate of intact and functioning ileorectal anastomoses appears to be increasing, likely because recurrent CD is either less frequent or if it occurs, is more readily managed. The use of biologic therapy has improved disease management enough to decrease, or at least delay, permanent diversion in patients undergoing Ileo-rectal anastomosis for CD.

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AN ANALYSIS OF CUMULATIVE AND STAGE TO STAGE OUTCOMES OF STAGE-TO-STAGE, MODIFIED STAGE-TO-STAGE AND 3-STAGE RESTORATIVE PROCTOCOLECTOMY FOR ACTIVE ULCERATIVE COLITIS.

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Purpose: Restorative proctocolectomy for active ulcerative colitis (UC) can be performed as single, 2-stage, modified 2-stage (Total Abdominal Colectomy [TAC] followed by IPAA without diversion) or 3-stage procedure.We hypothesize that the modified 2-stage procedure yields lower cumulative as well as individual stage to stage complication rates than the three stage procedure.

Methods: A retrospective review of institutional data base was performed and all IPAA's created for active UC from March 2000 to August 2015 were included in the study. Single stage IPAA's were excluded (n=28). Methodical review of electronic medical records was performed to obtain demographic and perioperative data to compare the procedures stage by stage. Complications and readmission within 30 days from surgery were recorded. Complications were reported per patient, per procedure, and not as a total number of complications. Primary end point was cumulative and individual rate of complications from all the procedures and readmissions.Univariate analyses (student's t-test and chi-square test) were performed to compare patient characteristics and perioperative outcomes.

Results: A total of 262 patients were included. Average age was 37.8±13 years;male gender (66%) was preponderant. 2-stage IPAA was performed in 129 patients (49.2%),modified 2-stage in 41 (15.6%) and 3 stage in 92 (35.1%). The use of steroids before TAC was similar between modified 2-stage and 3 stage patients ($p<0.05$). Cumulative complication rate for all pouch stages was 33.6% (n=88) and overall readmission rate was 23.3% (n=61). The cumulative complication rates for 2-stage, modified 2-stage and 3-stage pouches were 29.5%, 22% and 44.6 %, respectively ($p=0.01$). The cumulative readmission rates for 2-stage, modified 2-stage and 3-stage pouches were 20.2%, 14.6% and 31.5%, respectively ($p=0.049$). When procedures were compared at each stage (Table 1), there were no differences in outcomes during the index IPAA procedure across all groups ($p<0.05$). Hence it was clear that the difference in morbidity between the 3 groups was accumulated from the other (non-IPAA) procedures. 3-stage procedures had significantly higher complication rate (25%) for total abdominal colectomies (TAC) compared to modified 2-stage (9.8%) patients ($p=0.048$).

Conclusions: Stage to stage comparison of complication rates show that 2 stage and modified 2 stage IPAA share similar outcomes in patients with active UC. Modified 2 stage IPAA has lower morbidity and readmission rate despite similar pre-operative steroid usage. Ileostomy closure stage provides additional morbidity to the 3-stage IPAA"s and this cannot be ignored. In conclusion a modified 2 stage IPAA should be considered in patients who return for pouch creation after a total abdominal colectomy in the acute setting.

Outcomes of patients undergoing staged restorative proctocolectomy for ulcerative colitis.

Outcomes	2-Stage N=129 TPC, IPAA with ileostomy	2-Stage N=129 Ileostomy Closure	Modified 2 Stage N=41 TAC	Modified 2 Stage N=41 IPAA	3-Stage N=92 TAC	3-Stage N=92 IPAA with diverting loop ileostomy	3-Stage N=92 Ileostomy closure
Overall complications per procedure	19 (4.7%)	21 (16.3%)	4 (9.8%)	6(14.6%)	23 (25%)	11 (12%)	21 (22.8%)
Surgical Site Infection	5 (3.9%)	4(3.1%)	1(2.4%)	4 (4.8%)	2 (2.2%)	2 (2.2%)	2 (2.2%)
Deep Organ Space Infection	3 (2.3%)	1 (0.8%)	0	2 (4.9%)	3 (3.3%)	3 (5.4%)	4 (4.3%)
Thromboembolic event	1 (0.8%)	0	0	0	3 (3.3%)	2 (2.2%)	0
Cardiac complications	0	0	0	0	0	0	0
Pulmonary Complications	2 (1.6%)	0	0	0	0	1 (1.1%)	2 (2.2%)
Bowel Obstruction	3 (2.3%)	5 (3.4%)	1(2.4%)	0	7 (7.6%)	1 (1.1%)	9 (9.8%)
Prolonged Ileus	7 (5.4%)	12 (9.3%)	1 (2.4%)	2 (4.9%)	5(5.4%)	7(7.6%)	9 (9.8%)
Unplanned return to the operating room	4 (3.1%)	1 (0.8%)	0	2 (4.9%)	2 (2.2%)	0	4 (4.3%)
Death	1 (0.8%)	0	1 (2.4%)	0	0	0	0
Readmission	22(17.1%)	9 (7%)	3 (7.3%)	2 (4.9%)	16(17.4%)	11 (12%)	11 (12%)
Pre-operative steroids	60(46.5%)	7 (5.5%)	30(73%)	11(26.8%)	70 (76%)	17 (16.5%)	2 (2.2%)
Pre-operative Anti-TNF Agents	11 (8.3%)	1 (0.8%)	1 (2.4%)	1 (2.4%)	18(19.8%)	3 (3.3%)	1 (1.1%)

TPC - Total proctocolectomy

TAC - Total abdominal colectomy

IPAA- Ileal Pouch Anal Anastomosis procedure

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IMPACT OF IMMUNOSUPPRESSANTS ON POSTOPERATIVE COMPLICATIONS FOLLOWING COLECTOMIES FOR CROHN'S DISEASE: RESULTS FROM THE ACS-NSQIP DATABASE.

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Purpose: The impact of immunosuppressants on postoperative complications following colon resections for Crohn's disease remains controversial. We hypothesize that patients with Crohn's disease who were on immunosuppressants within 30 days of their colectomy were at increased risk of postoperative complications compared to those who were not on these medications.

Methods: After Institutional Board Review approval, patients with Crohn's disease who underwent elective colectomies, between 2012-2013 were identified from the American College of Surgeons National Surgical Quality Improvement Program database. Immunosuppression for Crohn's disease was predefined in this database as use of regular corticosteroids or immunosuppressants within 30 days of the operation. Patients who received chemotherapy/radiotherapy within 90 days of surgery, and patients who had disseminated cancer, preoperative shock or emergency surgery were excluded. Multivariate logistic regression was used to assess the impact of immunosuppression on major morbidity, infectious complications, anastomotic leak, organ space infection, wound infections (superficial and deep surgical site infection) and reoperation.

Results: Of 1724 Crohn's disease patients who met the inclusion criteria, 1,101 were immunosuppressed and 623 were immunocompetent. Nine percent, 29% and 61% of patients underwent a subtotal colectomy, segmental colectomy and ileocolic resection, respectively. Though immunosuppressed and immunocompetent patients' demographic, disease and operative characteristics were similar, on univariate analysis, immunocompetent patients were older (43.9 vs. 39.3 years, $p<0.001$), and had higher body mass indices (26 vs. 25 kg/m^2, $p=0.029$), rates of chronic obstructive pulmonary disease (2.4% vs. 0.9%, $p=0.012$), and hypertension (18.6% vs. 14.8%, $p=0.039$), compared to immunosuppressed patients. Immunosuppressed patients were more likely to undergo a laparoscopic approach (52.1% vs. 46.3%, $p=0.002$), have a stoma (18.1% vs. 14.1%, $p=0.034$) or a contaminated wound (24.1% vs. 18.9%, p=0.012) compared to immunocompetent patients. On multivariate logistic regression, the likelihood of major morbidity (OR 1.47 95%CI[1.09-1.98]), anastomotic leak (OR 1.93 95%CI[1.08-2.44]), organ space infection (OR 1.64 95%CI[1.19-2.25]), infectious complications (OR 1.50 95%CI[1.13-2.00]) and reoperation (OR 2.16 95%CI[1.24-3.77]) were all significantly greater for immunosuppressed compared to immunocompetent patients with Crohn's disease.

Conclusions: Patients with Crohn's disease who were on immunosuppressants within 30 days of an elective colectomy had significantly increased rates of infectious complications, anastomotic leak, organ space infection, major morbidity and reoperation compared to Crohn's disease patients who were not on immunosuppressants.

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PROGNOSIS OF ADOMINOPERINEAL RESECTION FOR SEVERE ANORECTAL CROHN'S DISEASE.

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Purpose: Abdominoperineal resection (APR) is definite surgical treatment for severe anorectal Crohn's disease (ARC) being preferable in western countries. Recently, the number of this procedure is increasing in Japan, too. The purpose of this study is to evaluate the prognosis of APR for severe ARC.

Methods: One hundred and thirty six patients (97 males and 39 females) with APR for their severe ARC were included. Average age at onset of Crohn's disease was 21 years and average age at APR was 38 years. Average duration of follow-up after APR was 50 months. Medical records were reviewed and clinical data was collected, included, preoperative anorectal complications, symptoms, complications and social activity after APR.

Results: Anorectal complications were complex anal fistula (n=104), anorectal stenosis (n=96), rectal fistula (n=36), rectovaginal fistula (n=24), perirectal abscess (n=14), rectourethral fistula(N=5) and anorectal cancer (n=27). Among 109 patients without anorectal cancer, most of their symptoms, such as, abdominal pain, pyrexia, fecal incontinence, vaginal gas or feces, difficulty on defecation, improved completely after APR. Delayed perineal wound healing occurred in 31% and caused suppurative discharge or pain. Fistula from perineal wound to small intestine developed in 6 patients and needed further surgery. Sexual dysfunction was complicated in 2 male patients. Eighty patients had work (or wanted to work) or went to school and 6 patients were looking for their new job .

Conclusions: APR for severe ARC is effective in terms of improving the symptoms and offering relatively good social life and has an advantage of removal of all anorectal lesions. The results let us to recommend APR to the patients with severe ARC, irrespective of some complications.

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RISK FACTORS OF A NEED FOR RECONSTRUCTION OF A STOMA IN PATIENTS WITH CROHN'S DISEASE.

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Purpose: Although stoma construction is generally a useful method for treating Crohn's disease patients, some patients result in stoma reconstruction as a course of disease. The aim of this study was to evaluate risk factors of a need for re-construction of a stoma in patient with Crohn's disease.

Methods: Thirty-nine consecutive cases with Crohn's disease who underwent permanent stoma construction at Hiroshima University Hospital January 2005 through December 2014 were enrolled in the study. Patient's demographics, the type of stoma, postoperative complications at

the stoma site, and a combined medical therapy were reviewed retrospectively and the relationship between these factors and a need for re-construction of a stoma were assessed.

Results: There were 25 men and 14 women included and median age at the time of surgery was 40 (range, 21-63) years. The type of stoma was classified into ileostomy (74.4 %) or colostomy (25.6 %), Nine (23.1 %) cases had erosion, three (7.7 %) had parastomal hernia, and Crohn's disease-specific complications (fistula, abscess, stricture) were presented in eight cases (20.5 %). Sixteen cases (41.0 %) took biologics before the surgery, and nine (23.1 %) cases started taking biologics after the surgery.Ten (25.6 %) cases needed re-construction of a stoma in this study period. In the univariate analysis, age (under 40 years), disease duration (under 200 months), history of previous construction of a stoma, residual active lesions at the time of previous surgery, postoperative complications at the stoma site, Crohn's disease-specific complications at the stoma site were identified as risk factors of a need for re-construction of a stoma ($p < 0.05$). In the multivariate analysis, history of previous construction of a stoma (OR: 8.14, 95%CI: 1.09-9.15), Crohn's disease-specific complications at the stoma site (OR: 4.42, 95%CI: 0.06-16.5) were detected as independent risk factors.

Conclusions: Early detection and appropriate management of complications especially specific for Crohn's disease may have a possibility to avoid re-construction of a stoma.

Multivariate analysis of the risk factors of a need for re-construction of stoma. (Logistic regression analysis)

	OR	95%CI	p
Age (<40)	8.74	0.01-66.6	0.47
Disease duration (<200 months)	8.27	2.46-4.06	0.47
Previous construction of a stoma	8.14	1.09-9.15	0.006
Residual active lesions	0.16	0.03-3.88	0.27
Postoperative complication	1.7	0.04-26.6	0.36
Crohn's disease-specific complications	4.42	0.06-16.5	0.002

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POUCH VOLVULUS IN PATIENTS HAVING UNDERGONE RESTORATIVE PROCTOCOLECTOMY FOR ULCERATIVE COLITIS: A CASE SERIES.

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Purpose: Restorative proctocolectomy with ileal pouch-anal anastomosis (IPAA) has become the operation of choice in patients with medically refractory Ulcerative Colitis (UC). Intestinal obstruction is a common complication. However, obstruction due to pouch volvulus is extremely rare and only described in case reports. Diagnosis of IPAA pouch volvulus is challenging, as it is often mistaken for other conditions, delaying care and increasing morbidity. We report a series of patients diagnosed and treated for IPAA pouch volvulus at our institution to delineate symptoms and successful management which may help avoid ischemia and pouch necrosis.

Methods: During a 5-year period from 2010-2015 a total of 6 patients were diagnosed with IPAA pouch volvulus. A retrospective review was performed to analyze clinical, endoscopic and radiographic indicators of pouch volvulus. Management strategies were identified.

Results: Six patients with Ulcerative Colitis were identified with IPAA pouch volvulus. The majority (5/6, 83%) underwent a laparoscopic pouch creation with symptoms manifesting within five years of the initial surgery. Complications preceding volvulus were pouch ulceration (5/6, 83%) and pouchitis (4/6, 67%). The most common presenting symptoms of volvulus were abdominal pain (4/6, 67%) and obstipation (4/6, 67%). Multiple imaging modalities were utilized, though computed tomography (CT) scan was most likely to discover a volvulus. Management was primarily operative (5/6, 83%) with excision of IPAA (3/6, 50%), pouch-pexy (1/6, 17%), and defect closure ((1/6, 17%). Both operative and non-operative treatment with endoscopic detorsion resulted in low morbidity and improved patient symptoms. There were no mortalities.

Conclusions: IPAA volvulus is a rare complication in patients who are surgically treated for Ulcerative Colitis. Endoscopic discovery of pouch ulceration correlating with symptoms of pouchitis or obstipation should prompt concern for a twisting pouch. Diagnosis is multimodal; certainly, early diagnosis may and allow for pouch salvage.

Table 1. IPAA History	
Total Proctocolectomy w/ IPAA Laparoscopic: Open	5:1
Symptom Onset from Initial Surgery < 5 years	4/6 (67%)
Symptoms	Abdominal pain 4/6 (67%) Obstipation 4/6 (67%) Emesis 3/6 (50%) Diarrhea, incontinence 2/6 (33%)
Pouch Complications	Pouch ulceration 5/6 (83%) Pouchitis 4/6 (67%) Fistula 2/6 (33%) Small bowel obstruction 2/6 (33%) Enterocutaneous fistula 2/6 (33%) Neo-rectal vaginal fistula 2/6 (33%)
* Imaging	CT Abdomen/Pelvis 6/6 (100%) Endoscopy 5/6 (83%) Contrast enema 4/6 (67%)
Definitive management	Excision of IPAA 3/6 (50%) Exploratory laparotomy: Pexy 1/6 (17%) Defect closure 1/6 (17%) Endoscopic detorsion 1/6 (17%)
*Diagnosis achieved by: CT scan (3/6), Contrast enema (1/6), Endoscopy (1/6), OR (1/6) CT localized to IPAA in 83%.	

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POUCH EXCISION: ETIOLOGY AND ASSOCIATED MORBIDITY.

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Purpose: Ileal pouch anal anastomosis (IPAA) remains the operation in patients with ulcerative colitis (UC) and familial adenomatous polyposis (FAP). Despite its technical success, some pouch complications cannot be mitigated by fecal diversion, revision or reconstruction, and pouch excision is required. Limited data exists on the etiology of ultimate pouch failure requiring excision, time and morbidity prior to reaching the decision for pouch excision, and post operative morbidity associated with pouch excision surgery. We sought to better understand the etiology of pouch excision, duration of morbidity prior to reaching excision, and the post operative morbidity associated with IPAA excision.

Methods: A retrospective review of all patients who underwent IPAA excision at a quaternary referral center between 1994 and 2015 was performed. Data collected included demographics, indications for surgery, and short (<30 days) and long-term (>30 days) complications.

Results: 168 patients (82 females, median age 45 years) with an initial diagnosis of ulcerative colitis (n=155), familial adenomatous polyposis (n=11), indeterminate colitis (n=1), and HNPCC (n=1) have undergone pouch excision at our institution in the last 20 years. Mean time from pouch creation to pouch excision was 8 years (range 1 to 27 years). Fifty patients (30%) underwent a temporary diverting loop ileostomy prior to pouch excision. Indications for pouch excision included Crohn's disease (CD) of the pouch (n=61; 36%), pelvic sepsis (n=46, 27%), pouch dysfunction (n=28, 17%), refractory pouchitis (n=26, 15%), and malignancy (n=7, 4%). Interestingly, 62% (n=38 of 61) of cases of CD of the pouch have been seen within the last three years. Mortality occurred in 1patient (<1%) within 30 days of pouch excision. Short and long term complications were seen in 66 (36%) and 57 (34%) patients, respectively.Morbidity is outlined in Table 1.

Conclusions: The most common reason for IPAA excision at our institution is Crohn's disease, seemingly increasing in recent years. Pouch excision is associated with significant short and long term morbidity, and a high readmission rate. Future studies should attempt to identify pre-IPAA risk factors for subsequent development of CD of the pouch as these cases comprise more than a third of our series, and result in significant patient morbidity requiring numerous operative interventions prior to reaching the operating room for pouch excision.

Post operative Short and Long Term Complications

Short term morbidity (<30 day)		n=84	
	SSI (abdominal and perineal wound)	21	12.5%
	Pelvic abscess	16	9.5%
	Post Op Ileus	19	11.3%
	Post op bleeding requiring transfusion	13	7.7%
	Urinary retention	15	8.9%
Long term morbidity (>30 day)		n=69	
	Perineal wound	21	12.5%
	Pelvic abscess	7	4.1%
	Operative interventions	20	11.9%
	Parastomal/ventral hernia	12	7.1%
	SBO	9	5.4%

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POSTOPERATIVE OUTCOMES FOLLOWING EMERGENT VERSUS ELECTIVE COLECTOMY IN THE SETTING OF ULCERATIVE COLITIS.

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Purpose: Nearly a third of all patients with ulcerative colitis (UC) will eventually undergo colectomy for dysplasia, malignancy, or medically refractory disease. While some UC patients with dysplasia or inadequate response to medical therapy undergo an elective colectomy, others present emergently with severe UC refractory to medical therapy. We sought to understand the morbidity and mortality associated with emergent colectomy compared to elective colectomy in the setting of UC.

Methods: All patients with a primary diagnosis of UC undergoing colectomy within the ACS NSQIP dataset from 2006-2013 were analyzed. Patients were stratified by emergency versus elective surgery. Assessment of patient outcomes including total hospital length of stay (HLOS), post-surgical length of stay (SLOS), complications, and death were completed controlling for co-morbidities (cardiovascular, diabetes, COPD, and renal insufficiency) and demographic factors where appropriate, utilizing chi-squared and multivariate linear and logistic regression. Serious complications were defined as myocardial infarction, cardiac arrest, stroke, septic shock, acute renal failure, pulmonary embolism, and deep space SSI.

Results: 2080 patients were identified as having undergone emergent (n=318; 15.2%) or elective (n=1762; 84.7%) colectomy for complications for UC. Eleven percent (n=35) of emergent colectomies were performed laparoscopically compared to 62.0% (n=1092) of elective colectomies (p<0.001). 46.5% of emergent and 24.7% of elective cases had one or more complications (p<0.001). Patients undergoing emergent surgery were more likely to have cardiac, pulmonary, renal, neurologic, or sepsis related complications or death within 30 days (p<0.001 for each variable), but were no more likely to have surgical site (p=0.47) or urinary tract infection complication (p= 0.50). On multivariate linear regression, patients undergoing emergency surgery had an average increase in HLOS and SLOS of 5.9 (95% CI 4.1-7.8, model F-statistic 41.5, p<0.0001) and 3.9 (95% CI 2.8-4.9, model F-statistic 91.7, p<0.0001) days, respectively. After controlling for pre-operative comorbidities, patients undergoing emergency surgery were 2.4 and 6.9 times more likely to have a serious complication (p<0.0001) or die (p<0.0001) within 30 days of surgery, respectively.

Conclusions: Patients who undergo emergent colectomy for UC have significantly increased length of hospital stay, risk of postoperative serious complications, and death within 30 days of surgery. UC patients should be appropriately counseled regarding the indications and timing of colectomy, particularly in the inpatient setting or with biologic-refractory disease,

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PREOPERATIVE SHORT COURSE RADIOTHERAPY FOR RECTAL CANCER PROVIDES EXCELLENT DISEASE CONTROL AND TOXICITY RESULTS IN A US SETTING.

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Purpose: Short course radiation therapy (SCRT) followed by immediate surgery for locally advanced rectal cancer (LARC) has rarely been utilized outside of northern Europe despite two randomized, phase III trials that demonstrate equivalence to conventional preoperative chemoradiation (CRT). Recently, both the NCCN (National Comprehensive Cancer Network) and ASTRO (American Society of Radiation Oncology) have included SCRT as an option for select patients with LARC. However, results of this approach have not been well described in a US setting.

Methods: An institutional database of anorectal cancer was retrospectively reviewed with IRB approval. SCRT was routinely offered to patients with 1) inability to discern T3 versus T2 disease, 'T2+' 2) cT3N0 disease 3) high tumors (>8cm from anal verge) or 4) social considerations. All patients were evaluated jointly by a colorectal surgeon and radiation oncologist prior to treatment. Inclusion criteria included biopsy-proven rectal adenocarcinoma, preoperative RT with 20-25 Gy in 5 fractions, and planned immediate completion of surgery after RT. Exclusion criteria included metastatic disease at presentation, prior pelvic RT, and <2 years of follow-up. Censored cases with ≥2 years of follow-up were included along with any disease failure or death. We collected information on clinical stage, tumor size, distance from anal verge, timing of surgery, margin status, downstaging, acute/late toxicities and disease outcomes.

Results: 202 patients met the above criteria from 1977 to 2011. The mean age was 63.2 years (range 24-90). The majority of patients had cT2 (42.1%) or cT3 (50%) disease and 13.4% had cN1 disease. The mean tumor size and the mean distance from the anal verge were 3.5 cm (range 1-10) and 8.7 cm (range 1-16), respectively. The median time to surgery was 3 days (range 1-64) with 98% occurring within 1 week. 74% received sphincter-saving surgery. R0 and R1 resection rate were 98% and 2%, respectively. 5.4% had pathological complete response. Median follow-up was 6.5 years (range 2-29.2). 5-year Kaplan-Meier outcomes were 96.8% for local control (LC), 79.9% for disease-free survival (DFS), and 86.3% for overall survival (OS). For cT3 patients, 5-year LC, DFS, and OS were 94.3%, 76.1%, and 80.1%, respectively. The grade 3/4 acute and late toxicity rate was 2.5% and 13.4%, respectively.

Conclusions: Our institutional experience highlights that SCRT followed by immediate surgery is a safe and effective treatment for select patients with rectal cancer in the US. The late toxicity rate is consistent with the preoperative long course CRT from the German Rectal Cancer Study group outcomes. Though SCRT has not been widely adopted, recent updates to the national guidelines for rectal cancer; as well as financial pressures to reduce healthcare costs may lead to increased utilization in the future.

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LIMITED UPPER GASTROINTESTINAL SCREENING IS REASONABLE IN LYNCH SYNDROME PATIENTS.

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Purpose: Lynch syndrome (LS) is associated with an increased risk of gastric and small bowel cancer, however, the utility of screening for these cancers is debated and recommendations vary widely from none to evaluation at regular intervals. Our institutional screening protocol starts esophagogastroduodenoscopy (EGD) at age 25; if normal, subsequent examina-

tion is recommended in 3 years. Positive exams are followed up as indicated by age, family history, and pathology. This study reviews the results of an upper gastrointestinal screening program in LS to help guide clinical management.

Methods: A single institution prospectively maintained hereditary colorectal cancer database was queried for LS patients defined by presence of a DNA mismatch repair gene germline mutation. Upper gut screening methods, findings, and screening intervals were recorded. Patients evaluated for symptoms or with history of upper gut malignancy were not included.

Results: 153 LS patients were screened from 1985 to 2015. Screening included 371 evaluations over a median of 3.5 patient years (range <1-23.7 years). The median number of screening endoscopies was 2 (range 1-15). The median age at first screening endoscopy was 46 years. Thirty-one (20.3%) patients had at least 1 polyp detected and the median number detected per endoscopy was 5 (range 1-35). Ten patients had more than one positive endoscopy (median 2, range 2-8). A polyp was detected in 57 endoscopies (15.4%); of which 54 had at least one polyp in the stomach or gastroesophageal junction, and 6 had polyps in the duodenum or jejunum. The distribution of gastric polyp pathology was fundic gland (n=37, 64.9%), hyperplastic (n=12, 21.1%), adenomatous (n=8, 14%), and metaplastic (n=2, 3.5%). Four patients were found to have 14 gastric and small bowel adenomas: 8 gastric, 5 duodenal, and 1 jejunal (**Table**). The earliest age at which a polyp was detected was 24 years. Of the 4 patients with adenomas, 2 had *MLH1* mutations, 1 had an *MSH2* mutation, and 1 had a *PMS2* mutation. Two of these 4 had family members with an upper GI cancer. No carcinomas were detected on screening endoscopy. There were no complications recorded for any of the endoscopies.

Conclusions: LS patients are at increased risk for small bowel cancer and this screening program identified premalignant gastric, duodenal, and jejunal adenomas in 2.6% of patients. Our data do not support programmatic upper endoscopy evaluations for all Lynch syndrome patients, though a baseline EGD at age 25 may identify individuals at risk for upper gastrointestinal neoplasia.

Adenomatous Polyps in Lynch Syndrome Patients

Patient	Gene Mutation	Polyp Location	Age at Detection, years	# EGD of total EGDs	Interval From Previous EGD or Capsule Endoscopy	Family History of Upper GI Cancer?
1	*MSH2*	Stomach	66.2	1rst of 6	--	Yes
1		Stomach	67.8	3rd of 6	12 months	
2	*MLH1*	Jejunum	72	6th of 7	2 months	Yes
3	*PMS2*	Stomach	24.5	1st of 6	--	No
3		Stomach	25	2nd of 6	7 months	
3		Stomach, Duodenum	25.9	3rd of 6	10 months	
3		Stomach, Duodenum	27	4th of 6	2 months	
3		Stomach, Duodenum	27.5	5th of 6	6 months	
3		Stomach, Duodenum	28.7	6th of 6	7 months	
4	*MLH1*	Duodenum	79	2nd of 2	52 months	No

EGD = Esophagogastroduodenoscopy

P119

REPEAT TRANSANAL ENDOSCOPIC MICROSURGERY FOR RECURRENT LESIONS - A MATCHED-PAIR CASE-CONTROL STUDY.

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Purpose: Transanal Endoscopic Microsurgery (TEM) is the procedure of choice for rectal adenomas and select early cancers. In the past decade, TEM has become ubiquitous and surgeons are beginning to see recurrent lesions after TEM resection. The aim of this study is to determine whether repeat TEM is a safe and feasible procedure.

Methods: At St. Paul's Hospital, TEM has been performed since 2007 and data for all patients has been prospectively collected and maintained in the SPH-TEM database. Demographic, pathologic, operative and postoperative data were collected. All consecutive patients treated with repeat TEM (TEM-R) for excision of a persistent or recurrent rectal lesion were identified. A comparison cohort of first time TEM treated patients (TEM-P), matched for age, gender, ASA score, BMI, tumor location, tumor size and patient positioning. Operative and surgical outcomes were analysed using student t test and chi square statistics.

Results: Between 2007 and 2015, 514 patients were treated by TEM at SPH. Of these, 32 (6.2%) patients were in the TEM-R group. These were matched to 32 patients in the TEM-P comparison cohort. Indications for repeated TEM were tumor recurrence (69%), involved margins (25%) and metachronous lesion (6%). Median operative time (46 min vs 45.5 min, p=), estimated blood loss (5cc vs 5cc, p=), length of hospital stay (0 day vs 0 day, p=) and rates of clear margins on pathology (87.5% vs 96.9%, p = 0.35) were similar between the two groups. No perioperative complications occurred in either group. Repeat TEM was associated with more unsutured rectal defects (66% vs 34%, p = 0.024) and a trend toward increased specimen fragmentation (25% vs 7%, p = 0.09). No difference was observed between groups in terms of post-operative bleeding rate (3% vs 6%, p = 0.48), readmission rate (9% vs 9%, p = 1) and overall complication rate (13% vs 16%, p = 0.77).

Conclusions: While repeat TEM can be technically challenging, it is a safe and feasible procedure when performed by experienced surgeons.

P120

PRECARIOUS MARGINS AFTER LAPAROSCOPIC PROCTECTOMY COMBINED WITH TRANSANAL TOTAL MESORECTAL EXCISION (TATME) FOR LOW RECTAL CANCERS – A CASE-MATCHED COMPARISON.

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Purpose: The combination of laparoscopy with transanal total mesorectal excision (taTME) has recently been described as an additional tool for rectal cancer resections. This approach combines the benefits of potential better visualization of low rectal tumors with natural orifice extraction. Our aim was to compare our initial series of rectal cancer resections with the adjunct of a transanal approach to historical controls at our same institution operated solely via a transabdmonimal minimally invasive approach.

Methods: Prospectively collected data were case-matched based on body mass index and tumor location with retrospectively collected rectal cancer resections. Preoperative, perioperative and pathologic variables were compared using unpaired t-test and chi-square analysis.

Results: Seven cases of laparoscopic proctectomy with taTME were case-matched with 11 historical controls from 2008-2012. Patient demographics and perioperative variables were not statistically different between groups. As a whole there was no difference between the distal margin status between groups, however 3 cases in the taTME group had distal margins <5mm (1, 2, 4 mm). Although there were a greater number of incomplete mesorectal specimens in the taTME group (71% vs. 29%), this did not reach significance due to the number of ungraded specimens in the control group (n=4). Close circumferential radial margins (≤5mm) were present in 57% (n=4) in the taTME group compared to none in the control group (figure 1).

Conclusions: Preliminary data from our single institution suggest that the addition of a transanal approach to low rectal cancer resection may lead to an increase in poor quality surgical specimens and close resection margins. Data from other institutions will be required to verify these findings.

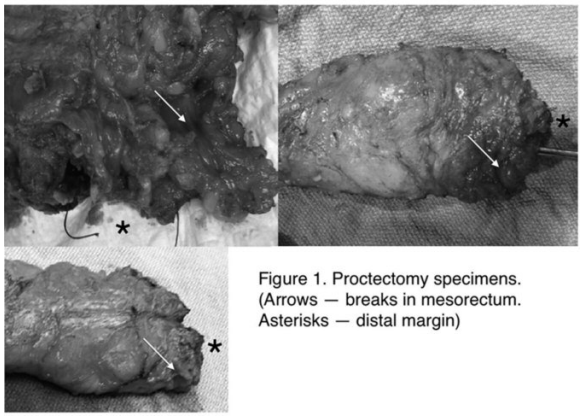

Figure 1. Proctectomy specimens. (Arrows — breaks in mesorectum. Asterisks — distal margin)

P121

LYMPH NODE YIELD IS AN INDEPENDENT PREDICTOR OF SURVIVAL IN RECTAL CANCER.

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Purpose: Lymph node yield is used as a marker for an adequate oncologic resection and has been shown to be associated with survival, though most of the data arises from colon cancer cohorts. The current recommendation from the American Joint Committee on Cancer is that at least 12 nodes are necessary to confirm node-negative disease and to avoid understaging. Despite this guideline, the 12 lymph node target is not always reached, particularly in patients who have received neoadjuvant treatment. The aim of this study was to examine the impact that lymph node yield has on prognosis following neoadjuvant chemoradiation in rectal cancer.

Methods: The 2006-2011 National Cancer Data Base was queried for clinical stage I-III rectal cancer patients who underwent surgical resections. Suboptimal lymph node yield was defined as <12 lymph nodes examined. A mixed-effect multinomial logistic regression model was used to 1) identify independent factors associated with lymph node yield and 2) compare risk-adjusted hospital specific rates of suboptimal lymph node yield. Separate mixed-effect Cox proportional-hazards models were subsequently used to estimate the adjusted effect of lymph node yield on 5-year overall survival.

Results: A total of 25,447 patients met inclusion criteria. 62.2% of the cohort received neoadjuvant chemoradiation and 31.8% of the cohort had suboptimal lymph node yield. The median lymph node yield for patients who received neoadjuvant therapy was 13 (IQR: 9-18) versus 15 (IQR: 12-21) in patients who did not receive neoadjuvant therapy. For patients who received neoadjuvant therapy, an interval of >8 weeks between the end of neoadjuvant treatment and surgery was independently associated with a 27% (OR=0.83, 95% CI=0.78-0.90) increase in the odds of suboptimal lymph node yield. After risk adjustment, there was a 3.5 fold difference in the rate of suboptimal lymph node yield among individual hospitals (27% to 95%). Suboptimal lymph node yield was independently associated with increased hazard of death (HR=1.22, 95%CI=1.14, 1.29) when controlled for neoadjuvant treatment, adjuvant treatment, staging, proximal and distal margins, and other patient level factors.

Conclusions: Optimal lymph node yield is independently associated with improved overall survival regardless of neoadjuvant therapy, pathological staging, and patient factors in rectal cancer. This finding underlies the importance and challenge of an optimal lymph node evaluation for prognostication, especially for patients receiving neoadjuvant therapy. Although the use of lymph node yield as a marker of the quality of care remains controversial, our findings emphasize the adverse outcome associated with a low lymph node harvest even in the setting of neoadjuvant therapy. Given the impact of lymph node yield on long term survival, additional work is needed to elucidate what the optimal evaluation of lymph nodes should be in rectal cancer patients.

Mixed-effects multivariable analysis for optimal lymph node yield

	Odds Ratio	95% CI	P-Value
Age			
<50	Reference	--	--
51-60	0.68	0.61-0.75	<0.0001
61-70	0.63	0.55-0.70	<0.0001
70+	0.57	0.50-0.66	<0.0001
Charlson-Deyo Score			
0	Reference	--	--
1	0.97	0.88-1.07	0.56
2+	0.76	0.64-0.89	<0.0001
Clinical Stage			
I	Reference	--	--
II	1.06	0.96-1.18	0.27
III	1.40	1.24-1.58	<0.0001
Received Neoadjuvant Chemoradiation	0.35	0.32-0.38	<0.0001
Operation			
Partial Proctectomy	Reference	--	--
Complete Proctectomy	0.91	0.85-0.98	0.012
Proctectomy NOS	1.98	0.75-1.58	0.67
Surgical Approach			
Laparoscopic	Reference	--	--
Open	1.00	0.87-1.14	0.96
Unknown	1.08	0.89-1.29	0.44
Pathologic T-Stage			
pT0/ypT0	Reference	--	--
pT1/ypT1	1.05	0.89-1.22	0.59
pT2/ypT2	1.43	1.25-1.63	<0.0001
pT3/ypT3	1.57	1.39-1.81	<0.0001
pT4/ypT4	1.45	1.17-1.81	<0.0001
Pathologic N-Stage			
pN0/ypN0	0.86	0.79-0.94	0.002
pN1/ypN1	Reference	--	--
pN2/ypN2	2.22	1.94-2.58	<0.0001
Positive Proximal/Distal Margins	0.66	0.56-0.77	<0.0001
Hospital Type			
Academic	Reference	--	--
Community	0.74	0.60-0.90	0.006
Comprehensive	0.88	0.76-1.02	0.11
Other	0.38	0.10-1.30	0.14
Rectal Cancer Resections Annually			
0-9.3	Reference	--	--
>9.3-19.5	1.29	1.11-1.49	0.002
>19.5	1.94	1.62-2.39	<0.0001

Model also controls for race, sex, income, education, population density, insurance status, year of diagnosis, histology, adjuvant therapy, hospital location, and unplanned readmissions within 30 days.

P122

FEASIBILITY STUDY TO EVALUATE THE SAFETY AND UTILITY OF A NOVEL CIRCUMFERENTIAL IMAGING DEVICE TO VISUALIZE THE ANAL CANAL IN PATIENTS WITH ANAL DYSPLASIA.

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Purpose: Anal cancer incidence has increased dramatically in the last 10 years with up to 4 million men and women at risk for anal cancer in the US. Anal HPV testing, anal Pap smear and high resolution anoscopy (HRA) are currently used for anal cancer screening although the definitive screening modality remains to be determined. To improve on imaging of the anal canal, we designed and developed a novel imaging device capable of imaging the anal canal circumferentially (Figure 1A, B). We conducted a first in man clinical trial to determine feasibility and safety of this device in patients at high risk for anal cancer.

Methods: Under an IRB approved protocol, 10 patients with a history of cervical or anal cancer and who were scheduled for surveillance exams were consented and accrued. The patients underwent exam under anesthesia (EUA), HRA and evaluation with the novel imaging device under general anesthesia. Findings were photographed using an in-line camera attached to the colposcope and with the device. Biopsies were completed if clinically indicated based on HRA findings. Patients were followed up within 2 weeks of the procedure.

Results: Of the 10 patients consented to the protocol, 7 patients had EUA, HRA and imaging with the device. One patient was not imaged with the device due to a technical malfunction; the other two patients had severe anal stenosis preventing device insertion. No adverse events related

to use of the device have been reported. Representative images demonstrate excellent imaging characteristics including resolution comparable to HRA images obtained during the same examination (Figure 1C-E) and reproducible images with multiple insertions. Findings were photographed using an in-line camera attached to the colposcope and with the device. Biopsies were completed if clinically indicated based on HRA findings. Patients were followed up within 2 weeks of the procedure.

Conclusions: The circumferential imaging device is safe for clinical use and is capable of obtaining reproducible images that are comparable to images of HRA findings. Future clinical studies are needed to determine the performance characteristics of this device in detecting anal epithelial abnormalities in comparison with HRA.

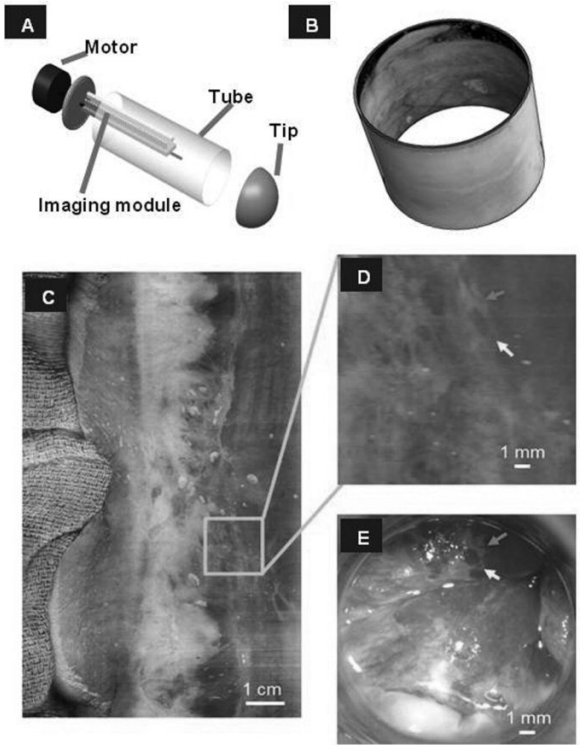

Figure 1. High resolution circumferential imaging of the anal canal. A. The imaging principle and design set up of the imaging device. B. A 360-degree scanned image in a porcine model. C. The linearized full field-of-view image with the zoomed in area (D), in a patient. E. The same area as seen at HRA and photographed by an in-line camera.

P123

PROGNOSTIC AND ONCOLOGIC SIGNIFICANCES OF PERINEURAL INVASION IN SPORADIC COLORECTAL CANCER.

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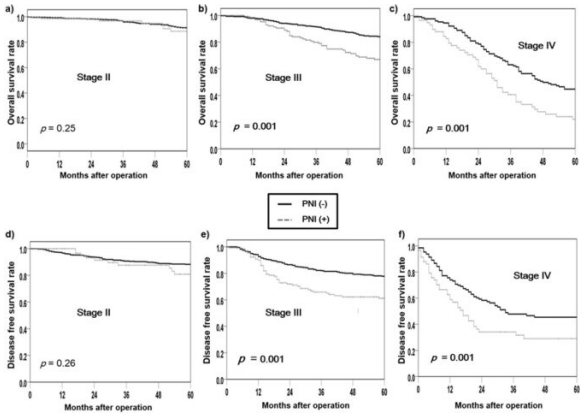
Purpose: The existence of peri-neural invasion (PNI) indicates a more aggressive phenotype. The aim of this was to evaluate the oncologic outcome of PNI positive tumor and to investigate wether the PNI status have affected patient survival.

Methods: DESIGN: This is a retrospective observational study. **SETTING**: This study was conducted at a single, tertiary center. **PATIENTS:** 1,983 patients, who underwent curative surgery for colorectal adenocarcinoma between January 2006 and December 2008, were included. The patients were classified into two groups depending on thier PNI status: PNI+ and PNI- group. **MAIN OUTCOME MEASURES:** Survival and recurrence

Results: Among 1,983 patients, the PNI+ tumor identified in 268 (13.5%). PNI+ group, compared to PNI- group, was significantly poorly differentiated (7.5 *vs.* 3.8%, p = 0.015), necrotic (39.6 *vs.* 31.0%, *p* = 0.009), associated more with LVI (53.0 *vs.* 17.7%, *p* = 0.001), and more advanced TNM stage. The PNI+ group had an adverse effect, compared with the PNI- group, regarding 5-year overall survival (5y-OS) (65 *vs*. 88%, respectively, *p* = 0.001) and the 5-year disease free survival (5y-DFS) (63 *vs*. 85%, respectively, *p* = 0.001). In stage II, there was a significantly prolonged 5y-OS for PNI+ who recieved the adjuvant therapy compared to those who did not (95 *vs.* 57%, respectively, *p* = 0.001). On multivariate analysis, PNI acts as an independently worse prognostic factor for 5y-OS and 5y-DFS (HR = 1.518, 95% CI = 1.175 - 1.961, *p* = 0.001, and HR = 1.523, 95% CI = 1.166 - 2.012, *p* = 0.002, respectively).

Conclusions: PNI+ tumor independently incurs an aggressive behavior and unfavorable prognosis. Further evaluation will be needed to specify survival effect of PNI status in stage II colorectal cancer.



P124

RETROSPECTIVE CASE-MATCH COMPARISON OF SHORT-TERM OUTCOMES OF LAPAROSCOPIC VS. OPEN PELVIC SIDE-WALL LYMPH NODE DISSECTION FOR LOWER RECTAL CANCER.

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Purpose: Lateral lymph node dissection (LLND) for pelvic node-positive lower rectal cancer has been thought as one of the most effective treatment. However, the technical and oncological feasibility of laparoscopic LLND is not confirmed yet. The aim of this study is to compare the short-term outcomes of laparoscopic and open lateral lymph node dissection following TME for lower rectal cancer.

Methods: We analyzed retrospectively 247 lower rectal cancer patients underwent total mesorectal excision with LLND in our institute between 2010 and 2014. We started Laparoscopic LLND following laparoscopic TME in 2010. Since then, 150 patients were performed by laparoscopic procedures and 200 were by open ones. The short-term clinical outcomes of Laparoscopic TME with LLND were compared with a computerized, case matched, open-resection group, the case-matching variables being age, gender, and histological TNM stage.

Results: Our case-matching could make two groups considering their clinical back grounds, Laparoscopic TME with LLND group (Lap-group) and Open TME with LLND group (Open-group) consisted of 74 patients, respectively. No conversions to open laparotomy was found in Lap-group. Mean operation time was 422 min for Lap-Group and 430 min for Open-group, and median intraoperative blood loss was significantly lower in the Lap-group (246ml vs. 1102ml, P<0.001). No mortality was seen in both group. According to the Clavien-Dindo (C-D) classification, 3 cases of Lap-group (2 were grade IIIa and 1 was IIIb) and 7 cases of Open-group (6 were grade IIIa and 1 was IIIb) were classified into over the C-D grade III. Low anterior resection, abdominoperineal resection and intersphincteric resection were included 23, 14 and 37 patients in Lap-group, and 24, 13, and 37 patients in Open-group, respectively. Additional internal iliac vessels resection when

performing LLND was done in 4 patients of Lap-Group and done in 2 of Open-Group. There were no differences between 2 groups in tumor location from anal verge (4.45cm vs. 4.5cm), a rate of neoadjuvant therapy, a number of harvested lymph nodes. Postoperative hospital stay in Lap-Group was 3 days shorter than Open-Group(P=0.01) and a number of urinary dysfunction 3 months after surgery in Lap-Group was also fewer than Open-Group (4% vs. 13.5%, P=0.04). During median follow-up of 32.4 months, local recurrence was found in 8 of Lap-Group and 7 of Open-Group and distant recurrences were found in 17 patients in each group. 2-year disease-free survival rate didn't show the differences between two groups (69% in Lap-group and 74% in Open-group, P=0.59).

Conclusions: Laparoscopic TME with pelvic side-wall dissection is safe and feasible in terms of short-term clinical results compared to conventional procedures.

P125

INTRAPERITONEAL-FREE CANCER CELLS REPRESENT A MAJOR PROGNOSTIC FACTOR IN COLORECTAL PERITONEAL CARCINOMATOSIS.

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Purpose: Complete cytoreductive surgery (CRS) is the only treatment with a curative intent for selected patients suffering from colorectal peritoneal carcinomatosis (CRPC). Although several factors have been reported to properly select patients only 16% will be cured by the combination of systemic chemotherapy and CRS plus Hyperthermic IntraPeritoneal Chemotherapy (HIPEC). Intraperitoneal free cancer cells (IPCC) are considered as an important prognostic tool in gastric and ovarian cancer. However, there is no evidence in literature about the prognostic value of IPCC in peritoneal carcinomatosis after primary CRS. The aim of this study was to determine the role of IPCC as a prognostic tool in outcome for colorectal peritoneal carcinomatosis treatment.

Methods: Between 1991 and 2012, all patients treated in a single institution, for CRPC by complete CRS with peritoneal cytology available were evaluated. HIPEC was realized using either Oxaliplatin or Mytomycin C. All surgical data were prospectively collected and retrospectively analyzed. Peritoneal cytology was stained the conventional way (May Grumwald Giemsa). Primary endpoint was the impact of positive IPCC on overall survival. Univariate and multivariate analysis were realized in order to outline predictive factor of death.

Results: Among a population of 162 patients treated for CRPC by complete CRS, 38 presented positive IPCC (23.5%). Primary tumor was colonic for 151 patients (93%) and rectal for 11 patients (7%). Systemic chemotherapy was administered to 135 (85%) patients during preoperative course. After CRS, 110 patients (76%) received adjuvant chemotherapy. Median follow up was 34.5 months. Patients with positive IPCC presented a significant higher PCI and received significantly less neoadjuvant chemotherapy. Median overall survival was 19 and 44 months for respectively positive and negative IPCC (p=0.018). In multivariate analysis, Peritoneal Carcinomatosis Index and positive IPCC were significant prognostic factors of overall survival (HR 2.3 [1.18-4.52] p=0.014; HR 1.9 [1.08-3.38] p=0.027 respectively).

Conclusions: Positive IPCC is a negative predictive factor for colorectal PC treated in curative intend by complete CRS. Presence of free cancer cell in the peritoneal fluid could be the first clue of a different disease's history and a suggestion to develop new therapeutic strategies, such as extensive intraperitoneal lavage, targeted intraperitoneal therapies or repeated intraperitoneal chemotherapy, in this specific group of patients in order to increase local control.

P126

REDO LOW ANTERIOR RESECTION AS A SALVAGE PROCEDURE FOR LOW PELVIC ANASTOMOTIC COMPLICATIONS: WHAT CAN BE EXPECTED.

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Purpose: The purpose of this study is to assess a single institution experience with re-do low anterior resections (LAR) in the treatment of low pelvic anastomotic complications.

Methods: Data was retrospectively reviewed from all patients who underwent a redo LAR between the years 2010 and 2015 by a single surgeon. Patient demographics, disease characteristics, surgical and healing timeline, and postoperative complications were assessed. Success was defined as a lack of stoma 6 months after the re-do procedure.

Results: Twelve patients (7 men) were included in the review, with 11 undergoing redo LAR with a hand-sewn colo-anal anastomosis and one undergoing a redo LAR with a low colo-rectal anastomosis. The median age at redo surgery was 56 years (range, 45-71). Indications for re-do surgery included anastomotic leakage (n=9), anastomosis stricture (n=2), and colovaginal fistula (n=1). The median delay between the initial surgery and the re-do procedure was 16 months, with the overall rate of re-do postoperative morbidity being 42% (3 with minor wound complications, 1 with presacral abscess, 1 with DVT, 1 with ileus). No patient suffered a recurrent leak, stricture or fistula, and definitive stoma closure was achieved in 11 of 12 patients (92% success rate). The final patient has an intact anastomosis, and is awaiting closure.

Conclusions: Re-do low anterior resections are complicated procedures but morbidity rates are reasonable and consistent with historical controls. At a tertiary referral center and in the hands of an experienced surgeon high success rates in terms of ultimately achieving stoma closure can be expected.

P127

COMBINED RELAPARSOCOPY AND TRANSANAL ENDOLUMINAL REPAIR (HYBRID APPROACH) IN THE MANAGEMENT OF EARLY POSTOPERATIVE COLORECTAL ANASTOMOTIC LEAKS – TECHNIQUE AND OUTCOMES.

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Purpose: Colorectal anastomotic leak are associated with high morbidity, persistent stomas, involvement of high cost to health care system and significant mortality (6-22%) after leaks. Reexploration with takedown of anastomosis with formation of end stoma and salvage of anastomosis with ileostomy are most frequently preferred options in Grade C leaks. There is no clear general consensus for management of leaks and mostly depends upon surgeons experience or institutional protocols. This study aims to evaluate the feasibility of the combined laparoscopic and transanal endoluminal repair of colorectal anastomotic leaks in the acute settings for Grade B and C leaks. Secondary outcomes measured were successful control of leak and morbidity associated with the procedure. Last, we compared the outcomes of patients undergoing this combined approach in patients with early (<5 days) detection of leaks vs. late detection (>/= 5 days).

Methods: Patients included in our prospective data base, sustaining anastomotic leak after colorectal anastomosis after laparoscopic anterior resection or low/ ultralow anterior resection with or without coloanal anastomosis for malignant disease, operated on with the described hybrid approach. Sixteen patients with Grade B (n=5) and Grade C (n=11) leaks, hemodynamically stable, with anastomotic dehiscence <50% of the circumference were included in the study.

Results: The median days to detection of leak and operative intervention was 4.5 days (range 1-22) with 15 out of 16 leaks detected in same hospital stay. Univariate analysis showed that patients with stoma (p=0.041)

and presence of low anastomosis (p=0.041) significantly affected the detection of leak while ASA (II vs. III), early vs. advanced stage and low vs. high vessel ligation did not affect outcomes. The combined procedure was feasible in 13 patients with median length of stay after intervention was 9 days (range: 2- 53 days) and total length of stay including index surgery was 12 days (range: 5-62 days). Control of anastomotic leak was achieved in 14 patients after combined modality.There was no intraoperative morbidity or conversion to open in patients undergoing early reoperation (< 5 days) when compared to late intervention (≥5 days) (conversion to open =3, morbidity-37%). No additional intervention done.There was no in-hospital mortality.Stoma closure was achieved in 14 patients(median:158 days). No anastomotic site sinus or fistula or recurrence was noted in one year follow up period.

Conclusions: Combined re-laparoscopy and transanal endoluminal repair in the management of early postoperative colorectal anastomotic leaks is feasible and safe. It should reduce early and late post-operative morbidity associated with anastomotic leaks. However, early detection and early re-intervention remain the key issues for success.

Comparison of outcome according to Early (< 5 days) and Late(≥5 days) interval before and after 2nd operation

	Early leaks(< 5 days), n=8	Late leaks(>5 days), n=8	p value
Age	57 (16.3, 32-70)	60.5 (20.5, 33-89)	0.71
sex (male)	7	8	1
BMI	21.3 (19.3-29.1)	23.4 (1.2, 22.3-34.1)	0.28
ASA II/III	6/2	5/3	1
Early stage(I /II)	2	4	0.61
Advanced Stage (III/IV)	6	4	0.61
First procedure(LAR/TME)	5/3	3/5	0.61
Stoma at 1st operation	1	6	0.041
Operative time (1st) (min)	246 (54, 191-379)	302 (70, 206-439)	0.4
Blood loss (1st) (ml)	35 (117.5, 20-300)	125 (217.5, 20-360)	0.44
Vessel ligation (low)	4 (50%)	5 (63%)	1
Distance of anastomosis (cm from anal verge)/Anastomosis (<5 cm from anal verge) (n)	7 (5, 2-10) /1	3 (2.3, 2-6) /6	0.018/0.041
Interval to detection of anastomotic leak (day)	3.5 (1, 1-4)	6 (75%)	<0.001
Interval to 2nd operation (day)	3.5 (1, 1-4)	7.5 (9, 5-22)	<0.001
Operative time (2nd) (min)	176.5 (56.3, 112-211)	173 (107.8, 35-324)	1
Blood loss (2nd) (ml)	20 (0-20)	20 (280, 20-1650)	0.076
Bleeding requiring transfusion	0	1	1
Injury to other organ	0	2	0.47
Conversion to open procedure	0	3	0.2
Surgical site infection	1	1	1
Persistent leak	1	1	1
Anastomotic stenosis	0	1	1
Post-operative (2nd) length of stay (day)	8 (5.8, 2-23)	11 (10.8, 2-53)	0.34
Interval from 2nd operation to stoma closure	131 (66, 107-269) (n = 8)	168 (119, 62-531) (n = 6)	0.64

Data are medians with interquartile ranges and ranges in parentheses for continuous variables. Data are numbers with percentages in parentheses for categorical variables. ASA indicates American Society of Anesthesiologists; BMI, body mass index; TAMIS, transanal minimal invasive surgery

P128

TRANSANAL ENDOSCOPIC OPERATION VS. TRANSANAL EXCISION IN RECTAL TUMORS.

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Purpose: Radical surgery is regarded as the standard treatment for rectal tumor but accompanied by relatively higher morbidity. Although, transanal local excision (TAE) appropriate for frail patients with severe co morbidities or early rectal tumor, has several limitations in difficulty in adequate tumor visualization. Trans anal Endoscopic Operation (TEO) has emerged with new technology to facilitate precise localization, visualization and adequate tumor excision. TEO has achieved great success to decrease the rate of local recurrence and enhance the patient's survival. The aim of this study is to compare the local recurrence and disease free survival between TEO and TAE in rectal tumors.

Methods: We reviewed records of 92 patients retrospectively, diagnosed with early rectal tumors enrolled in a database of patients underwent transanal resection between 2006 and 2014. These patients categorized based on the procedure types to compare local recurrence and overall survival between TEO and TAE.

Results: 92 patients included in the study whom underwent transanal excision. Grouped to 48 and 44 patients operated by TEO and TAE respectively. Age, sex and comorbidities were similar for both groups. There were no significant differences in tumor diameter with the range (1.6± 1.68) vs. (1.17± 1.17) respectively. We found significant different in the tumor height from anal verge for those who operated by TEO at a range (7.46 ± 3cm) compared to (3.84± 1.88cm) in TAE group with a significant (P- value <0.001). However, TEO procedure end with 4 complications were bleeding, perianal abscess and 2 perforations, whereas no major consequence after TAE group with significant (P –value 0.028). Perforations occurred due to high tumor location which was managed by radical resection. 7 patients (14.6%) underwent salvage operation in TEO but was only 1(2.3%) patient in TAE with (P –value (0.039). Total of 8 patients (17.4%) diagnosed with Adenocarcinoma developed recurrence, rated at 4 patients in each group. DFS rate were similar in both group, TEO – 41.8 month, 95% RI (39.4 – 44.1)/ TLE 79.7 month, 95% RI (72.2 – 87.3), which explained by given higher courses of chemotherapy to TAE, 7(15.9%)patients compared to 2(4.2%) patients in TEO. In additional to 6 (13.6%) and 1 (2.1%) patients received adjuvant therapy respectively.

Conclusions: TEO treatment of rectal tumor is feasible for selective high located rectal tumor, which can achieve adequate local recurrence and survival rates as adequate as to TAE, however, salvage operation and minor complications found higher in TEO group. Further follow-up is necessary to evaluate recurrence and survival rates after TEO for patients with invasive rectal cancer.

P129

HEMICOLECTOMY IS ASSOCIATED WITH IMPROVED SURVIVAL FOR APPENDICEAL ADENOCARCINOMA LESS THAN 2 CM.

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Purpose: Primary adenocarcinoma of the appendix is rare. The aim of this study is to examine the epidemiology and outcomes of different surgical interventions (appendectomy vs. right hemicolectomy) based on histologic types (mucinous adenocarcinoma, colonic adenocarcinoma and signet ring cell adenocarcinoma), and tumor size (less or greater than 2cm).

Methods: We utilized the SEER database from 1988 to 2012. 5882 patients were analyzed based on age, gender, race, histologic types, tumor size, surgical treatment, survival time, and mortality rate. Kaplan-Meier and Cox Regression were used to compare the outcomes. We excluded other non-adenocarcinoma histologic types.

Results: The mean age at diagnosis was 60.8 years. The majority of the patients were female (52.2%) and most patients were white (82.9%). 54% of patients had mucinous adenocarcinoma, followed by colonic (36.3%) and signet ring cell adenocarcinoma (9.7%). The overall mortality rate among patients who had an appendectomy was 48.7% and was 41.4% in those who underwent a hemicolectomy (p<0.001). The survival time for tumors less than 2 cm was higher when a hemicolectomy was performed (median of 130 months) compared with appendectomy (median of 75 months) p=0.001. For tumors greater than 2 cm the survival time was not significantly different with a median of 61 months for a hemicolectomy and a median of 63 months for appendectomy (p=0.22). Using age, gender, race, histology, and surgical types as covariates in Cox Regression the risk of mortality increased with age whatever the tumor size. The mortality risk was 1.4 times higher for appendectomy than for hemicolectomy (p=0.015) for tumor size less than 2 cm. But, for tumors greater than 2 cm the type of surgery did not play a role. Histology did not play a role in small tumors but in tumors greater than 2 cm the risk of mortality for signet ring cell adenocar-

cinoma was 2.5 and 2.6 times higher than mucinous adenocarcinoma and colonic adenocarcinoma respectively (p <0.001). No significant difference in mortality risk was found between mucinous adenocarcinoma and colonic adenocarcinoma.

Conclusions: The outcome in appendiceal adenocarcinoma less than 2 cm is better with right hemicolectomy. However with larger tumors the procedure performed does not impact survival. For tumor greater than 2 cm signet ring cell adenocarcinoma is associated with the highest mortality of all histologic subtypes. Increasing age is a negative prognosticator for all groups.

P130

CLINICAL CHARACTERISTICS OF PATIENTS WHO DEVELOPED EARLY SYSTEMIC FAILURE AFTER PREOPERATIVE CHEMORADIOTHERAPY FOR RECTAL CANCER.

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Purpose: Preoperative chemoradiotherapy has been a standard treatment for locally advanced rectal cancer. Distant metastasis, however, although rare, can occur within the window from radiotherapy (RT) to operation or in the early postoperative period. This study was conducted to evaluate the clinical characteristics of patients who developed early systemic failure after preoperative chemoradiotherapy for rectal cancer.

Methods: The charts of patients who underwent neoadjuvant concurrent chemoradiotherapy (CCRT) for rectal adenocarcinoma between June 2007 and July 2015 were reviewed. The patients who were found to have developed distant metastasis from the preoperative re-staging work-up studies after CCRT, or who developed distant metastasis within 6 months after CCRT, were identified and then compared with the control group.

Results: Of total 107 patients who underwent neoadjuvant CCRT for rectal cancer, 7 developed early systemic failure. Two were found to have developed distant metastasis in the post-CCRT period, 4 within 6 months after CCRT, and one in both periods, repeatedly. The lung was the most common metastatic site (4 patients), followed by the bone (3), liver (1), and anal canal (1). There was no significant difference between the early failure (EF) group and the control group in terms of age, sex, BMI, tumor level, preoperative CEA, clinical T, N stage, pre-CCRT tumor size, and RT duration and dose. In the EF group, capecitabine as a sensitizer of CCRT was used more frequently (28.6% vs. 3%; p=0.002). Of the 7 patients in the EF group, only 4 underwent primary tumor resection (57.1%), in contrast with the 100% resection rate in the control group (p<0.001). The mean duration between RT and operation was also longer in the EF group than in the control group (68.0 vs. 54.7 days; p=0.044). Although no differences were shown between the groups with regard to most of the operative and postoperative data, the mean operative time was significant longer in the EF group (404 vs. 297 min; p=0.017). In terms of the pathologic outcomes, the ypN and ypTNM stages were more advanced (p<0.001 and p=0.047, respectively), the numbers of positive and retrieved lymph nodes were much higher (p<0.001 and p=0.027, respectively), and the size of the surgical tumor specimen was significantly larger in the EF group (p=0.047).

Conclusions: The patients who developed early distant metastasis after CCRT also showed a poor local response, with a low primary tumor resection rate. Further studies to determine the intrinsic factors of tumor as a significant predictor of CCRT response, such as a gene expression profile analysis, are necessary, and it will be helpful to plan the neoadjuvant therapy using pretreatment biopsy.

P131

PERINEAL FLAP RECONSTRUCTION AFTER ABDOMINAL PERINEAL RESECTION IN A RADIATED FIELD: CASE COMPARISON WITHIN AN URBAN COLORECTAL SURGERY PRACTICE.

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Purpose: The wound complication rate of Abdominal Perineal Resection (APR) has been reported to be appoarching 100%. Flap closure of eventration wounds has gained acceptance. Some practitioners have begun using pedicled rotational flap reconstruction with the purpose of reducing wound complication and overall morbidity in APR. This study was conducted with the purpose of determining if there was a reduction in morbidity from the intervention of flap closure of perineal wounds.

Methods: Patients were identified retrospectively. All patients in a large urban colorectal practice who had underwent APR over the past three years after neoadjuvant radiation were identified. Those patients who had undergone pedicled rotational flap closure of the perineal wound were placed into one group, those who underwent closure of the perineal wound in the other. Twenty eight patients were identified meeting this criteria, 13 in the flap closure group and 15 in the primary closure group. Preoperative characteristics were compared: age, gender, BMI, diabetes, tobacco use. Outcomes were compared: operating room time, length of stay, wound infection, wound necrosis, wound dehiscence, and need for reoperation were compared. Statistical significance was evaluated: scaled variables were compared using Mann-Whitney U test and categorical variables were compared using Fisher's Exact Test. P value was set at < 0.05.

Results: There were no significant differences in regard to the patient groups in regard to age, gender, BMI, diabetes, tobacco use, and indications for operation (data available on request). Outcomes are listed in Table 1. There was one postoperative death from cardiac illness in the flap closure group. There were three incidences of wound necrosis in the primary closure group, all of which required flap coverage as a salvage. There was one patient in the flap closure group that required reoperation of the peritoneal site, which consisted of irrigation and minor local debridement. There were three incidences of donor site morbidity, two requiring reoperation.

Conclusions: The use of flap closure of perineal wounds in APR has been utilized by early adoptors of the technique. Our study identified a longer length of stay and OR time in the flap closure group but resulted in reduction of site and peritoneal wound dehisence. The reduction of peritoneal site morbidity must be weighed against the additional OR time, longer hospital stays and flap donor site morbidity. The single mortality in the flap closure group was not likley the result of technique. This review of outcomes of pedicled rotational flaps to close perineal wounds in APR merits further study with larger numbers.

Table 1. Outcomes in flap and primary closure of APR perineal wounds

	OR time (min)	LOS (days)	Readmission	Wound infection	Wound necrosis	Wound dehiscence	Perineal hernia	Reoperation of perineum
Flap closure	632 (476-740)	10 (5-90)	3/13	1/13	1/13	2/13	0/14	1/13
Primary closure	334 (194-632)	6 (4-58)	4/15	4/15	3/15	9/15	1/15	5/15
P value	≤0.001	0.005	0.891	0.333	0.600	0.002	N/A	0.172

Scaled variables are represented as Median (Range).

Categorical variables are represented as proportion of the measured group.

P132

IMPACT OF RACE ON ANAL CANCER OUTCOMES IN THE 21ST CENTURY.

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Purpose: To determine recent trends in anal cancer outcomes in the US population from 2000-2012. We focused specifically on the role of race on incidence and survival and compared these outcomes to historic trends from 1973-1999.

Methods: Utilizing the Surveillance, Epidemiology and End Results (SEER) database, we identified all patients with cancer of the anus, anal canal, and anorectum from 1973-1999 and 2000-2012 and stratified patients by race. The incidence, staging, and treatment provided for each group was determined. Age-adjusted annual incidence was calculated using the 2000 US standard population. The primary outcomes was 5-year survival. Age-adjusted comparisons were made by race for each historic group using chi square tests.

Results: Of 24,782 patients diagnosed with cancer of the anus, anal canal, and anorectum in the 1973-2012 SEER database, 6,755 (27%) and 18,027 (73%) patients were identified from 1973-1999 and 2000-2012, respectively (Table 1). Patients were primarily white (85.6%) and female (61%) with black patients constituting 10.4% of the cohort. The overall incidence of anal cancer increased from 1.1 to 1.8 cases per 100,00 individuals from the 20th to 21st century. Compared to white patients, black patients had a higher overall incidence of anal cancer (1.6 vs. 1.3 cases per 100,000 individuals) and black males, in particular, experienced an increased incidence of anal cancer from the 20th to 21st century (1.3 to 1.9 cases per 100,000 individuals, respectively). On staging, the majority of patients presented with localized (48.1%) or regional disease (30.8%). In the 21st century, more patients received treatment of any form for anal cancer compared to pre-2000 (74% vs. 63%, respectively). The use of radiation therapy increased from 61.3% to 71.6% and surgical treatment (local excisions and APR) decreased from 60.1% to 45% when comparing the 1973-1999 to the 2000-2012 cohorts, respectively. Black patients were more likely than white patients to not undergo recommended surgery (9.8% vs. 8.7%, respectively) or refuse recommended surgery (1.8% vs 1.1%, p< 0.05). Overall 5-year survival for anal cancer has significantly improved from 63.1% in 1973-1999 to 70% in the 21st century (p<0.05). Black patients, however, had significantly lower 5-year survival rates in both time periods compared to white patients (1973-1999: 53% vs. 64% and 2000-2007: 62% vs. 71%, p<0.05) (Table 1).

Conclusions: The overall incidence of anal cancer in the United States continues to increase in the 21st century with improvements in 5-year survival rates. Black patients, however, continue to have significantly and disproportionately lower 5-year survival rates compared to white patients. Further investigations into these health disparities are warranted.

		1973-1999 n=6,755	2000-2012 n=18,027	Overall n=24,782
Incidence (Cases per 100,000 individuals)	Overall	1.1	1.8	1.4
	White	1.1	1.8	1.3
	Black	1.3	1.7	1.6
Local Disease (%)	Overall	44	50	48
	White	45*	50**	49***
	Black	38*	46**	44***
Regional Disease (%)	Overall	33	30	31
	White	32*	30	31***
	Black	37*	31	33***
Received Any Treatment (%)	Overall	63	74	71
Received Radiation (%)	Overall	61.3	71.6	68.6
Received Surgery (%)	Overall	60.1	45	49
Refused Surgery (%)	Overall	1.3	1.2	1.3
	White	1.3	1.1**	1.1***
	Black	0.9	2.1**	1.8***
5 Year Survival (%)	Overall	63	70	69
	White	64*	71**	70***
	Black	53*	62**	60***

* Denotes statistically significant comparision in 1973-1999 (p-value <.05)
** Denotes statistically significant comparision in 2000-2012 (p-value <.05)
*** Denotes statistically significant comparisons in Overall 1973-2012 (p-value <0.05)

P133

DOES SURGICAL SUBSPECIALTY INFLUENCE TIME TO ADJUVANT CHEMOTHERAPY (TTAC) IN STAGE III COLON CANCER? A SINGLE CENTER REVIEW.

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Purpose: Colon cancer is the second leading cause of cancer death in the United States each year. Even with the addition of chemotherapy, the five year survival for patiens with stage III disease is only 70.4%. The timing from surgery to adjuvant chemotherapy in stage III patients is shown to affect both overall and disease-free survival. Post-operative complications are known to delay chemotherapy, and are associated with worse long term oncologic outcomes. This study examined the time to adjuvant chemotherapy (TTAC) at our institution, and the relationship between surgical subspecialty and post-operative complications on this timing.

Methods: IRB approved chart review using our tumor registry was conducted. Patients with stage III colon cancer treated at Robert Wood Johnson University Hospital from 2008-2014 were identified to assess TTAC at our institution. Data were compared via T-test and non-parametric statistics.

Results: 128 charts were reviewed, 56 patients did not receive chemotherapy (patient's choice, loss to follow-up, >150 days from surgery). 72 patients were included in our final analysis. Mean time from surgery to adjuvant chemotherapy was 49.6 days. There was no significant difference between colorectal surgeons, surgical oncologists, or general surgeons for TTAC. Post-operative complication was found to be a significant contributor to delay among all groups (p<0.016).

Conclusions: This study investigated TTAC in stage III colon cancer at our institution, and found no difference between surgical subspecialty in getting patients to chemotherapy in a timely fashion. Post-operative complication was found to have a significant impact on timing. Improving TTAC for all stage III colon cancer patients at our institution is a quality initiative.

P134

LOCAL RECURRENCE AFTER CURATIVE RESECTION FOR RECTAL CARCINOMA: THE ROLE OF SURGICAL RESECTION.

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Purpose: In patients with rectal cancer, local recurrences are difficult to treat, may cause severe and disabling symptoms, and usually have fatal outcomes. The aim of this study was to document the clinical nature of locally recurrent rectal cancer and to determine the effect of surgical resection on long-term survival.

Methods: A retrospective review was conducted of prospectively collected medical records of 2485 patients with primary rectal adenocarcinoma who underwent radical resection between September 1994 and December 2008. Local recurrence was defined as any evidence of rectal cancer recurrence in the small pelvis. Recurrence location was classified into one of the following five subsites: presacral, anterior, anastomotic, lateral, and perineal. Anastomotic and perineal recurrences were combined as axial and the rest were combined as nonaxial recurrences in further analyses.

Results: 147 (5.9%) exhibited local recurrence. The most common type of local recurrence was lateral recurrence while anastomotic recurrence was the most common type in patients without preoperative CCRT. Tumor location with respect to the anal verge significantly affected the local recurrence rate, but preoperative CCRT did not affect the local recurrence rate. Factors that were significantly preferred of surgical resection for recurrent rectal cancer included: a less advanced tumor stage (p = 0.017, RR=3.840, 95% CI=1.271-11.597), axial recurrence (p<0.001, RR=5.772, 95% CI=2.281-14.609), and isolated local recurrence (p=0.006, RR=8.679, 95% CI=1.846-40.815). Overall survival after diagnosis of local recurrence was negatively influenced by an advanced pathologic tumor stage (p=0.040, RR=1.867, 95% CI=1.028-3.389), a positive CRM (p=0.001, RR=12.939, 95% CI=2.906-57.604), combined distant metastases (p=0.001, RR=2.086, 95% CI=1.352-3.218), and nonsurgical resection of the recurrent tumor (p<0.001, RR=4.865, 95% CI=2.586-9.153).

Conclusions: The clinical outcomes of local recurrence after curative resection of rectal cancer are diverse. Surgical resection of locally recurrent rectal cancer might be considered as an initial treatment, especially in patients with less advanced tumors and axial recurrence.

P135

EARLY USE OF GRACILIS FLAP FOR PERINEAL CLOSURES IN ABDOMINAL PERINEAL RESECTION.

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Purpose: Perineal wound complication rates after abdominal perineal resection (APR) are thought to occur in 40% of cases, and rates as high as 80% have been previously reported. Large perineal defects often occur with oncologic APRs. Common practice for high-risk perineal resections is pelvic floor and perineal reconstruction with tissue flaps. However, the use of rectus abdominus flaps has negated the concept of minimally invasive surgery due to the nature of its midline incision in order to access the muscle. The aim of this study was to evaluate the use of a unilateral gracilis muscle as an alternative to more common perineal closures.

Methods: An IRB-approved retrospective review of all consecutive patients undergoing APR from September 2012 to June 2015 was performed. Demographics, perioperative, and post-operative courses were obtained through direct review of patient charts.

Results: Thirty-four patients undergoing APRs were identified. Seventeen (50%) had primary perineal closure without the use of tissue flaps. Twelve (35%) had a non-gracilis flap closure. Five APRs with gracilis flap closures were performed (15%). Within the gracilis group, the mean age of patients was 66 years and the mean body mass index was 26.2. In the early period (Sept. 2012 to Sept. 2014; first 17 APRs), a gracilis flap was used once (6% of all cases; 10% of cases with flaps). In the late period (Oct. 2014 to June 2015; last 17 APRs), gracilis flaps were the preferred flap (24% of all cases; 57% of cases with flaps). Three of the APRs with gracilis flap reconstructions (60%) were laparoscopic, and two (40%) employed an open approach. Three cases (60%) were for rectal adenocarcinoma, 1 case (20%) was for urothelial cancer, and 1 case (20%) was for benign disease. Two (40%) of gracilis flap closures had Grade I skin dehiscence complications based on Clavien-Dindo surgical complication classification. One (20%) case had a combined Grade 1 skin dehiscence as well as a Grade III donor site infection requiring surgical exploration. Time to complete perineal wound healing varied from 2 to 5 months with a mean of 2 months in the group without complications and 4 months in the group with complications. Three of the five cases required adjuvant chemotherapy; two of these cases were delayed by one month due to perineal wound complications and started chemotherapy at post-operative Month 3. The third patient undergoing adjuvant chemotherapy also delayed initiation to post-operative Month 3 by choice.

Conclusions: Gracilis flaps are a feasible alternative to traditional muscle flap perineal closure techniques. While gracilis flap closures appear to have similar wound complication rates as other perineal closure methods, the gracilis flap allows for perineal tissue defect coverage without a midline incision making these flaps particularly useful for laparoscopic resections.

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THE ANASTOMOTIC LEAK RISK SCORE (ALRS): A MODEL TO PREDICT THE RISK OF ANASTOMOTIC LEAKAGE.

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Purpose: Anastomotic leakage remains a major cause of peri-surgical morbidity after rectal surgery, especially with low anastomoses. Intraoperative judgment in predicting potential leakage has shown extremely low sensitivity and specificity. The lack of a model for predicting anastomotic leakage might explain this insufficient judgment. We aimed to propose a clinical parameters-based model to predict anastomotic leakage after total mesorectal excision.

Methods: This study was a retrospective analysis of rectal cancer dataset in changhai hospital from 2005 to 2015. We analyzed the clinical variables of rectal cancer patients with anastomotic leakage. The variables and their association with anastomotic leakage were investigated in univariate analyses using the x^2 test and the Cochran–Mantel–Haenszel test. Multivariate logistic regression analysis was used to identify the independent risk factors for anastomotic leakage. The clinical parameters-based model was proposed in line with the regression coefficient for each significant risk factor.

Results: During the period analyzed, 75 anastomotic leakage patients were included. Smoking, perioperative anemia, diabetes, level of anastomosis, tumor size and TNM stage were significantly associated with increased anastomotic leak. From these factors, the logistic regression model identified the following 5 independent predictors: perioperative anemia (risk ratio [RR]=3.64, 95% confidence interval [CI]: 1.82–5.34), diabetes (RR=2.36, 95% CI: 1.80–5.06), level of anastomosis (RR=3.56, 95% CI: 1.43–5.95), tumor size (RR=2.05, 95% CI: 1.02–4.12) and TNM stage (RR=1.87, 95% CI: 1.06–3.32). The locally weighted scatterplot smoothing regression showed an anastomosis within 5 cm from the anus and tumor size ≥ 3 cm as the cutoff values for a significantly increased risk of leakage. Based on these independent factors, a parameters-based model was established by the regression coefficients. The high and low risk groups were classified according to scores of 3–5 and 0–2, with leakage rates of 9.62% and 3.58%, respectively (P<0.001).

Conclusions: An ALRS is proposed to aid clinical decision-making. Quantifying ALRS would help identify candidates most likely to benefit from interventions to decrease the risk of anastomotic leakage.

Factors associated with anastomotic leakage in patients undergoing TME

Factors	No leakage (n=80)	Leakage (n=75)	*P* value
Sex			0.419
Male	63(78.8%)	63(84.0%)	
Female	17(21.2%)	12(16.0%)	
Age			0.332
<60	39(48.8%)	30(40.0%)	
≥60	41(51.2%)	45(60.0%)	
Smoking			0.014
No	71(88.8%)	54(72.0%)	
Yes	9(11.2%)	21(28.0%)	
BMI	23.24±2.56	21.65±1.34	0.256
ASA score	2.31±0.78	2.28±0.59	0.312
Perioperative anemia			<0.001
No	57(71.3%)	12(16.0%)	
Yes	23(28.7%)	63(84.0%)	
Diabetes			0.001
No	75(93.8%)	56(74.7%)	
Yes	5(6.2%)	19(25.3%)	
Preoperative radiochemotherapy			0.236
No	76(95.0%)	67(89.3%)	
Yes	4(5.0%)	8(10.7%)	
Level of anastomosis			0.002
<5cm	21(26.3%)	39(52.0%)	
≥5cm	59(73.7%)	36(48.0%)	
Tumor size			<0.001
<3cm	43(53.8%)	11(14.7%)	
≥3cm	37(46.2%)	64(85.3%)	
Preventive stoma			0.109
No	33(41.3%)	41(54.7%)	
Yes	47(58.7%)	34(45.3%)	
Operating time			0.100
<3h	8(10.0%)	2(2.7%)	
≥3h	72(90.0%)	73(97.3%)	
TNM stage			0.006
I-II	53(66.3%)	33(44.0%)	
III-IV	27(33.7%)	42(56.0%)	

TME=total mesorectal excision, BMI=body mass index, ASA=American Society of Anesthesiologists, TNM=Tumor node metastasis

P137

RECTAL CANCER: DO OUTCOMES JUSTIFY SELECTIVE RECTAL PRESERVATION?

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Purpose: Rectal cancer has traditionally been treated with surgery and adjuvant chemoradiotherapy (CRT) pre/post operatively. Rectal resection (RR) surgery is associated with significant patient morbidity and permanent stoma rates. Previously rectal preservation (RP) has only been possible in early rectal cancer treated with local excision and CRT or in patients unfit for rectal resection post CRT. In recent years some patients with complete clinical response (CCR) post CRT have opted for RP. However, concerns about local and systemic recurrence remain and need to be discussed with patients prior to considering RR. We reviewed our outcomes of patients who had RP and compared them to a cohort managed with RR for a complete or near complete pathological response following CRT.

Methods: A prospectively maintained colorectal cancer database (January 2009 to December 2013) at University Hospitals of Leicester NHS Trust was analyzed. Rectal cancer patients submitted to RP were compared to surgical patients that had pathological complete or near complete response (pT0, pTis and pT1). Statistical analysis was performed by using Kaplan-Meier survival curve, chi-sqare test, Fisher exact probability test, and the Student t test for comparisons between groups. Results were considered significant for p values ≤ 0.05.

Results: During the period studied RP was performed in 45 patients had rectal preservation therapy (15 Endoscopic Mucosal Resection, 2 Transanal resection, 22 Transanal endoscopic microsurgery and 6 chemoradiotherapy only). Rectal resection was performed in 109 patients (45 APERs, 50 anterior resections, 12 Hartmann's procedure and 2 panproctocolectomy). Demographic data included: median age was 66.4 years (range from 34.1 to 93 years), 91 male and 63 female patients. Rectal preservation group had an overall disease free survival (DFS) of 46.1 months compared to 46.3 months of non-rectal preservation group (p=0.7206). No difference in overal survival was found (84.4% vs 92.7%, p=0.081).

Conclusions: Rectal preservation (RP) in selected patients appears to have comparable survival outcomes with those treated with rectal resection (RR). This data is helpful for clinicians and patients when discussing rectal preservation for rectal cancer when appropriate. Also, it may aid clinicians to discuss watch-and-wait strategy post CRT in clinical complete response (CCR).

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OUTCOMES OF SALVAGE SURGERY AFTER FAILURE OF LOCAL EXCISION FOR RECTAL CANCER: A SYSTEMATIC REVIEW.

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Purpose: Local excision (LE) is an appealing option in the treatment of early rectal cancer (ERC). However, the possibility of an increased risk of local recurrence (LR) is an important concern after LE for ERC compared with radical surgery. The outcomes of patients who develop recurrence after LE have not been well analyzed. Our study examines the short and long term outcomes of salvage surgery after failed LE for rectal cancer.

Methods: A literature search was performed using PubMed to identify cases of salvage surgery for recurrence after local excision for rectal cancer from 1986 to 2015. The targeted group consisted of patients with early rectal tumors who initially underwent LE (TAE, TEM, or transsacral excision), consequently developed recurrence of cancer, and then underwent salvage surgery with curative intent. All studies were assessed according to a set predetermined selection criteria.

Results: A total of 44 papers were identified with 2,683 patients who underwent LE for rectal malignancy. Out of 2,608 eligible patients, we identified 377 (14.5%) who developed LR (rates by stage 12% T1, 24% T2, and 38.6% T3). Of these patients, 245 were candidates for salvage surgery (65%). Most patients presented with isolated local recurrence (64.5%). Recurrence was more common after TAE compared to TEM (26.0% vs 15.6%, respectively [p<0.0001]). An additional 152 patients were identified in studies reporting only the outcomes of salvage procedures after failed LE. Method of salvage surgery included 9.8% repeat LE, 80% total mesorectal excision, and 10.3% multiorgan resections. Overall morbidity was 38% and mortality was 0%. Re-recurrence after salvage surgery was 40%, with the majority presenting with metastatic disease only (67%). Disease-free survival and overall survival at 5 years were 50% and 58%, respectively.

Conclusions: Only two out of three patients who develop local recurrence after LE for rectal cancer are candidates for salvage surgery and their survival is limited because of a high risk of re-recurrence and metastatic disease. Prospective studies are needed to evaluate the use of novel adjuvant and neoadjuvant therapies in this subset of patients.

P139

NATIONAL EARLY RECTAL CANCER TREATMENT REVISITED.

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Purpose: Total mesorectal excision (TME) has excellent results for early stage rectal cancer, but in order to reduce treatment-related mortality and morbidity and improve functional results, a focus on local resections has reached increasingly importance during the recent decades. Furthermore,

old and frail patients may not be fit for major surgery, and for them some sort of transanal procedure may be the only option. In 2005 a study on the Norwegian national cohort on T1 rectal cancer during 1993-1999 revealed inferior outcomes for patients treated by standard transanal excision compared to TME. Those results made the Norwegian Colorectal Cancer Group to recommend transanal endoscopic microsurgery (TEM) for early stage rectal cancer. The purpose of this study was to compare outcomes after TEM and TME for T1 and T2 rectal cancer in Norway during 2000-2009. The primary outcomes were five-year relative survival and five-year local recurrence rate.

Methods: This observational study was based on prospectively collected data from the Norwegian Colorectal Cancer Registry, a national population-based registry.

Results: There were 543 patients with T1 and 1592 patients with T2 rectal cancer without distant metastases treated by TEM or TME without radiochemotherapy during 2000-2009. Among the 543 patients with T1 cancer, the five-year overall survival was 65.3% after TEM versus 81.5% after TME (p=0.012). Adjusted for age and gender the HR TEM/TME for mortality was 1.28 (0.8-1.9, p=0.22). The five-year relative survival was 96.8% after TEM versus 98.2% after TME (p=0.603), and the five-year local recurrence rate was 14.5% versus 1.4% (p<0.001), respectively. For T1 cancer the mean age in the TEM group was 72.5 (45-90) years compared to 68.2 (25-94) years in the TME group (p=0.007), and the 100-day mortality was 1.5% after TEM and 2.5% after TME (p=0.72). Among 1592 patients with T2 cancer, five-year overall survival was 42.1% in the TEM group versus 76.1% (p<0.001) in the TME group. The adjusted HR TEM/TME for mortality was 1.81 (1.14-2.85, p=0.01). Five-year relative survival was 65.4% versus 93.9% (p<0.001), and five year local recurrence rate was 11.4% versus 4.4% in the two groups, respectively. For T2 cancer the mean age of the TEM group was 81.8 (59-91) years and 69.9 (27-95) years for the TME group (p<0.001), and of these no patients in the TEM group died within 100 days compared to 2.8% after TME (p=0.63).

Conclusions: Following a national strategic change of technique for local excision of early rectal cancer there was similar relative survival for TEM and TME for T1 rectal cancer, but inferior for TEM in T2 tumors. Compared to TME, the TEM technique was associated with a considerable higher rate of local recurrence, both for T1and T2 rectal cancer. The 100-day mortality was similar for the two procedures. The study should be interpreted according to its observational design.

P140

ARE WE READY FOR EXTRALEVATORY ABDOMINOPERINEAL EXCISION? LITERATURE REVIEW AND A META-ANALYSIS.

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Purpose: Extralevatory abdominoperineal resection (ELAPR) is invented to improve oncological outcomes and prognosis of low rectal or anal cancer patients. However, there is controversy that whether this procedure can fulfill its purpose. The aim of this study is to collect current evidences and evaluate the effectiveness and safety of ELAPR.

Methods: A search of PubMed, Embase and Clinic trial from inception to August 2015 with language but no region limitations was performed. The eligible patients were those who received standard abdominoperineal resection (SAPR) or ELAPR after they received chemoradiation for rectal cancer or not. The studies that compared circumferential margin involvement rate and/or intra-operative perforation rate were included. Meta-analysis, sensitivity test and subgroup analysis were performed to estimate the effectiveness and safety of the two surgical procedures.

Results: 10 studies with 2667 patients were enrolled. Comparted to APR, ELAPR was advanced in reducing CRM involvement rate (14.2% vs 16.9%, OR=0.79, 95% CI 0.64-0.98, p=0.03). Subgroup analysis indicated that ELAPR still showed its advantage in the institutional studies (14.3% vs 23.5%, OR=0.49, 95% CI 0.36-0.66, p<0.001) but failed in nation-wide studies (14.2% vs 11.3%, OR=1.31, 95% CI 0.96-1.79, p=0.09). The intraoperative perforation rates were comparable between two groups (6.3% vs 7.1%, OR=0.95, 95% CI 0.66-1.36, p=0.78), no matter in institutional (6.5% vs 9.5%, OR=0.74, 95% CI 0.38-1.42, p=0.36) or nationwide (6.2% vs 6.1%, OR=1.06, 95% CI 0.69-1.63, p=0.79) ranges. Further analysis indicated that ELAPR led to higher risk of infectious wound complications (21.3% vs 17.2%, OR=1.41, 95% CI 1.13-1.76, p=0.002, data from 2201 patients of 8 studies), but comparable sexual/urinary complications rate (15.0% vs 13.5%, OR=1.13, 95% CI 0.66-1.94, p=0.66, data from 551 patients of 4 studies) and in-hospital mortality rate (1.9% vs 2.1%, OR=0.92, 95% CI 0.38-2.24, p=0.86, data from 950 patients of 2 studies).

Conclusions: Current evidences indicate that ELAPR, as an initiative procedure based on the comprehension of local anatomy, is capable of improving CRM positive rate in specific institutions, with higher risk of wound infection. Thus we may take a second look at its generalization, further high quality studies are required ameliorate the surgery's essential nature.

Figure 1A Meta-analysis and subgroup analysis of circumferential margin positive rate between ELAPR and SAPR

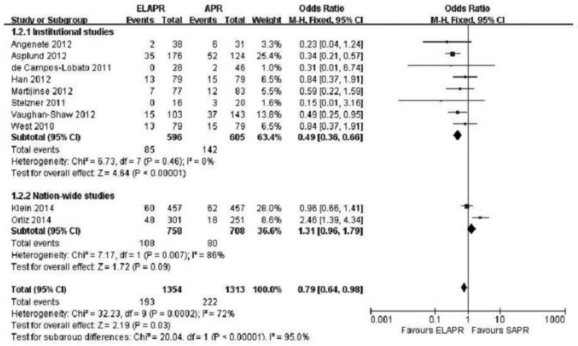
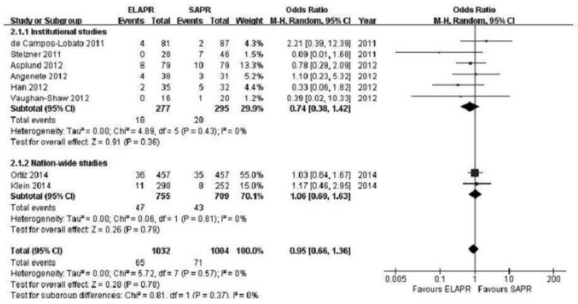


Figure 1B Meta-analysis and subgroup analysis of bowel perforation rate between ELAPR and SAPR



Forest-plot of comparisons between ELAPR and SAPR

P141

ASSOCIATION BETWEEN POORLY DIFFERENTIATED CLUSTERS AND EFFICACY OF 5-FLUOROURACIL-BASED ADJUVANT CHEMOTHERAPY IN STAGE III COLORECTAL CANCER.

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Purpose: Recently, poorly differentiated cluster (PDC) was reported to be a useful grading system for predicting prognosis in CRC patients. The prognosis of CRC patients with PDC G3 is worse than those with PDC G1 or G2. We hypothesized that tumors with PDC G3 are more tolerant of adjuvant chemotherapy compared with those with PDC G1 or G2. The aim of this study was to investigate the association between PDC grade and the efficacy of 5-FU-based adjuvant chemotherapy in stage III CRC.

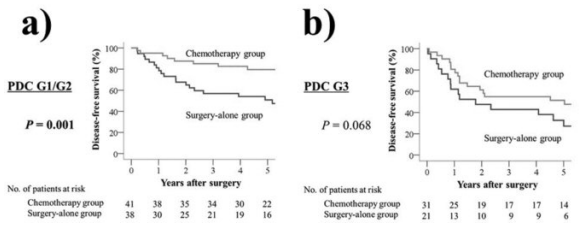
Methods: This retrospective study enrolled 131 patients with stage III CRC who underwent curative resection: 59 received 5-FU-based adjuvant chemotherapy (chemotherapy group) and 72 did not (surgery-alone

group). Patients who received neoadjuvant chemotherapy or adjuvant chemotherapy with 5-FU only or oxaliplatin-based regimen were excluded. Among the 131 patients, the median follow-up period was 61 (1–150) months. PDC was defined as cancer clusters in the stroma composed of ≥ 5 cancer cells that lack a gland-like structure. To quantify PDCs, the entire tumor including its advancing edge was first viewed at low-power magnification to identify the area containing the greatest number of PDCs. The clusters were then counted under the microscope using a × 20 objective lens. Tumors with < 5, 5–9, and ≥ 10 clusters were classified as G1, G2, and G3, respectively. To elucidate factors influencing DFS and overall survival (OS), 10 clinicopathological variables were tested in all 131 patients: age (< 65 vs. ≥ 65 years), sex, tumor location (colon vs. rectum), tumor size (< 50 vs. ≥ 50 mm), T category (T1–3 vs. T4), histopathological grading (G1, 2 vs. G3), lymphatic invasion (absence vs. presence), venous invasion (absence vs. presence), N category (N1 vs. N2), PDC (G1, 2 vs. G3), and adjuvant chemotherapy (absence vs. presence).

Results: Five-year DFS rates were 72.5%, 59.8%, and 43.9% for PDC G1, G2, and G3, respectively ($P = 0.013$). Multivariate analyses identified that tumor location, PDC G3, and adjuvant chemotherapy were significant independent prognostic factors for DFS ($P = 0.046$, $P = 0.010$, and $P = 0.003$, respectively). Figure 1 compares DFS between the chemotherapy group and the surgery-alone group according to the PDC status. Among PDC G1/2 patients, significant differences were observed in the 5-year DFS (79.5% vs. 50.8%, $P = 0.001$) (Fig. 1a). Conversely, among PDC G3 patients, no significant difference in 5-year DFS was observed between the chemotherapy group and surgery-alone group (51.4% vs. 32.7%, $P = 0.068$) (Fig. 1b).

Conclusions: The efficacy of 5-FU-based adjuvant chemotherapy is different according to PDC grade. The presence of PDC G1/2 predicts significant survival benefit from 5-FU-based adjuvant chemotherapy, while the presence of PDC G3 predicts a poor response to chemotherapy

Figure 1



P142

COLONIC STENTING FOR OBSTRUCTED COLORECTAL CANCER: A SINGLE SURGEON EXPERIENCE.

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Purpose: Self-expanding metal stents (SEMS) can be used as a bridge-to-surgery (BTS) or for palliation in the treatment of malignant large bowel obstruction. This case series intends to evaluate outcomes after deploying SEMS in relation to a surgeon's experience.

Methods: A single-surgeon series of a prospectively collected database of 70 patients with SEMS inserted between a 6-year period, from from 2009 when the sugeon began colonic stenting independently to 2015, for obstructed colorectal cancer was analysed. Primary outcomes were technical and clinical success rates. The study cohort was further sub-divided to two 3-year time periods.

Results: The majority of cases were for BTS intent (80%). Overall technical and clinical success was 94.3% and 82.9% respectively; with a trend of better clinical success rates in the latter half of the study (89.7% in 2012-2015 versus 74.2% in 1999-2011, p-value = 0.08) though it was not statistically significant. There were also ten cases of stenting for proximal lesions with no complications. Clinical failures include six cases of inadequate decompression and two of colonic perforation. The median duration from stent insertion to surgery was 10 days, with the majority (60.4%) being performed as open procedures. All except one case did not require stoma formation.

Conclusions: SEMS remains an effective way of relieving malignant large bowel obstruction for BTS and palliative intent, even for proximal lesions. While technical success remains high, the importance of an experienced endoscopist in patient selection, the selection and placement of SEMS is reflected in better clinical success rates.

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OPEN OR LAPAROSCOPIC RECTAL CANCER SURGERY? ANALYSIS OF 1204 PATIENTS AND SHORT-TERM RESULTS.

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Purpose: To asses the short term results of rectal patient treated with open and laparoscopic technics in a 9 years time period

Methods: We analysed 1204 cases operated in our Hospital for rectal cancer between years 2002 and 2011 with JMP statistics program by computer

Results: Three hundred and eigth patients were operated with open, 856 patiens were with laparosopic technic. In open group 54% of patients (n=166), in laparoscopic group 64% of patients (n=576) had neoadjuvant therapy. of 208 (67%) patients in open group had sphineter preserving surgery and 666 (74%) patients in laparoscopic group. in open group average gas discharge was 2.9, defecation 3.5, starting to solid nutrition 4, lengh of stay was 10.8 days. These averages were in laparoscopic group 2.1, 2.7, 3.s and 9.3 days respectively (P=0.001). Mayor complication rate was (11%) in open group and (9%) in laparoscopic group. There were no difference in terms of mortality rate.

Conclusions: Laparoscopy has better outcome than open sugery in terms of short term and pathological results

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THE EFFECT OF DIVERTING STOMAS ON POSTOPERATIVE MORBIDITY AND MORTALITY IN PATIENTS WITH ANASTOMOTIC LEAK FOLLOWING LOW ANTERIOR RESECTION FOR RECTAL CANCER.

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Purpose: The utility of creating a diverting stoma in patients with rectal cancer at the time of a low anterior resection continues to be debated. While some studies have shown that diverting stomas can mitigate the consequences of anastomotic leak few studies have evaluated morbidity and mortality outcomes over longer time periods.

Methods: This study is a retrospective chart review of all patients with rectal cancer who received a low anterior resection at Baylor University Medical Center from January 1, 2009 to January 31, 2015. Patients with metastatic disease and/or multiple primary tumors at the time of resection were excluded from the study. Only the morbidity and mortality outcomes of patients found to have an anastomotic leak according to the International Study Group (ISR) definition were analyzed.

Results: The study group was comprised of 25 patients who met the inclusion criteria and had an anastomotic leak. Thirteen out of the 25 patients (52%) received a diverting stoma at the time of their low anterior resection. No patient died during the follow up period. There was no statistically significant difference in the mean follow up period (1050 days vs 924 days) between those with and without diverting stomas, respectively. There was no statistically significant difference in age or gender between the two groups, however, diverted patients had statistically significant more tumors

located below the peritoneal reflection (77% vs 17% p<0.0033). The number of patients with ISR grade 3 leaks (62% vs. 58%), permanent stomas (46% vs 17%), distant (0% vs 17%) or local (0% vs 0%) recurrence, total length of stay (25 days vs 18 days), total major morbidity (2.4 vs 1.5), or total number of treatments (3.4 vs 1.8) were not statistically different between patients with and without diverting stomas, respectively. However, patients with diverting stomas had statistically significant more readmissions (3.6 vs 1.7 P<0.0101) than patients without diverting stomas.

Conclusions: Our study shows that patients with and without diverting stomas have similar morbidity and mortality following an anastomotic leak. However, patients with diverting stomas have higher readmission rates. Larger studies using longer follow up periods will be needed to further evaluate the utility of diverting stomas in mitigating the consequences of anastomotic leak.

Morbidity Outcomes	*Stoma (N=13)*	*No Stoma (N=12)*	*P-Value*
Permanent Stoma	*6 (46.2%)*	*2(16.7%)*	*0.2016*
Local Recurrence	*0 (0%)*	*0 (0%)*	*---------*
Distant Recurrence	*0 (0%)*	*2 (16.7%)*	*0.2200*
*Total Length of Stay **	*25.0 +/- 12.1*	*17.8 +/- 11.4*	*0.1400*
*Total Major Morbidity ***	*2.4 +/- 2.1*	*1.5 +/- 1.3*	*0.2239*
Total # of Readmissions	*3.6 +/- 2.1*	*1.7 +/- 1.2*	*0.0101*
*Total # of Treatments ****	*3.4 +/- 2.5*	*1.8 +/- 2.5*	*0.1339*
ISR Grade 3 Anastomotic Leak ^	*8 (61.5%)*	*7 (58.3%)*	*0.4283*
No Patient Deaths Occurred in Either Group During the Follow-Up Period			

* Includes readmission hospital days

** Total # of occurrences for Sepsis, septic shock, DVT/PE, myocardial infarction, pneumonia, need for mechanical ventilation > 48 hrs, cerebral vascular accident, progressive renal insufficiency and acute renal failure requiring dialysis

*** Treatments include percutaneous, endoscopic, transanal, and other surgical options

^ Defined as an anastomotic leak requiring reoperative intervention

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A COMPARISON OF LAPAROSCOPIC VERSUS OPEN SURGERY FOR RECTAL AND RECTOSIGMOID CANCERS: AN ANALYSIS OF LONG-TERM CLINICAL AND ONCOLOGICAL OUTCOMES OF 827 CASES.

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Purpose: Laparoscopic colectomy has been established as the standard of care for the treatment of colon cancer. However, laparoscopy for rectal cancer remains controversial. More specifically, the benefits of long term survival and clinical outcomes of readmissions and surgery for intestinal obstruction and incisional hernias is under-reported in literature. We aim to evaluate the short and long term outcome of laparoscopic rectal and rectosigmoid resection and the impact of conversion.

Methods: Treatment and followup details of 827 consecutive patients who underwent surgery for rectal and rectosigmoid cancer at the Singapore General Hospital from January 2005 to December 2009 were analyzed. Patients were compared in four groups: Open surgery, Laparoscopic surgery, Laparoscopic-assisted surgery (LAS) and Converted laparoscopic surgery (CON). Short-term, long-term and survival outcomes were compared.

Results: The mean follow-up duration was 45.8 months. 299 patients underwent a planned laparoscopic surgery with 177 patients having a successful laparoscopic procedure and 91 patients had LAS. The conversion rate was 10.3%. Successful laparoscopic surgery was associated with shorter operative time, younger age, lower ASA score, lower pTstage and AJCC stage. There was no difference in incidence and surgery for intestinal obstruction or incisional hernias during the follow-up period. Factors predictive of improved survival on univariate analysis include laparoscopic approach (p=0.004), age, ASA status, AJCC stage, tumour grade, presence of perineural invasion and vasculi emboli and CRM<2mm. Excluding open and metastatic cases, neither 5 year overall survival (70.5% vs 61.8%, p=0.217) nor cancer-free survival (64.3% vs 66.6%, p=0.854) were significantly different between laparoscopic and converted patients.

Conclusions: From our intitution's experience, with a large patient sample size of 827 cases, we have found that laparoscopic resection has equivalent short and long term clinical and oncologic outcomes when compared to open surgery. In addition, we also show that conversion does not confer a worse prognosis.

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PRIMARY SMALL CELL CANCER OF THE ANUS: INSTITUTIONAL AND NATIONAL CANCER DATABASE OUTCOMES.

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Purpose: Primary Small Cell Cancer (SCC) of the anus accounts for less than 1% of all anal neoplasms and has anecdotally described poor outcomes. Treatment strategies are currently based on the management of pulmonary SCC and other anal neoplasms. We sought to review our institutional experience and the National Cancer Data Base (NCDB) regarding outcomes.

Methods: The NCDB (1998-2012) and medical records from a high-volume, tertiary care academic medical center (1994-2014) were queried for patients with a pathologically confirmed primary non-metastatic SCC of the anus. The primary outcome was overall survival (OS). Descriptive statistics were used for the institutional analysis. For the larger NCDB cohort, unadjusted survival analysis was performed using the Kaplan-Meier method.

Results: The institutional review identified 9 patients with primary SCC of the anus over a 21 year period. Mean age was 60 ± 16 years, with 6 (67%) being female. Patients presented primarily with an advanced stage (n=5 stage IV, n=3 stage IIIB, and n=1 stage II) and grade (n=7 high, n=2 unknown). All patients received adjunctive therapy (2 chemotherapy, 1 radiation, and 6 both) and 1 patient underwent surgical resection. Median OS was 10 months [IQR 6, 15.5]. Of those with stage II/III primary SCC of the anus 2 died of the disease (5 and 20 months post diagnosis) and the surviving 2 had limited follow-up (1 and 12 months). Review of the NCDB revealed 174 patients with primary SCC of the anus. Mean age was 58.6 ± 13.5 years, with 74% being female. Most (95%) tumors were high grade and the majority of patients presented with advanced disease (n=50 stage IV, n=49 stage III, n=29 stage II, n=25 stage I, n=21 unknown). The liver was the most common site of metastasis at diagnosis (n=10). OS was 66% at 12 months and 29% at 36 months. Of those with stage I-III disease (n=103), 95% received medical therapy (7 chemotherapy, 4 radiation, 87 both) and 30% (31) underwent surgery with curative intent. OS in patients with stage I-III disease was 72% at 12-months and 39% at 36-months. When comparing patients who underwent resection to those that did not there was no difference in sex, age, race, year of diagnosis, comorbidities, or rates of chemotherapy or radiation (all p>0.05). However, patients in the no surgery group tended to be a higher stage (57% stage III) than those in the surgery group (26%, p=0.005). OS at 36-months was equally poor between the surgery and no surgery groups (Figure).

Conclusions: Primary SCC of the anus is a rare but devastating condition. Our results revealed that surgical resection does not improve long-term survival. This information may help guide surgeons and oncologists when counseling these rare and challenging patients.

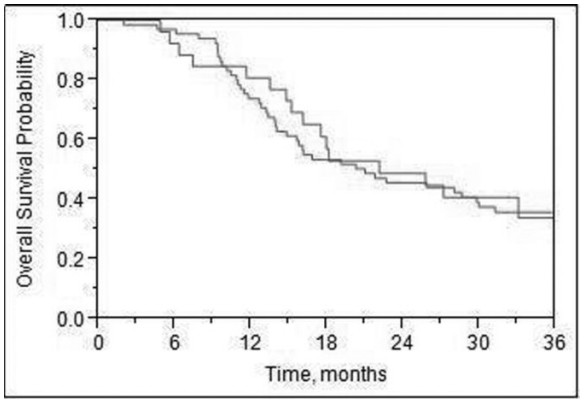

Figure. Kaplan Meier curve showing overall survival among NCDB patients undergoing surgical resection (blue line, 33.9%) vs no surgery (red line, 35.8%) at 36-months (p=0.87).

P147

LAPAROSCOPIC RIGHT HEMICOLECTOMY FOR CANCER: DOES VESSEL LIGATION TECHNIQUE IMPACT OUTCOMES?

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Purpose: Intracorporeal (IC) vessel ligation in laparoscopic right hemicolectomy has the theoretical advantage of improved visualization facilitating high ligation, a smaller extraction site, and better nodal harvest as compared to extracorporeal (EC) vessel ligation. Therefore, our objective was to compare nodal harvest, operative time, blood loss, extraction site length, and length of stay in patients undergoing IC versus EC vessel ligation in laparoscopic right hemicolectomy for cancer.

Methods: A retrospective review of our prospectively maintained database of 114 consecutive patients who underwent laparoscopic right hemicolectomy for cancer by 6 surgeons between 2010 and 2015 was undertaken to compare nodal harvest, operative time, blood loss, extraction site length, and length of stay in patients who had IC versus EC vessel ligation.

Results: IC vessel ligation was performed in 54 patients (47%) and EC vessel ligation was performed in 60 patients (53%). Median tumor size was similar (EC: 5.0 cm; IC: 4.0 cm, p=0.744) as was stage (EC: Stage 0: 6 (10%), Stage 1: 18 (30%), Stage 2: 13 (22%), Stage 3: 19 (32%), Stage 4: 4 (7%); IC: Stage 0: 4 (7%), Stage 1: 15 (28%), Stage 2: 12 (22%), Stage 3: 22 (41%), Stage 4: 1 (2%), p=0.704). Table 1 compares IC and EC vessel ligation undergoing right hemicolectomy for cancer. Median BMI was not significantly different between groups (EC: 27.2; IC: 26.4, p=0.52) and the frequency of patients with BMI ≥ 30 (n=33) was similar in both groups (EC: 28%, IC: 30%, p=0.879). Median lymph node harvest was not significantly different (EC: 27; IC: 25.5, p=.939). The proportion of patients with at least 12 nodes harvested was also similar (EC: 97%; IC: 93%, p=0.333). Median intraoperative blood loss (EC: 100; IC: 100, p=0.591) and extraction site length (EC: 5.0; IC: 5.0, p=0.383) were similar. Patients with IC vessel ligation had significantly longer operative times when compared to those with EC vessel ligation (EC: 137.5; IC: 176.5, p=<0.001). A trend toward longer length of stay was identified in the IC vessel ligation group (EC: 5.0; IC: 6.0, p=0.053).

Conclusions: While associated with longer operative times, IC vessel ligation technique in laparoscopic right hemicolectomy for cancer does not impact the quality of the surgical resection compared to EC vessel ligation when performed by experienced laparoscopic colorectal surgeons.

Comparison of extracorporeal versus intracorporeal vessel ligation in laparoscopic right hemicolectomy, 2010-2015 (n=114)

	N	Extracorporeal* (n=60)	Intracorporeal* (n=54)	p value
Lymph node harvest	114	27 (17.5-33.2)	25.5 (20.0-34.8)	0.939
Extraction site length, cm	67	5 (4-5)	5 (4-5)	0.383
Estimated blood loss, ml	114	100 (50-100)	100 (50-137.5)	0.591
Operative time, min	114	138 (117-171)	177 (139-219)	<0.001
Length of stay, days	114	5.0 (4.0-6.2)	6.0 (4.2-9.0)	0.053

*All numbers are median (interquartile range)

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TRANANAL ENDOSCOPIC MICROSURGERY A S DAY SURGERY – IS IT SAFE?

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Purpose: Transanal endoscopic microsurgery (TEM) is the current standard in the treatment of rectal adenomas and early rectal cancer. Many centers performing TEM admit patients to hospital for observation. The aim of this study is to determine if TEM can be performed safely as an outpatient procedure.

Methods: At St. Paul's Hospital, TEM has been performed since 2007 and data for all patients has been prospectively collected and maintained in the SPH-TEM database. Demographic, pathologic, operative and postoperative data were collected. Patients were analysed in two groups; patients admitted to hospital (TEM-A) and patients discharged on the date of surgery (TEM-D). Admission and readmission rates were analysed using the Cochran-Armitage trend test. Multivariate logistic regression was used to determine demographic and surgical features associated with hospital admission.

Results: Between 2007 and 2015, TEM was performed in 500 patients at SPH. The overall admission rate was 29% (n=145/500). While discharge on the day of surgery was the protocol starting in 2007, the admission rate decreased over the time of the study to a stable 19% in the most recent 3 years (p<0.001). The overall readmission rate was 5% (n=26/500), and did not change significantly (Figure 1) over the study period (p=0.30). In admitted patients, 81% required a length of stay ≤ 2 days. Reasons for hospital admission were: surgeon discretion/monitoring (35%), urinary retention (26%), hemorrhage (10%), breech of peritoneal cavity (7%), infection (7%) and other (15%). In patients requiring readmission, the most common reasons were hemorrhage (54%, n=14), pain (19%, n=5), and infection (12%, n=3). In multivariate analysis, factors associated with admission were: tumor height (OR 1.09, 1.02-1.17), prolonged operative time (OR 1.25, 1.14-1.37), unsutured surgical defect (OR 1.99, 1.22-3.25) and surgeon experience (OR 4.62, 2.75-7.77).

Conclusions: Outpatient TEM is safe and carries a low risk of readmission. In a center with an outpatient TEM strategy, predictors of admission to hospital include proximal tumors, prolonged surgical time and open management of the surgical defect.

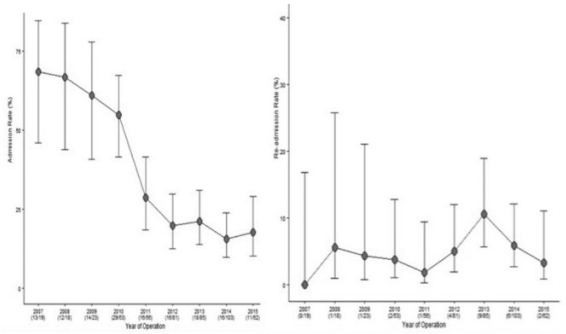

Figure 1 – Admission and Readmission rates after Transanal Endoscopic Microsurgery over time

P149

PROGNOSTIC IMPACT OF PREOPERATIVE CHEMORADIOTHERAPY IN PATIENTS WITH LOCALLY ADVANCED LOW RECTAL CANCER HAVING LATERAL PELVIC LYMPH NODE METASTASES.

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Purpose: Although preoperative chemoradiotherapy (CRT) is a standard treatment for patients with locally advanced low rectal cancer (LALRC), the prognostic significance of preoperative CRT in patients with lateral lymph node metastases (LLNM) is unknown. The aim of the present study was to examine the prognostic impact of preoperative CRT in patients with LALRC having LLNM.

Methods: From 1985 to 2012, we analyzed 73 patients with LALRC having LLNM who underwent total mesorectal excision and lateral lymph node dissection. Patient population was subdivided into the CRT group (N = 30) who were treated with preoperative CRT and the surgery alone group (N = 43) who were treated without CRT. Clinicopathological characteristics were compared between the two groups. Furthermore, univariate and multivariate analysis were performed to assess the predictors of overall survival (OS), relapse-frees survival (RFS) and local recurrence (LR) rate.

Results: Forty-six (63.0%) were male and 27 (37.0%) were female patients. Sixty-eight patients (93.2%) underwent R0 resection, but five patients (6.8%) had positive circumferential resection margin. The median distance of the tumor from the anal verge was 40 mm in both groups. The number of total, mesorectal, and LLNM were significantly smaller in the CRT group than in the surgery alone group. Five-year OS, RFS and LR rate of the CRT group were significantly better (78.2, 72.1 and 3.5%, respectively) than those of the surgery alone group (41.1, 25.4 and 39.6%, respectively). Multivariate analysis showed that surgery without CRT was an independent worse predictor of OS (HR 3.513, $P = 0.004$), RFS (HR 2.696, $P = 0.021$) and LR rate (HR 11.094, $P = 0.001$). A total number of lymph node metastasis ≥4 was also independent worse predictor of OS and RFS.

Conclusions: Preoperative CRT might have significant prognostic impact on patients with LALRC with LLNM treated with total mesorectal excision and lateral lymph node dissection. Preoperative CRT and lateral lymph node dissection should be considered for LALRC with suspected LLNM.

P150

ROBOT-ASSISTED VERSUS LAPAROSCOPIC RECTAL RESECTION FOR CANCER IN A SINGLE SURGEON'S EXPERIENCE: A COST-ANALYSIS, COVERING THE INITIAL 50 ROBOTIC CASES.

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Purpose: Since the introduction of the da Vinci® Surgical System, several studies have been published regarding the clinical and surgical benefits of robot-assisted colorectal surgery, but, only a few have reported a structured cost-analysis. The aim of this study is to compare surgical parameters and costs of robotic surgery with those of laparoscopic approach in rectal cancer based on a single surgeon's early robotic experience.

Methods: Data from the first 50 robotic (ROB) and from 25 laparoscopic (LAP), rectal resections performed at our institution by an experienced laparoscopic surgeon (>500 procedures) between 2009 to 2014, were collected, retrospectively analyzed and compared. Patient demographic, procedure and outcome data were gathered. Financial costs of the two procedures were collected and categorized into fixed and variable costs. The robotic learning curve was analyzed using the cumulative sum method (CUSUM).

Results: Based on CUSUM analysis, ROB group was divided into 3 phases (ROB1: 1-19; ROB2: 20-40; ROB3: 41-50). Overall median operating time was significantly lower in LAP than in ROB (270 min vs 312.5 min, P=0.006) and regression analysis showed a borderline significant interaction effect between type of surgery and year (P=0.058) suggesting a significant reduction of operating time only in ROB group. Length of hospital stay did not differ between groups (P=0.567). Overall mean costs associated with LAP procedures were significantly lower than ROB (P<0.001). A statistically significant reduction in variable and fixed costs were found between ROB3 and ROB1 (P<0.05). If we exclude fixed costs, the difference between laparoscopic and ROB3 were no longer statistically significant.

Conclusions: Even if our results suggest a significant optimization of costs with increased experience, robotic rectal surgery has significantly greater costs and operating times compared to standard laparoscopy. The dominant cost is fixed cost and efforts to reduce it include accurate patient selection and use in high volume, multidisciplinary centers.

Overall costs, Adjusted analysis*	Coef. (Std.Err.)	(95% CI)	P-value
Costs not including fixed costs			
Robot1 vs Laparoscopy	3201.5(677.5)	(1873.6-4529.3)	<0.001
Robot2 vs Laparoscopy	2053.8(678.5)	(723.9-3383.7)	0,002
Robot3 vs Laparoscopy	1444.9(837.3)	(-196.2-3085.9)	0,084
ROB 1 vs ROB 3	1854.9(828.0)	(231.9-3477.8)	0,025
ROB 2 vs ROB 3	842.4(840.9)	(-805.7-2490.4)	0,316
Overall costs			
Robot1 vs Laparoscopy	4773.1(675.3)	(3449.5-6096.8)	<0.001
Robot2 vs Laparoscopy	3683.9(676.4)	(2358.2-5009.6)	<0.001
Robot3 vs Laparoscopy	2996.4(834.7)	(1360.5-4632.4)	<0.001
ROB 1 vs ROB 3	1876.6(824.0)	(261.6-3491.7)	0,023
ROB 2 vs ROB3	916.7(836.8)	(-723.4-2556-8)	0,273

*Adjusted for Age and adjuvant therapy

P151

THE BIMODAL ASSOCIATION BETWEEN PATHOLOGIC COMPLETE RESPONSE AND TUMOR HEIGHT IN LOCALLY ADVANCED RECTAL CANCER PATIENTS UNDERGOING NEOADJUVANT THERAPY.

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Purpose: Neoadjuvant therapy is standard for locally advanced (AJCC stage II and III) rectal cancer. Achieving a pathologic complete response (pCR) has been associated with better prognosis when compared to patients achieving an incomplete response. The objective of this study was to investigate the relationship between distance to the anal verge (DTAV) and pCR.

Methods: Review of a tertiary cancer center's prospectively maintained database identified 827 patients with locally advanced rectal cancer who received neoadjuvant treatment, long-course radiation with concomitant 5-Fluorouracil chemotherapy over 25-28 fractions, during the study period (1998 – 2011). Univariate and multivariate analysis were undertaken to determine association between tumor height from the anal verge (measured pretreatment with proctoscopy) along with other covariates and tumor response to neoadjuvant therapy.

Results: Of the 827 included patients, the median height of the distal aspect of the tumor from the anal verge was 7 cm (IQR 5 – 9 cm). 165 patients (20.0%) had a pCR. DTAV was strongly associated with pCR ($P = 0.002$): pCR rates were 11.0% for tumors ≤ 4.0 cm, 23.9% for tumors 4.1-6.0 cm, 29.9% for tumors at 6.1-8.0 cm, 16.6% for tumors 8.1 – 10.0 cm (16.6%) and 13.6% for tumors > 10 cm from the anal verge. After adjusting for clinical tumor stage, clinical nodal stage, tumor grade and year of surgery, there continued to be a strong association between DTAV and pCR ($P = 0.008$). The bimodal distribution of tumor response to neoadjuvant therapy resulted in a lower odds ratio of pCR for tumors ≤ 4cm and >8 cm from the anal verge.

Conclusions: We demonstrate a bimodal distribution of pCR based on DTAV. Patients with low tumors (<4cm) and those with higher tumors (>8 cm), were less likely to have a pCR. Further investigation is warranted to

determine if these observations are related to tumor biology or differences in radiation technique.

P152

EXPERIENCE WITH 400 HAND-ASSISTED LAPAROSCOPIC LEFT COLON RESECTIONS IN A SINGLE CENTER– TIME TO RETHINK ITS ROLE IN THE ERA OF PURE LAPAROSCOPY.

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Purpose: There is enough evidence to support use of laparoscopy in colorectal cancers. Questions still remain on the learning curve required for laparoscopy and can that be overcome by an average surgeon working in a low volume center and secondly can we decrease the cost to make the procedure more affordable especially in developing countries. Use of surgeon's non dominant hand to assist surgery (HALS) has been advocated to decrease learning curve, improve accuracy and decrease complications by regaining tactile sensation but its exact role in current laparoscopic era is still controversial.

Methods: We believe in hand assisted laparoscopic surgery and are routinely performing it using our own simple method using wound retractor and double gloves (Medanta Handport Technique presented last year). We are presenting our experience of performing left colon resections using this technique in the last 5 years.

Results: Between March 2010 – March 2015, 400 patients underwent left colonic resections using HALS. The mean age was 65 years and male to female ratio 4/1. There were 180 cases with sigmoid colectomies, 53 underwent left hemicolectomy and 167 had rectal cancers. Among rectal cancers, 70 % received neoadjuvant treatment. Overall, 85% of resections were for cancers, 10 % had diverticulitis and the rest were for benign pathologies including resection for prolapse, volvulus and large adenomas. There were 5 cases which needed conversions to open surgery in view of dense adhesions due to previous surgery in two patients whereas other three were converted in view of hemodynamic instability on pneumoperitoneum. All others underwent laparoscopic procedure. Except rectal cancers in male patients, majority of patients were managed by a 5 cm periumbilical handport, one camera port and one working port. Rectal cancers required additional 5mm left assistant port for anterior retraction. Distal transaction was performed using laparoscopic linear staplers (one stapler in 85% and two in 15%). The mean operating time was 48 minutes (30-160 minutes). Adjacent organ resections were performed in 24 cases. On histopathology, all patients had negative resection margins and mean lymph node yield was 13 (6-22). The median hospital stay was 3.6 days (2-8days).

Conclusions: With decrease in number of ports and stapler requirement and by using our indigenous handport, we were able to offer the benefits of laparoscopic surgery to majority of our patients with left colon resections. The precision and speed of surgery increased with tactile feedback using hand port. It also allowed us to complete technically challenging cases like diverticulitis and those requiring adjacent organ resections. .

P153

EARLY EXPERIENCE OF FULL ROBOTIC COLORECTAL RESECTIONS FOR CANCER COMBINED WITH OTHER MAJOR SURGICAL PROCEDURES WITH THE NEW DA VINCI XI.

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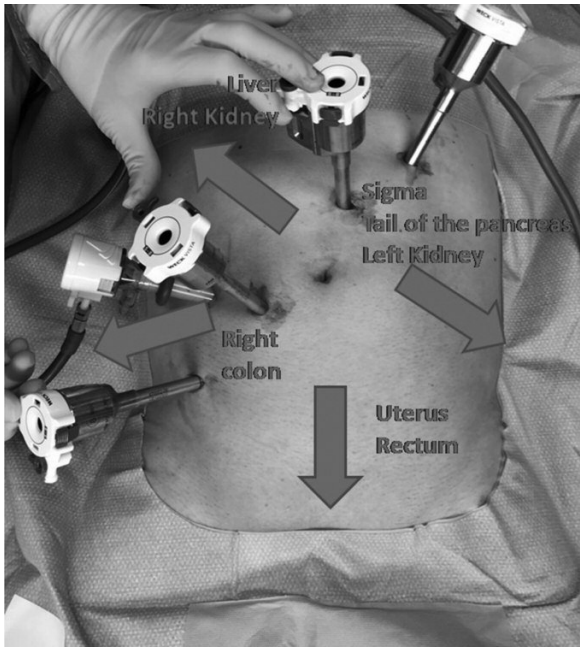
Purpose: The new da Vinci Xi® has been developed and released to overcome some of the limitations of the previous platform, thereby increasing the acceptance of its use in robotic multiquadrant surgery. These new characteristics could have an important role in colorectal surgery and particularly in attaining fully robotic colorectal resection combined with other major surgical procedures.The aim of this study is to evaluate the perioperative results of totally robotic colorectal surgery for cancer associated with other major procedures with da Vinci Xi.

Methods: We reviewed the charts of all patients undergoing fully robotic combination procedures involving colorectal resections using the da Vinci Xi, from January 2015 to October 2015. Variables examined include patient demographic characteristics, perioperative data (trocar position, technical aspects, operative time and robot dock/undocking times). Postoperative variables included the length of hospital stay, morbidity and mortality. Ten patients were included in the study, comprising 12 colorectal procedures: 5 right hemicolectomy and 5 anterior rectal resections with TME were performed in combination with sigmoidectomy (1), right nephrectomy (1), hysterectomy (1), hepatic resection (3), enucleation of pancreatic tail lesion (2) and ileocecal resection (1).

Results: All the operations were completed by a fully robotic approach, without conversion to hand assisted laparoscopy or laparotomy, and without hybrid approaches or need of changing of robotic cart position. Trocar positions respected the Universal Port Placement Guidelines provided by Intuitive Surgical for "left lower quadrant". Simultaneous procedures in same quadrant or left quadrant and pelvis, or left/right and upper, were performed with a single docking/single targeting approach; in cases of left/right quadrant or right quadrant/pelvis, we performed a dual-dock operation where we re-targeted using the camera to orient the system towards the new work space (an opposite facing quadrant) and redocked the remaining arms. No external collisions or problems related to trocar positions were noted. Mean overall procedural time was 360 min. No patient experienced postoperative surgical complications and the mean hospital stay was 6 days.

Conclusions: The herein presented high success rate of robotic colorectal resection combined with other surgical interventions for synchronous tumors, without conversion or excessive operating time, suggest the efficacy of the robotic platform, and in particular the new released product da Vinci Xi, in minimally invasive multiquadrant combined surgery. A further possible advantage may be provided by da Vinci Xi Integrated Table Motion feature (available only in the EU), that allows patients to be repositioned without undocking the robot and without removing instruments from inside the abdomen.



P154

DOES EMERGENCY SURGERY AFFECT RESECTABILITY OF COLORECTAL CANCER?

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Purpose: Emergency surgery for colorectal cancer is common in daily practice, and is mainly implied by bowel obstruction. It is related to increased morbidity and mortality. Its relation with the stage and respectability of the disease is uncertain. This study aims to further clarify these parameters.

Methods: Over the past 15 years period 183 patients had an emergency operation (13%) from a total of 1418 patients with colorectal carcinoma. There were 89 men (49.8%) and 94 women (50.2%) with a men of age of 69 years (range 28-94); 93 patients (51.4%) were ≥ 70 years old. The data of all these patients were studied retrospectively in comparison with those who underwent elective surgery. Emergency cases were further divided into two age groups (≥ 70 and <70 years) and compared. The tumor location was mainly in the left colon, whereas obstruction was the predominant reason for acute presentation.

Results: On operation, absence of macroscopic spread was noted in 60.8% of emergency cases and 72% of elective cases ($p<0.05$). The resectaility rates were 74% and 90% respectively ($p<0.05$), and were not significantly affected by the age factor. There were no differences in the grade of malignant cell differentiation or in the depth of microscopic invasion ($p<0.05$) in either group. For emergency operations, the morbidity was 21% (38 patients) and the 30-day mortality rate was 5.2% (9 patients). Both parameters were higher in patients ≥ 70 years old.

Conclusions: Emergency surgery for colorectal carcinoma is related to lower resectability and higher - but acceptable - postoperative morbidity rates, when compared with elective surgical management.

P155

FEASIBILITY AND SAFETY OF SHORT-COURSE RADIOTHERAPY FOLLOWED BY NEOADJUVANT CHEMOTHERAPY IN THE MANAGEMENT OF METASTATIC RECTAL CANCER.

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Purpose: Optimum management of metastatic rectal cancer is considered controversial. Curative treatment includes resection of the primary as well as the metastasis. However timing and the schedule of chemotherapy and radiotherapy varies according to the individual patient presentation as well as the intent of therapy. Inorder to address the primary as well as the metastasis early in disease management short course radiotherapy (SCRT) followed by systemic chemotherapy as been proposed as a viable option. We look at our own results in this subgroup of patients.

Methods: This is a retrospective review of a prospectively maintained database including patients treated between October 1, 2013 and March 31, 2015 at our center. All the patients with metastatic rectal cancer who were planned for SCRT followed by neoadjuvant chemotherapy were included in the study. These were divided into two groups – those with oligometastasis who were treated with curative intent and those with non oligometastasis who were treated with palliative intent. The primary objective was to determine response rate and toxicity in both the groups. Secondary objective was to determine event free survival.

Results: There were 80 patients included in the study. In the first group there were 57 patients and in the second group there were 23 patients. In the first group, 23 patients had atleast partial response (56%), 9 had stable disease (22%) and 9 had progressive disease (22%) among the 41 patients who completed treatment. Of the 23 patients who had atleast partial response, 20 (50%) underwent surgery for primary tumor, Metastasis were treated with surgery in 7 patients (2 pulmonary metastatectomy, 5 hepatic resections), RFA in 4 patients and rest were kept under close observation as metastasis disappeared after the neoadjuvant therapy. Fourteen patients developed grade ¾ (24%) toxicity of which one died.

Conclusions: Short course radiotherapy followed by neoadjuvant chemotherapy prior to definitive surgery is feasible. This approach avoids delaying systemic therapy for metastasis while retaining the effect of radiotherapy for the primary tumor and hence appears to be a lucrative option for the management of metastatic rectal cancer

P156

THE FEASIBILITY OF PREOPERATIVE PET/CT IN COMPLETION SURGERY FOR T1 COLORECTAL CANCER FOLLOWING INCOMPLETE ENDOSCOPIC RESECTION.

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Purpose: The Japanese Society for Cancer of Colon and Rectum (JSCCR) guidelines indicates that T1 colorectal cancer (CRC) with positive margin, submucosal invasion over 1,000μm, lymphatic or venous invasion, budding grade 2/3 or other than well or moderately differentiated adenocarcinoma following endoscopic resection is required for completion surgery. However, histopathological results often clarify that it is redundant because of neither evidence of lymph node metastasis nor residual tumor. Fluorine-18-fluorodeoxyglucose (18F-FDG) positron emission tomography/computed tomography (PET/CT) is a feasible modality for screening or diagnose of several kinds of malignant disease including CRC. The purpose of this study is to evaluate the feasibility of PET/CT to predict the residual tumor of CRC (i.e. lymph node metastasis and residual cancer) following endoscopic resection.

Methods: The objects were the patients who had undergone completion surgery for T1 colorectal cancer following incomplete endoscopic resection and had available PET/CT before surgical resection from 2012 to 2015 in our institution. We calculated the sensitivity and specificity of PET/CT for predicting of residual tumor following endoscopic resection. We compared the standardized uptake value (SUV) of site of endoscopic resection or regional lymph node between the patients with and without residual tumor as a result of further surgical treatment following endoscopic resection of CRC. Moreover, we analyzed the impact of SUV on predicting of residual tumor by using logistic regression analysis.

Results: The objects were 36 patients. The residual cancer cells in the site of endoscopic resection and regional lymph node metastasis were observed in 2 patients and one patient showed only lymph node metastasis. The sensitivity of PET/CT for residual tumor was 66.7% and the specificity was 96.9%. Mean SUV of the patients with residual tumor was higher than the patients without residual tumor (average 3.11 vs 0.65 $p=0.028$). Univariate logistic regression analysis revealed that residual tumor was significantly correlated with SUV (odds ratio [OR]: 1.50, 95% confidential interval [CI]: 0.96-2.36, $p=0.076$), venous invasion (OR: 8.69, 95% CI: 0.958-78.9, $p=0.055$), and positive horizontal margin (OR: 6.25, 95% CI: 0.50-78.4, $p=0.156$). In multivariate analysis adjusted with the factors such as venous invasion and positive horizontal margin, SUV (OR: 3.42, 95% CI: 1.0024-11.7, $p=0.050$) was still an independent risk factor for residual tumor.

Conclusions: PET/CT might be a feasible modality to predict residual tumor following endoscopic resection of CRC and especially SUV might be a robust predictive marker to require for completion surgery.

Univariate and multivariate analysis of residual tumor

			univariate analysis		multivariate analysis	
Factors	OR	95% CI	p vlaue	OR	95% CI	p value
SUV	1.50	0.96-2.36	0.076	3.42	1.002-11.67	0.050
positive horizonal margin	6.25	0.50-78.4	0.156	9.52	0.007-11768	0.535
venous invasion	8.69	0.958-78.9	0.055	0.62	0.019-198.9	0.871

P157

ONCOLOGICAL OUTCOME AFTER ELECTIVE SURGERY FOR TRANSVERSE COLONIC CANCER: IS OPEN BETTER THAN LAPAROSCOPIC? A NATIONWIDE COHORT STUDY.

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Purpose: Laparoscopic management of mid-transverse colonic cancer may be challenging with regard to central ligation and lymph node yield along the middle colonic artery. Studies comparing oncological outcomes of laparoscopic versus open colonic resection often exclude tumors of the transverse colon and only few and small studies on selected patients have compared a laparoscopic and open approach in these patients. The aim of this study was to investigate potential differences in the quality of the resection specimen and survival between open and laparoscopic surgery for mid-transverse colonic cancer

Methods: This was a nationwide cohort study merging data from 3 nationwide registries: the Database of the Danish Colorectal Cancer Group, the National Patient Registry and the Danish Pathology Registry. Patients operated electively between 2010 and 2013 for a mid-transverse AJCC I-III colonic cancer, excluding flexure cancers, with primary anastomosis were included. Primary outcomes were resection plane, ligature height, lymph node yield, anastomotic leak (AL), 90-days and 3-years mortality. Covariates were age, gender, BMI, T- and N-stage, ASA score, extent of resection and the surgeons' specialization.

Results: In total, 317 patients were included for analysis of whom 78 (25%) underwent a laparoscopic approach. Follow-up was median 3.0 years (95% CI 2.8-3.2 years). Age, gender, BMI and T- and N-stage were similar between patients subjected to open or laparoscopic surgery. An extended right hemicolectomy was performed in 211 (67%) patients and 106 (33%) underwent transverse resection. The rate of resection in the mesocolic plan was 72% in the laparoscopic group and 86% in the open group, *P*=0.006. Median ligature height was 70 mm in both groups, *P*=0.896. Lymph node yield was 18 (IQR 14-26) in the laparoscopic group compared with 23 in the open group (IQR 16-37), *P*=0.01. There were no differences in the rate of AL (adjusted odd ratio 0.59, 95%CI 0.16-2.17; *P* = 0.429), and neither 90-day nor 3-years mortality rates differed between the groups (adjusted hazard ratio (aHR) 0.41, 95%CI 0.12-1.36, *P*=0.144 and aHR 0.77, 95% CI 0.40-1.49, *P*=0.441, respectively).

Conclusions: Laparoscopic approach to mid-transverse colonic cancer was associated with inferior resection specimens in oncological terms compared with the open approach. However, no differences in mortality nor anastomotic leakage were detected. Data on local- and distant recurrence in the two groups are currently being collected for presentation on the ASCRS 2016 meeting.

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THE IMPACT OF OBESITY ON THE SHORT-TERM EFFICACY OF INTERSPHINCTERIC RESECTION FOR PATIENTS WITH ULTRALOW RECTAL OR ANAL CANAL CANCER.

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Purpose: Discussing whether obesity has impact on the short term efficacy of intersphincteric resection for patients with ultra-low rectal or anal canal cancer.

Methods: This retrospective study includes 276 patients with rectal or anal canal cancer who received treatment from the professional rectal surgery group of the Gastrointestinal Surgery Center of West China Hospital. According to the definition made by the World Health Organization, one who has the normal body weight has a BMI between 18.5 to 24.9, and one who is overweight has a BMI bigger than 25. We compare the intraoperative related indicators, postoperative recovery indicators and the rate of occurrence of complications between Group A and Group B(p=0.023).

Results: The time of operation in Group B is apparently longer than that in Group A (143.41min v.s. 130.91min P<0.05), the intraoperative blood loss, the anastomotic patterns and the reconstruction pattern are not statistically different. The rate of crissum infection of Group B is significantly higher than that of Group A (6.5% v.s. 1.5% P<0.05), and the rate of incision infection of Group B is significantly higher than that of Group A (5.6% v.s. 0.6% P<0.05). However, the rate of occurrence of other complications between 2 groups is not statistically different.

Conclusions: Obesity increases the difficulty of performing ISR for ultra-low rectal or anal canal cancers, extends the time of operation, and increases the incidence rate of crissum infection post-operatively. However, there is no significant difference between the indications of postoperative recovery, and the incidence rate of complications in obese patients and that in normal weight patients. In terms of the short-term effects, the operations for obese patients are safe and effective.

The comparison of intraoperationindex

	Group A(168cases)	Group B(108cases)	F or chi-square	P
intraoperative blood loss(ml，x±s)	29.90±18.014	40.09±37.449	5.463	0.018
time of operation(min，x±s)	130.91±30.281	143.41±34.331	4.832	0.023
anastomotic patterns [n(%)]			0.159	0.690
handwork	143(85.1%)	90(83.3%)		
anastomat	25(14.9%)	18(16.7%)		
reconstruction way[n(%)]			2.112	0.348
end-to-end-intesti-nal anastomosis	151(89.9%)	91(84.3%)		
J -Pouch	13(7.7%)	14(13.0%)		
W -Pouch	4(2.4%)	3(2.8%)		

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CHYLOUS ASCITES AFTER COLORECTAL CANCER SURGERY: RISK FACTORS AND IMPACT ON SHORT-TERM AND LONG-TERM OUTCOMES.

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Purpose: The incidence, risk factors and oncologic impact of chylous ascites after colorectal cancer surgery have rarely been reported. This study aimed to explore the risk factors and short-term and long-term impact of chylous ascites following colorectal cancer surgery.

Methods: We retrospectively reviewed 2917 primary colorectal cancer patients who underwent surgical resection between January 2008 and December 2013. Patients with postoperative chylous ascites were compared with those without chylous ascites in terms of short-term and long-term outcomes, and risk factors for chylous ascites were analyzed.

Results: Chylous ascites occurred in 138 (4.7%) patients. Multivariable logistic regression analysis showed that shorter operative time (odds ratio [OR] = 0.992, 95% confidence interval [CI] 0.988 – 0.996) and number of retrieved lymph nodes (OR = 1.015, 95% CI 1.004 – 1.025) were independent risk factors for postoperative chylous ascites after colorectal cancer surgery. All of the patients with chylous ascites were managed conservatively without surgical intervention. Postoperative hospital stay was similar between the two groups (9.4 vs. 9.2 days, $p = 0.467$). After median follow-up of 37 months (range 0–118), 3-year disease-free survival (85.0 vs. 83.9%, $p = 0.408$) and 5-year overall survival (93.0 vs. 89.7%, $p = 0.662$) showed no statistical difference between the two groups.

Conclusions: Chylous ascites after colorectal cancer surgery was associated with shorter operative time and number of retrieved lymph nodes. It was not associated with short-term and long-term outcomes.

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DIFFERENCES IN TREATMENT OF RECTAL CANCER BY AGE AND DEMOGRAPHICS: A NATIONAL REVIEW.

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Purpose: Colorectal cancer is the third most common cancer in the United States. The aim of our study was to determine the differences in the

presentation and treatment of rectal cancer by age and patient demographics.

Methods: Data for all patients undergoing rectal cancer treatment from 2003 to 2013 was gathered from the National Cancer Database. Retrospective analysis was performed and stratified by age for variables including patient demographics, education level, insurance status, distance traveled, academic status & location of treating center and therapy received. "Young" patients were defined as being younger than 50 years of age at diagnosis.

Results: A total of 253,218 patients were reported during the 10 year period of which 36,926 patients (15%) were young. Young rectal cancer patients had a similar incidence between genders but a male predisposition was demonstrated in older patients (males 58%, females 42%). Caucasians were the predominant race with rectal cancer across all age groups. African Americans (<20 year age group) and Hispanics (20-39 year age group) were more likely to be diagnosed with rectal cancer at a younger age than Caucasians. Academic centers treated more than twice as many young patients compared to community centers, while older patients were equally distributed. More minorities were treated at academic centers (27%) than community centers (20%, p=0.008). The more educated the patient, the further they travelled for treatment. Significantly more patients across all age groups travelled greater than 100 miles for academic centers (10%) as opposed to community centers (4.8%, p=0.002). Young patients with rectal cancer were more likely to be uninsured (2% vs. 7%, p=0.003). The percentage[DoVA1] of uninsured young patients treated at community (7.8%) and academic centers (8.3%) was similar. When categorizing by income, more high income earners across all ages (<$69,000/year) were treated at academic centers compared to community centers (24% vs. 16%, p=0.008). Young patients were most commonly diagnosed at a higher stage compared to older patients (Stage III vs. Stage I). There was no difference noted in the tumor stage at presentation between academic and community centers.

Conclusions: Young rectal cancer patients are diagnosed at a higher stage and are more likely treated at distant academic centers when compared to older patients. Well educated and/or higher income earners, both young and old, undergo treatment at academic centers more frequently than community centers. Therefore, it is plausible that young patients may benefit more from being treated at specific cancer centers of excellence. OSTRICH Consortium efforts to establish rectal cancer centers of excellence would help better care for young patients, minorities and also help prepare participating community hospitals standardize treatment for those who are afraid or unable to travel far due to age or low income.

P161

DOES TUMOR LOCATION HAVE AN IMPACT ON SURVIVAL IN COLON CANCER?

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Purpose: To compare survival rates between right and left colon cancers following curative intent oncologic resection

Methods: Right (caecum-splenic flexure) and left-sided (splenic flexure-restosigmoid junction) colon cancer patiens treated through central vascular ligation tehnique between 2000 and 2012 were enrolled. Epidemiologic, clinical and pathological characteristics, early postoperative results overall 5-year survival rates were compared. Stage IV cancers were excluded.

Results: A total fo 852 patients were enrolled. there were no differences in epidemologic and clinical characteristics between two groups (P>0.05), except a higher mean lymph node yield in right-sided cancers (P<0.001). Short-term morbidity and mortality were no different between both study groups, whereas mean initial flatus time, oral feeding time and length of stay were longer in the right-sided colon cancer group (P<0.05). There were no differences in overall 5-year survival rates among right -sided 68% vs. left-sided colon cancer 72.1% groups (P=0.479). Logistic regression analysis was performed to evaluate whether the location of colon cancer affected overall 5-year survival and no significant difference was observed (P=0.836).

Conclusions: Following curative intent oncologic resection with central vascular ligation, lymph node yield was greater for right-sided colon tumors. Overall 5-year survival rates were comprable in rigth vs. left-sided colon cancers

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CHARACTERIZATION OF THE CLINIC-PATHOLOGICAL FEATURES OF PATIENTS WITH COLORECTAL CANCER RELATED TO DIFFERENT FAMILY HISTORY.

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Purpose: To investigate if distinct clinic-pathological feature related to different family history of colorectal cancer.

Methods: From January 1995 through December 2012, a total of 14479 patients with newly diagnosed colorectal cancer were recorded in Colorectal Cancer Registry. Family history was classified into 5 categories: 1= sporadic; 2= familial adenomatous polyposis; 3= HNPCC ; 4= patients with positive family history of other malignancy; and 5 = HNPCC-like. We compared clinic-pathological characteristics,treatment outcomes and cumulative risks of secondary tumors.

Results: Significantly less lymph node metastases or N0 patient in HNPCC group (61.1%, p<0.0001) than HNPCC-like (51.7%), positive family history (51.1%) and sporadic patients (49.6%); less rate of distant metastases (11.2%, p<0.001) compared with HNPCC-like (19.5%), positive family history (17.6%) and sporadic patients (19.2%). Tumor size is larger in HNPCC patients (24.5 cm2, p<0.0001). Significantly lower frequency of rectal cancer (27.6%, p<0.0001) were found in HNPCC patients, in addition, presence of multiple tumor either synchronous or metachronous (27.9%, p<0.0001); younger age (mean age; 13 years, 12 years or 9.1 years younger than sporadic, positive family history (FH) or HNPCC-like patients respectively (p<0.0001); right colon predominant (49.5% v.s. sporadic (21.1%), positive FH (22.9%) and HNPCC-like patients (25.6%); mucinous type adenocarcinoma (15.0% v.s. sporadic (8.0%), positive FH (7.2%) and HNPCC-like patients (8.4%) p=0.0013); and poorly differentiated (17% v.s. sporadic (8.6%), positive FH (8.7%) and HNPCC-like patients (10.6%) p<0.0001). Multivariate Cox proportional hazard model demonstrated patients of patients with positive FH or HNPCC-like patients have better OS than those of sporadic CRC, with hazard ratios 0.873 p<0.0001 and 0.769 p=0.0012, respectively. Patient of positive FH have significantly better RFS and OS than those of sporadic type (RFS: HR:0.872, 95% CI 0.800-0.949, p=0.0016) During an average of 4.8 year (range 2-15 years) post-operative follow-up period, 192 patients were found with metachronous CRC and 641 non-colorectal secondary tumors. For frequencies of second colorectal cancer of sporadic, FAP, HNPCC, positive FH and HNPCC-like patients, the incidence among three groups are 2.36, 1.44, 7.55, 2.94 and 5.71 per 1000 person-year, respectively. HNPCC was 4.185 fold higher (p<0.0001) than sporadic patients and HNPCC-like 2.49 fold higher (p=0.003). For second cancer of other types (non-colorectal), the incidences are 8.73, 10.84, 12.52, 9.03 and 10.46 per 1000 person-year, respectively. Only HNPCC patients showed significantly higher risk of second non-colorectal cancer than sporadic patients (p=0.0074).

Conclusions: We added new distinct clinic-pathological characteristics related to different family history groups of colorectal cancer patients.

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TATTOOING OR NOT? A REVIEW OF CURRENT PRACTICE AND ASSOCIATED OUTCOMES IN LAPAROSCOPIC COLON RESECTION FOLLOWING ENDOSCOPY AT A SINGLE TERTIARY CARE CENTER.

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Purpose: Since small or soft colonic tumors may not be visible or palpable during laparoscopy, the location of the lesion must be identified before surgery. The aim of this study is to evaluate effectiveness of the current recommendation of endoscopic tattooing of lesions prior to laparoscopic colon resections.

Methods: All consecutive patients who underwent elective laparoscopic colon resection for a neoplasm at St. Paul's Hospital in Vancouver, Canada between 2013 and 2015 were identified. Rectal lesions were excluded. Details concerning tattooing, endoscopic documentations and localization, operative visualization, planned and performed procedures, changes in surgical plan as well as peri-operative and post-operative outcomes were recorded.

Results: 224 patients underwent laparoscopic resection for a benign or malignant colon neoplasm during the study period. All patients had a complete colonoscopy pre-operatively. 148 patients (66%) had the lesion tattooed at endoscopy, while 11 patients (5%) had the lesion tattooed at a second endoscopy. Most lesions were tattooed distally but 15% were either tattooed proximally (8 lesions), both proximally and distally (2 lesions) or tattooed without specifying location as proximal or distal (13 cases). Tattoo localization was accurate in 69% of cases. Tattooed lesions were not visible during surgery in 28 cases (19%) of time with 2 cases (7%) converted to open surgery to identify the lesion. Inaccuracy in endoscopic localization led to change in surgical plan in 35 surgeries (16%). In the non-tattooed group, 1 case was converted to open surgery to localize the lesion, 3 cases required intra-operative colonoscopy and 1 case had positive margins on final pathology.

Conclusions: There is variability in tattooing of lesions during colonoscopy with 33% of lesions not tattooed and 15% not tattooed distally to the lesion. Surgical procedure was changed in 16% of cases due to inaccurate preoperative localization. To improve surgical planning, we recommend adoption of the practice of endoscopic tattooing of all colon lesions at a location just distal, and only distal, to the lesion using multiple injections to cover the circumference of the lumen.

P165

PREDICTIVE VALUE OF KRAS MUTATION & ERCC1 OVEREXPRESSION IN COLORECTAL CANCER PATIENTS WITH FOLFOX CHEMOTHERAPY.

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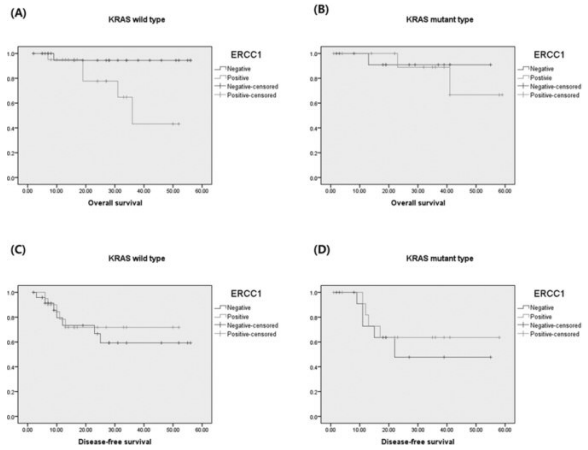
Purpose: To determine the clinical significance of KRAS mutation and ERCC1 overexpression as a predictive factor for resistance against oxaliplatin based treatment.

Methods: We retrospectively analyzed the clinicopathologic features, and the status of KRAS mutation and ERCC1 overexpression in 386 colorectal cancer patients who received curative intent surgery. Among them 84 patients received FOLFOX regimen as their first line treatment. Their overall survival and disease-free survival according to the KRAS and ERCC1 were analyzed.

Results: 25.5% of the patients were KRAS wild-type with ERCC1 overexpression. Among the patients who were treated with the FOLFOX regimen, 73 patients were evaluated for KRAS and ERCC1. There were no significant differences in overall survival and disease-free survival according to KRAS status and ERCC1 expression, respectively. Subgroup analysis showed that overall survival of ERCC1 overexpression group in wild-type KRAS was poorer than ERCC1 negative group (p=.029), but no significant difference was found in the mutant KRAS group (p=.671).

Conclusions: Our results suggest that colorectal cancers that show KRAS wild-type with ERCC1 overexpression may be associated with the oxaliplatin resistance. When it comes to oxaliplatin based chemotherapy, both KRAS mutation and ERCC1 overexpression status should be evaluated.



P166

SHORT- AND LONG-TERM OUTCOMES OF LAPAROSCOPIC SURGERY FOR TRANSVERSE COLON CANCER: A MULTICENTER STUDY.

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Purpose: The purpose of the present study was to compare the perioperative outcomes and oncologic outcomes of laparoscopic surgery with those of open surgery for transverse colon cancer.

Methods: From January 2005 to June 2015, a retrospective review was performed to identify patients who underwent transverse colon cancer at six Hallym University-affiliated hospitals. The perioperative outcomes and oncologic outcomes were compared between laparoscopic and open surgery.

Results: Of the 226 transverse colon cancer patients, 103 patients underwent laparoscopic surgery and 123 patients underwent open surgery. There were no differences in patient characterstics between the two groups. As for perioperative outcomes, operation time was significantly longer in the laparoscopic groups than in the open group (267.3 ± 74.8 min vs 172.7 ± 54.0 min, P < 0.001), although the time to soft food intake (6.0 ± 1.6 days vs 6.6 ± 2.2 days, P = 0.036) and the duration of postoperative hospital day (13.2 ± 5.6 day vs 15.7 ± 9.7 days, P = 0.018) are shorter in the laparoscopic groups than in the open group. No significant differences were found in tumor size, proximal resection margin and number of harvested lymph node. 5-year overall survival rate (96.5% vs 90.6%, P = 0.208) and disease free survival rate (86.1% vs 78.9%, P = 0.201) were similar in the both groups.

Conclusions: The present study shows that laparoscopic surgery is associated with several perioperative benefit and similar oncologic outcomes for the treatment of transverse colon cancer. Therefore, laparoscopic surgery can be safely performed in transvers colon cancer.

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THE ROLE OF CELL-FREE CIRCULATING TUMOR DNA (CTDNA) DEFINED BY KRAS AND TP53 MUTATIONS IN THE ASSESSMENT OF COLORECTAL CANCER RECURRENCE: A META-ANALYSIS.

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Purpose: Circulating tumour DNA may be beneficial in understanding pathophysiology of tumour metastases however its precise role is unclear and limited data exist regarding its role in colorectal cancer. This study investigates the prevalence of circulating tumour DNA as defined by kras mutations and TP53 and examines their role in recurrence after surgery

Methods: A review of the literature was conducted up to May 2015. Data were extracted and analysed according to meta-analytical techniques using comprehensive meta-analysis. Data was not provided to allow for time to event analysis in all but 2 studies.

Results: Pooled overall prevalence of TP53 and kras mutations in ctDNA was 14% and 30% respectively. Patients who had kras mutations in their circulation were more likely to develop recurrences [RR: 2.30, p<0.001] and there was no significant heterogeneity between studies (p=0.39, I2=5.79). Patients without metastases who had kras mutations in their circulation had a tendency towards more recurrences [RR: 2.23, p=0.076]. Patients with metastases who had kras mutations in their circulation had a tendency towards more recurrences [RR:1.74, p<0.01]. TP53 was found to have a sensitivity and specificity of 19% and 83% for recurrences respectively in one study and may be associated with peritoneal disease. CEA and mutant circulating kras DNA are suggested to be independent of each other. Healthy individuals rarely have kras or TP53 mutations.

Conclusions: Tumour mutations in DNA can be readily identified in the circulation. Pre-operative kras mutations appears to be an independent prognostic factor for identifying recurrences in metastatic disease and likely to be prognostic for non-metastatic disease. Routine testing could be used to risk stratify and counsel patients pre and post operatively. Circulating tumour DNA may be useful in the post-operative setting for follow-up to detect early recurrences but further studies are required.

Results for prognosis and kras mutation in the circulation

Prognosis	RR	CI	Z value	P-value	df	Q	I2
Any stage & Any sampling time	2.61	1.75 : 3.87	4.72	P<0.001	8	14.29	44
Any stage & Any sampling time (Excl Wang)	2.30	1.68 : 3.13	5.23	P<0.001	7	7.43	5.8
Any stage & pre-operative blood sampling	1.79	1.22 : 2.63	2.96	P<0.01	4	0.44	0
Any stage & post-operative blood smapling	3.23	1.80 : 5.80	3.93	P<0.001	2	2.89	31
Non-metastatic & Any sampling time	3.17	1.88 : 5.32	4.34	P<0.001	3	3.06	2
Non-metastatic & pre-operative blood sampling	2.23	0.92 : 5.38	1.78	P=0.076	1	0.10	0
Non-metastatic & post-operative blood sampling	3.51	1.38 : 8.96	2.63	P<0.01	1	2.01	50
Metastatic & Any sampling time	2.28	1.61 : 3.21	4.67	P<0.001	6	7.38	19
Metastatic & pre-operative blood sampling	1.74	1.17 : 2.58	2.72	P<0.01	3	0.12	0
Metastatic & post-operative blood sampling	3.23	1.80 : 5.80	3.93	P<0.001	2	2.89	31

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THE RARITY OF RECTAL SQUAMOUS-CELL CARCINOMA MAY BE UNDERSTATED.

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Purpose: Rectal squamous cell carcinoma (RSCC) is a small fraction of colorectal cancer (90% of which is adenocarcinoma). There are less than 50 cases per year on average in the U.S., and the largest reported single-institution case series is 12 patients over a 27-year period. Large analyses of this tumor type have been hampered by its rarity as well as the lack of administrative diagnosis codes. The aim of this study was to use a longitudinal pathology database to identify possible cases of RSCC and then select for those that met formal criteria.

Methods: A free-text search was applied to a National Comprehensive Cancer Center-designated hospital's pathology database for all consecutive samples between January 1, 2000 and December 31, 2014. Possible cases of RSCC were identified using "squamous," "carcinoma," and "rectum" or "anus." Cases were then reviewed to identify cases that met all of the 1979 Williams criteria: 1) absence of other squamous cell carcinoma primary; 2) no involvement of squamous anal canal with neoplastic lesion; 3) lack of spread by fistulous tract; and 4) consistent histology. An IRB-approved chart review was performed to collect demographic, perioperative, and post-operative follow-up data.

Results: 344 potential cases were identified using free-text search. 244 duplicates were eliminated. 113(46%) of the total identified cases were anal squamous; 42(17%) were rectal adenocarcinoma with mention of squamous tissue. After review of each pathology report by the study team, a total of 52 (23 using "anus"; 29 using "rectum") possible cases – defined as squamous cell carcinoma in rectal tissue – and 16 (7 "anus", and 9 "rectum") probable cases – defined as squamous cell carcinoma in rectal tissue with no anal involvement and no other primary noted – were selected. After exhaustive chart review, those cases were weaned to 3 (3 from probable, 0 from possible) meeting all of Williams' criteria All were women ranging in age from 60 to 70 years-old. The first two cases had no risk factors (no prior pelvic radiation; nonsmokers; no anorectal disease). Case 3 had a history of pilonidal cyst and 16 pack-year smoking. All were treated with 5-fluorouracil(5FU)-based neoadjuvant chemotherapy. Case 1 was determined to have unresectable metastatic disease and elected for hospice care. Case 2 underwent total proctectomy in 2013 and continues to receive maintenance chemotherapy. Case 3 underwent proctectomy and partial sigmoidectomy with pathology demonstrating no residual tumor in the surgical specimen and recurrence-free survival at 9 months.

Conclusions: RSCC is an exceedingly rare neoplastic occurrence. At our institution, RSCC has been managed predominantly with an "anal cancer paradigm" employing aggressive use 5FU-based neoadjuvant chemotherapy. While there is no clear benefit to excision without evidence of residual disease, patients often elect for definitive surgical oncologic control.

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RISE OF THE ROBOTS: A COMPARISON OF OUTCOMES, COST, AND TRENDS IN UTILIZATION FOR OPEN, LAPAROSCOPIC, AND ROBOTIC ABDOMINOPERINEAL RESECTION.

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Purpose: Laparoscopic abdominoperineal resection (LAPR) has been shown to be safe, with favorable short-term outcomes when compared to the open technique (OAPR). Robot-assisted APR (RAPR) has also gained recent popularity, with proponents citing technical and visual advantages for the deep pelvis. Unfortunately, previous LAPR and RAPR reports generally involved only established experts, and the outcomes may exceed typical results. The purpose of this study was to compare cost, short-term outcomes, and trends in utilization for OAPR, LAPR, and RAPR using a nationwide sample. We hypothesized that RAPR would have increased utilization, equivalent cost and outcomes to LAPR, and lower rates of conversion to open surgery.

Methods: The University Health Consortium (UHC) database was used to identify all elective APRs performed from 2009 to 2014. ICD-9-CM codes were used to identify the surgical approach and conversions to open surgery. Regression lines were created from the utilization data. Univariate analyses, as well as descriptive statistics, were calculated for patient demographics and 30-day outcomes using IBM SPSS v22.0.0.0.

Results: A total of 13,454 patients were identified (Table 1). Baseline demographics were similar for LAPR and RAPR, while OAPR had a higher severity score (P<0.001). Overall morbidity, length of stay, 30-day readmis-

sion, surgical site infection, and conversion to open surgery were not significantly different between LAPR and RAPR. The overall cost for RAPR exceeded that of LAPR (p<0.001). RAPR utilization increased from 1.7% in 2009 to 11.7% in 2014. Intersection of the regression lines of utilization predict that RAPR rates will exceed LAPR in 2017 (R^2=0.967).

Conclusions: Short-term outcomes are equivalent for laparoscopic and robot-assisted APR, while the robotic approach is more expensive. Utilization of the robot for APR is increasing, and will likely exceed conventional laparoscopy in the near future.

Table 1: Demographics, outcomes, and trends in utilization

Demographics and Outcomes	Open	Laparoscopic	Robot-assisted	p
	n=9,838	n=2,729	n=887	
Age, mean ± SD	56.3 ±15.5	55.9 ± 15.9	57.9 ± 14.6	0.004
Sex				0.001
Male	5,730 (58.2%)	1,466 (53.7%)	534 (60.2%)	
Female	4,108 (41.8%)	1,263 (46.3%)	353 (39.8%)	
Severity Score				<0.001
Minor/Moderate	6,519 (66.3%)	2,212 (81.1%)	726 (81.8%)	
Major/Extreme	3,315 (33.7%)	517 (18.9%)	161 (18.2%)	
Morbidity Rate	1,186 (12.1%)	164 (6.0%)	55 (6.2%)	<0.001
Length of Stay , Median (IQR)	8 (6-11)	6 (4-8)	6 (4-8)	<0.001
30 Day Readmission Rate	1,988 (20.2%)	451 (16.5%)	146 (16.5%)	<0.001
Surgical Site Infection	829 (8.4%)	107 (3.9%)	36 (4.1%)	<0.001
Cost , median (IQR)	$14,966 ($10,520-22,455)	$13,038 ($10,120-17,638)	$15,974 ($12,398-21,662)	<0.001
Mortality	4 (0.04%)	1 (0.04%)	0 (0%)	0.834
Conversion to Open Surgery	--	520 (16.1%)	151 (17.0%)	0.554
Yearly Utilization				
2009	1,656 (81.4%)	345 (17.0%)	34 (1.7%)	
2010	1,666 (77.2%)	432 (20.0%)	61 (2.8%)	
2011	1,666 (74.3%)	452 (20.4%)	125 (5.6%)	
2012	1,651 (71.7%)	477 (20.7%)	176 (7.6%)	
2013	1,366 (69.2%)	436 (22.1%)	171 (8.7%)	
2014	1,833 (66.9%)	587 (21.4%)	320 (11.7%)	
Linear Trend of LAPR+RAPR Use Versus OAPR Use Over Time				<0.001
Linear Trend of RAPR Versus LAPR Use Over Time				<0.001

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ONODERA'S PROGNOSTIC NUTRITIONAL INDEX (OPNI) AS A PROGNOSTIC FACTOR FOR POST-OPERATIVE PALLIATIVE COLORECTAL CARCINOMA.

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Purpose: Criteria for the indication of chemotherapy in metastatic colorectal carcinoma has not yet been established. To date, the performance status (PS) is the most widely used patient-related prognostic factor. Several studies have found that OPNI, calculated from the serum albumin and lymphocyte count, is a simple and objective prognostic factor for colorectal carcinoma. Recently, however, the controlling nutritional status score (CONUT), calculated using the albumin and lymphocyte count and the total cholesterol value is gaining traction as a new nutritional assessment tool. The aim of this study was to therefore analyze the clinical efficacy of these nutritional indexes as a prognostic factor for metastatic colorectal carcinoma.

Methods: Between 2004 and 2014, 102 unresctable metastatic colorectal cancer patients underwent surgery to remove the primary lesion at our institution. Those who did not undergo postoperative chemotherapy (N =21) were excluded from this study. The following clinicopathological factors included in the univariate survival analysis were age, gender, primary lesion(colon/rectum), existence of two or more systemic comorbidity and complaint at the initial hospital visit, TNM stage(4a/4b), histology, existence of intensive systemic chemotherapy(with oxaliplatin or irinotecan), tumor marker(CEA, CA19-9, CA125),PS, OPNI, and CONUT.

Results: The age range of the patients was 31 to 88 years(average 63)and included 54 men and 27 women. Sixty-eight patients(84%) received intensive chemotherapy. The univariate analysis revealed that age(85), histology(por/muc/sig), PS(2), OPNI (35), and CONUT(5)were important prognostic factors. A multivariate analysis using the Cox's proportional-hazard model revealed that histology (HR 2.6, CI 1.45-4.66; p0.01) and OPNI (HR 10.5, CI 1.11-99.6; p0.04) were significant independent prognostic factors.The median survival time of the patients with a low and high OPNI value is 5 months and 2years, respectively.

Conclusions: OPNI is a useful prognostic indicator in patients with metastatic colorectal carcinoma. Moreover, these findings suggest that patients with a low OPNI value may not be suitable candidates for intensive chemotherapy.

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CAN WE USE ALBUMIN AND GLYCEMIA LEVELS FOR ESTIMATING FIRST 30-DAY MORTALITY?

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Purpose: Following sepsis, major surgery and trauma, hypercatabolism, inflammation and hypermetabolism could be seen related to the effects of hypoalbunemia and hyperglycemia. There can be an association between inflamation and greater fractional catabolic rate. Colon/rectum resection as a major surgery has an effect of surgical trauma. In this we would like to evaluate the albumin and glycemia levels on the postoperative date in estimating first 30 day mortality following colon/rectum resection.

Methods: A retrospective study was designed including 1352 patients undergone colon/rectum resection with a malignant diagnosis at Gulhane Military Medical Academy between 2002 and 2015. Patients who had postoperative first day serum albumin and glycemia levels measured and the knowledge of first 30 day mortality were included in the study. The level of albumin lower than 3,5 g/dl was defined as hypoalbunemia. The level of glycemia greater than 107 mg/dL was defined as hyperglycemia whether insuline used or not.

Results: Totally 55 patients were identified with first 30 day mortality, although 24 of them under dissected that met our inclusion criteria included and studied. A significant correlation between the first 30 day mortality following colon/rectum resection and hypoalbunemia & hyperglycemia one by one was detected (p < 0.005).

Conclusions: Our data show that hypoalbunemia and hyperglycemia on the first postoperative day could be used as a predictor for showing the risk of the first 30 day mortality following colon/rectum resection.

P172

APPENDICEAL CARCINOID TUMORS: IS THERE A SURVIVAL ADVANTAGE TO COLECTOMY OVER APPENDECTOMY?

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Purpose: Guidelines recommend colectomy in patients with appendiceal carcinoid tumors larger than 2 centimeters, but physicians debate whether patients with smaller tumors should have colectomy. The purpose of the study is to determine the relationship of tumor grade and stage with survival in appendiceal carcinoid patients and whether colectomy conferred a survival advantage over appendectomy.

Methods: 879 patients from the Surveillance, Epidemiology, and End Results database who underwent appendectomy or colectomy for appendiceal carcinoid. Patients were stratified by age group, gender, TNM stage, tumor grade, and race. We performed Kaplan-Meier analysis relating grade, stage, and receipt of colectomy to overall and cancer-specific survival. We also evaluated the likelihood of colectomy based upon stratifications and the percentage of patients with node positivity and metastases by T stage.

Results: 879 patients underwent surgical extirpation of an appendiceal carcinoid, with 541 (62%) colectomies and 338 appendectomies. Patients who underwent colectomy had worse cancer-specific survival (HR 2.36, 95% CI 1.53-3.44, p<0.001) than those who underwent appendectomy, and colectomy did not confer a survival advantage over appendectomy in any subset analysis (smaller or larger than 2 cm; low grade or high grade tumors; node-positive, non-metastatic tumors).

Conclusions: There appears to be no survival advantage to colectomy over appendectomy in appendiceal carcinoid. Survival is primarily determined by tumor grade and stage.

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A COMPARISON OF ENDORECTAL ULTRASOUND AND MAGNETIC RESONANCE IMAGING IN THE PREOPERATIVE STAGING OF RECTAL CANCER: A SINGLE-CENTER EXPERIENCE.

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Purpose: Endorectal ultrasound (ERUS) and Magnetic Resonance Imaging (MRI) are both commonly used in the preoperative staging of rectal cancer. Locoregional staging is instrumental in determining both the operative approach and the need for neoadjuvant chemoradiotherapy (CRT). Comparative data between the two modalities are inconsistent, and neither has emerged as a clear gold standard for determining nodal (N) involvement or depth of local tumor (T) invasion. We sought to examine the preoperative locoregional staging performance of ERUS and MRI in patients surgically treated for rectal cancer without neoadjuvant CRT at our institution.

Methods: A retrospective review of patients diagnosed with rectal cancer between January 2012 and December 2014 was carried out at our institution. All patients with a histopathological diagnosis of primary rectal adenocarcinoma, preoperative staging with both MRI and ERUS, and operatively managed were included. Patients that had neoadjuvant CRT and/or disease recurrence were excluded. We compared the performance of MRI and ERUS to surgical histopathology for nodal involvement and depth of tumor invasion.

Results: We evaluated 40 patients, with a mean (SD) age of 58 (15) years, of whom 24 (60%) were men. Ten patients (25%) had positive lymph nodes in the surgical specimen. Eighteen tumors were pathologic (p) T1, 16 pT2, and 6 pT3. Sensitivity (60% [95%CI: 26-88%] vs 73% [95%CI: 39-93]; P=NS) and specificity (63% [95%CI: 44-80%] vs 66% [95%CI: 46-82]; p=NS) of ERUS and MRI in detecting positive lymph nodes was comparable. The sensitivity of ERUS for staging T1 tumors was greater than that of MRI, with MRI overstaging most T1 tumors. Specificity of the two modalities was similar for T1 tumors. Sensitivity and specificity of MRI and ERUS were similar for staging T2 and T3 tumors.

Conclusions: In our study population, MRI tended to over stage early stage tumors. MRI and ERUS were comparable for more advanced tumors and detecting positive lymph nodes. Limitations of this study include the small number of patients and locally advanced lesions. Further prospective studies will be useful in helping to elucidate the optimal imaging study for locoregional staging of rectal cancer.

Sensitivity and Specificity of ERUS and MRI for Staging of Rectal Tumors According to Pathologic Stage

	pT1 (n=18)		pT2 (n=16)		pT3 (n=6)	
	Se (95% CI)	Sp (95% CI)	Se (95% CI)	Sp (95% CI)	Se (95% CI)	Sp (95% CI)
ERUS	72% (47-90%)	82% (60-95%)	69% (41-89%)	75% (53-90%)	67% (22-96%)	94% (80-99%)
MRI	33% (13-59%)	90% (71-99%)	69% (41-89%)	50% (29- 71%)	83% (36-99%)	88% (73-97%)
P*	<.05	NS	NS	NS	NS	NS

Table 1. Se, sensitivity; CI, confidence interval; Sp, specificity; ERUS, endorectal ultrasound; MRI, magnetic resonance imaging; NS, not significant.

*p-value: difference in performance of ERUS vs MRI

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SURGICAL TREATMENT OF STAGE IV LOW RECTAL CANCER PATIENTS WITH CLINICAL LATERAL PELVIC LYMPH NODE METASTASIS.

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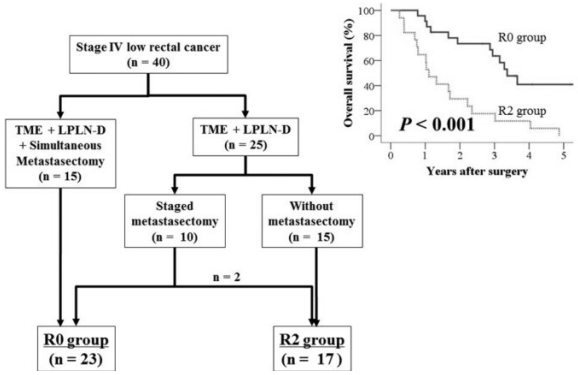
Purpose: Based on the rationale of lateral extramesenteric spread risk, lateral pelvic lymph node dissection (LPLN-D) is performed to eradicate LPLN metastasis in low rectal cancer patients. The management of LPLN associated with low rectal cancer is considerably different between Western countries and Japan. In Western countries, LPLN metastasis is generally considered as a metastatic disease, and preoperative chemoradiation and total mesorectal excision (TME) is the standard treatment. In contrast, LPLN metastasis is regarded as a local disease in Japan, and TME + LPLN-D is performed for patients with locally advanced low rectal cancer. However, the value of LPLN-D has not been fully proved, especially for stage IV patients. The present study assessed the survival outcome of surgical treatment including LPLN-D for stage IV low rectal cancer.

Methods: We retrospectively enrolled 40 consecutive stage IV low rectal cancer patients with clinical LPLN metastasis who underwent resection of the primary lesion by total mesorectal excision TME + LPLN-D. Simultaneous or staged metastasectomy was planned to achieve R0 resection of metastatic lesions. The patients who underwent R0 resection of both primary and metastatic lesions were classified as the "R0 group", and the remaining patients as the "R2 group". We identified potential prognostic factors for overall survival (OS) by univariate and multivariate analyses.

Results: Pathological LPLN metastasis was present in 29 of 40 patients (72.5%), with the designated R0 and R2 groups containing 23 (57.5%) and 17 patients (42.5%), respectively. Of the 40 patients, 25 received metastasectomy and 23 (57.5%) received R0 resection of both primary lesion and distant metastasis. In contrast, 15 of 40 patients did not undergo metastasectomy because of tumor progression (11 patients) or development of new metastatic lesion (4 patients) after TME + LPLN-D. There was no significant association between residual tumor status and clinicopathological characteristics. Univariate analysis revealed that histopathological grading ($P = 0.011$), N category ($P = 0.023$), pathological LPLN metastasis ($P = 0.022$), metastatic organ ($P = 0.032$), residual tumor status ($P < 0.001$), and grade 3 complication of TME + LPLN-D ($P = 0.018$) were significant prognostic factors for OS. These significant variables were entered into multivariate analyses, which identified residual tumor status (R0) as significant independent prognostic factors for OS ($P = 0.001$)

Conclusions: When R0 resection is achieved by TME + LPLN-D + Metastasectomy, the survival outcome is acceptable. LPLN-D is an important component of R0 resection in stage IV low rectal cancer patients with clinical LPLN metastasis.



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THE IMPACT OF MESORECTAL ADC VALUE ON SURGICAL OUTCOME OF LAPAROSCOPIC ANTERIOR RESECTION FOR RECTAL CANCER.

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Purpose: We previously reported usefulness of mesorectal volumetry and pelvimetry so far using the result of preoperative imaging, as the predictor of the surgical difficulty of laparoscopic anterior resection (LAR) for rectal cancer (RC). In addition, we anticipate that the mesorectal condition

with preoperative treatment(i.e. radiation and endoscopic resection) might have an influence on surgical difficulty because of obscuring mesorectal plane. It is reported that the impact of apparent diffusion coefficient (ADC) value on diffusion-weighted image of MRI on qualitative diagnosis or prognosis of malignant tumor previously, as ADC value reflects cell density in the interest region. Thus, we attempted in this study to evaluate mesorectal condition by using ADC value on diffusion-weighted image of MRI, and to clarify its impact on surgical difficulty of LAR for RC.

Methods: The object were the patients who underwent curative LAR for RC in our hospital from 2008 to March on 2015 and performed MRI preoperatively. We measured mean value of ADC in three spots randomly selected of mesorectum at the upper edge of femur superior border level on MRI diffusion-weighted image. Their clinicopathological backgrounds including gender, age, body mass index (BMI), distance between tumor and anal verge, preoperative T and N category of the TNM classification, tumor diameter, vascular invasion and harvested number of lymph nodes were reviewed from their clinical records. The correlation of those clinicopathological findings including ADC value with surgical difficulty (operative blood loss) were analyzed statistically.

Results: Fifty six patients (male 38) were included in this current study. Median ADC value was 0.001402(0.000943-0.001733). Their age and body mass index (BMI) were 64(median, 37-85) years and 23.5(median, 15.5-38.4) and the distance between tumor and anal verge (AV) was 8.0(median, 3.0-18.0)cm. Operative blood loss was 10(median, 5-1155)g. Univariate analysis revealed that lower value of ADC (p=0.018) and higher BMI (p=0.046) significantly increased operative blood loss. However, multivariate analysis adjusting with anal verge (AV), vascular invasion, invasion depth and BMI revealed that no significant correlation between ADC value and operative blood loss (p=0.102).

Conclusions: Mesorectal ADC value diffusion-weighted image of MRI might be correlated with blood loss and a promising predictor of surgical difficulty in LAR for RC though further investigation is required.

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INCIDENCE OF HEREDITARY COLORECTAL CANCER WITHIN A COMMUNITY PRACTICE.

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Purpose: Colorectal carcinoma (CRC) poses a major health concern throughout the United States in part due to its high incidence of mortality. According to the American Cancer Society an estimated 132,700 new cases and 49,700 deaths due to colorectal cancers will occur in 2015. Worldwide estimates demonstrate that approximately 15% of CRC cases are familial, while 10% are hereditary. Of these, hereditary nonpolyposis colorectal carcinoma (HNPCC), or Lynch Syndrome, remains the most common of the hereditary CRC at approximately 2-5%. Molecular and genetic analysis have also become important in the management and prognosis of CRC. Incidences of hereditary CRC within the community practice has not been analyzed in great depth. We investigated the extent of hereditary CRC cases in a prominent community practice as well as the prevalence of clinically important genetic markers such as BRAF and KRAS.

Methods: A retrospective review was conducted of colorectal cases performed by two board certified colorectal surgeons at Monmouth Medical Center in Long Branch, New Jersey. Evaluations of cases from January 2010 to May 2015 were performed to include all laparoscopic or open colectomies whether emergent or elective. Operative cases were then cross referenced with their corresponding pathologic reports with particular attention to any molecular genetic analysis, including mismatch repair, BRAF, or KRAS testing.

Results: A total of 606 cases were performed during the 65 month period. Three hundred and fourteen (51.8%) cases were performed for benign diseases processes while 215 (35.5%) identified malignant disease and the remaining 77 (12.75) demonstrated premalignant lesions. Results of molecular analysis demonstrated 13 (6%) cases of HNPCC as well as 21 (9.7%) KRAS mutations and 8 (3.7%) BRAF mutations. Furthermore, of the HNPCC cases there was a single case of abnormal MLH1 gene and the remaining 12 cases possessed abnormal MLH1 and PMS2 genes. No mutations within the MSH2 or MSH6 genes were encountered.

Conclusions: Molecular and genetic testing for CRC have advance significantly, leading to improvements in treatment modalities. The challenge to clinicians is to know the significance of these different genetic signatures in order to appropriately manage their cancer patients. Furthermore, deciphering the incidence of hereditary cases in the community setting allows for accurate risk assessment and precise screening approaches. A clinician must remain vigilant to these cases so as to properly council on the potential need for additional therapies or surveillances not only for the patient, but their family. This study showed a significant portion of a community surgeons' practice is composed of hereditary cases. As such, it has become the practice of these surgeons to routinely obtain MMR, BRAF, or KRAS genetic testing and encourage such practices in all cases.

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NATIONWIDE DEMOGRAPHICS OF APPENDICEAL TUMORS.

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Purpose: Appendiceal cancers are found in less than 1 % of all appendectomy specimens. The aim of this study was to analyze the Survival, Mortality Risk and Nationwide Demographics of appendiceal tumors**.**

Methods: This study utilized the Surveillance, Epidemiology, and End Results Database (SEER) from 1973 to 2012. Data were selected using ICD-0-3 codes for cases of malignant neoplasms of the appendix. 9692 patients were analyzed based on age, gender, race, histologic types, survival time, and mortality risks.

Results: Of the 9692 patients**,** (35.8%) had mucinous adenocarcinoma, (30.4%) carcinoid, (25%) colonic type adenocarcinoma, (6%) signet ring cell cancer and others (2.8%). The mean age at diagnosis was (57.5 yrs). The majority of the patients were females (53%) and Whites (84.2%). Male predominance was noted in colonic type adenocarcinoma while female predominance was noted for all others types; P<0.05.Whites demonstrated a predilection to carcinoids, Asians to mucinous adenocarcinoma and Blacks to colonic type adenocarcinoma; P<0.05. Stage IV was the most common stage at the time of presentation for signet ring cell cancer (58.4%) and mucinous adenocarcinoma (52.4%) compared to stage II in colonic type adenocarcinoma (35.5%) and carcinoids (34.4%); P < 0.05. Survival time was highest in carcinoids (median=360 mos), followed by mucinous adenocarcinoma (median=78 mos), colonic type adenocarcinoma (median=60 mos) and worst in signet ring cell (median=25 mos); P<0.05. Survival time was negatively affected by TNM stage (203 months in stage 1, 140 months in stage II, 41 months in stage III, and 28 months in stage IV); P<0.001. Overall mortality rate was 26.1% in patients with carcinoids, 48.5% in mucinous adenocarcinoma, 54.1% in colonic type adenocarcinoma and 68.4% in signet ring cell. Overall mortality increased with age at diagnosis and male gender; P<0.05. For each histological type, there was significant increase in risk of mortality with increasing age at diagnosis and TNM stage (P<0.001).There was no association with gender or race (P>0.05) except for mucinous adenocarcinoma where male had an increased risk of mortality; P<0.001.

Conclusions: Mucinous adenocarcinoma was the most common histologic variant of appendiceal cancer. Survival and mortality risks in patients with appendiceal cancer depend on age of diagnosis, gender, pathological types and TNM staging. Mortality risk was higher with increased age at diagnosis and TNM stage. Carcinoids had the highest survival while Signet Ring cell had the worst survival.

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RADIOFREQUENCY ABLATION TREATMENT (RFA) OF ANAL HIGH-GRADE DYSPLASIA: A PILOT STUDY.

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Purpose: Anal cancer (AC) rates are rising. High-grade squamous intraepithelial lesion (HSIL) is the AC precursor. Most HSIL occurs at the squamocolumnar junction (SCJ). High-resolution anoscopy (HRA) guided targeted HSIL ablation is hoped to prevent progression to AC. RFA is used circumferentially at the esophageal SCJ to ablate high-grade glandular dysplasia to prevent cancer. In a pilot study, we endeavored to determine efficacy and safety of hemi circumferential anal RFA HSIL ablation at the SCJ. Medtronic (Minneapolis, MN) funded the study.

Methods: This is a prospective study of HIV negative subjects with anal canal HSIL involving ≤50% of the circumference in ≤2 contiguous quadrants. Even if HSIL was identified in only 1 quadrant, the treatment zone (TZ) was defined as 2 adjacent quadrants (50% circumference). Prior AC, HPV vaccination, and treatment of HSIL in the TZ were exclusionary. RFA was applied with the Barrx^{TM}60 RFA Focal Catheter(Medtronic, Sunnyvale CA) in 3 pulses at 12 J/cm^2 in a non-overlapping, segmental fashion to the TZ at the SCJ. HRA was repeated every 3 months for 1 year. Areas suspicious for HSIL and sites of prior lesions were biopsied. Overall HSIL recurrence could occur 2 ways: site of a previous lesion (persistence) or a new site. Recurrence in the TZ(new or persistent) was retreated with RFA to the involved quadrant. Recurrence outside the TZ was treated with cautery. Subjects completed a 21 day post RFA diary. Pathology was reviewed locally but confirmed centrally.

Results: Of 22 subjects enrolled, 1 was excluded because of no HSIL on central pathology review leaving 21 (3 women) for analysis. All completed the trial. Mean age was 45 (range 32-65) years. At first treatment a mean of 1.7 HSIL's (range 1-4) per patient were treated with HSIL in adjacent quadrants in 7 (33%). Ten subjects recurred (48%): 6 (29%) in the TZ and 7 (33%) outside the TZ. Of 35 HSIL lesions treated initially, 5 (14%) recurred in 4 patients. At 1 year 4 (19%) subjects recurred but only 2 in the TZ (10%). No subject had >2 RFA's. KM curve predicts HSIL free survival within the TZ at 6 m and 1 year of 81% (95%CI 57%-92%) and 76% (95%CI 52%-89%). KM curve predicts individual lesion persistence post treatment at both 6 m and 1 year of 11% (95%CI 4%-28%). (Figure 1) Multivariate analysis of risk factors for HSIL persistence include each additional lesion (HR 1.7 [95% CI 1.2-2.6]), age (HR 0.8 [95% CI 0.7-0.9]) and female (HR <0.001 [95% CI 0.0-0.0]). No subjects had serious adverse events, anal stricture, incontinence, or heavy bleeding. Median peak pain score was 3/10 (range 0-8) for 5 days.

Conclusions: RFA is safe, well tolerated with a high success rate of curing HSIL by 1 year. Lesion persistence post initial treatment was probably related to incomplete ablation. Technique modification could improve efficacy. Circumferential canal treatment, as done in the esophagus, could further decrease recurrence.

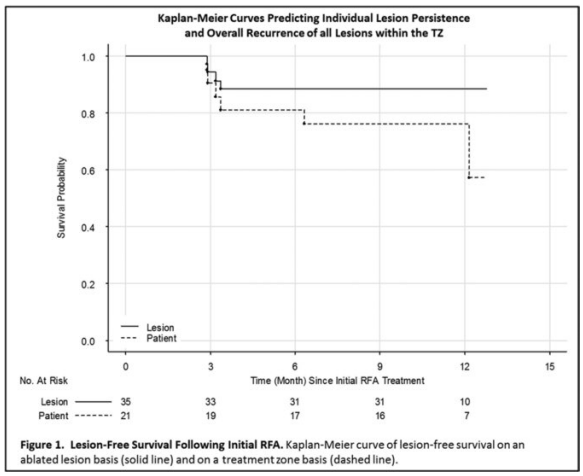

Figure 1. Lesion-Free Survival Following Initial RFA. Kaplan-Meier curve of lesion-free survival on an ablated lesion basis (solid line) and on a treatment zone basis (dashed line).

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LYMPH NODE RATIO AND SUGICAL QUALITY ARE STRONG PROGNOSTIC FACTOR OF RECTAL CANCER.

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Purpose: To asses the impact of LNR, conpared to other predicting factors of rectal cancer outcome, particularly TME quality and circumferential resection margin, on the long-term oncological oucomes.

Methods: In the setting of a tertiary referral centre, consecutive patients operateed for non-metastatic rectal cancer were extracted from a prospectively maintained database. A restrospective uni- and multivariable analysis was performed.

Results: From 1992 to 2013, 700 non-metastatic patients were operated for rectal adenocarcinoma. Overall neo-adjuvant radio (chemo) therapy was administered to 66.75 of the patients. A sphincter saving operation (SSO) was performed in 78.2% of the patients. The mean number of lymph nodes (LN) removed was 12.8±8.78 per specimen. The mean LNR was 0.74±0.16. Age, surgical approach, TME quality, and the administration of chemo-radiotherapy were independentlyassociated with the total number of LN retrieved. Multivariable analysis confirmed LNR, TME quality, absence of symptoms, peri-neural infiltration and age as independent pronostic factors of OS. LNR and extramural vascular infiltration were indendently associated to ORFS. LNR reached the highest hazard ratios in both models.

Conclusions: In this series, LNR was an independent prognostic factor of OS and ORFS. Furthermore, the only "controllable" independent prognostic factor was the surgical quality.

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ROBOTIC COMPLETE MESOCOLIC EXCISION FOR TREATMENT OF COLON CANCER.

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Purpose: Over the recent years, complete mesocolic excision (CME) has been proposed to improve oncological outcomes in patients with colon cancer and laparoscopy has been reported to be safe, feasible, and effective in this technique. The introduction of robotic systems with its technical advantages over laparoscopy has further revolutionized the minimal inva-

sive approach in colorectal surgery. However, the applicability of robotic surgery for this complex procedure has not been fully explored. The aim of this study was to evaluate the safety, efficacy, and feasibility of robotic CME in patients with colon cancer.

Methods: A retrospective review of a prospectively maintained database of 25 consecutive patients with stage I-III colon cancer undergoing robotic CME between December 2014 and September 2015 was performed. All the operations were performed with the da Vinci Xi® robotic system (Intuitive Surgical Inc., Sunnyvale, CA, USA) by a single surgical team. Data on demographics, tumor characteristics, intraoperative and postoperative short-term outcomes were analyzed.

Results: There were 12 male and 13 female patients with a mean age of 62.1 ± 10.5 years (range, 35-85 years) and a mean body mass index of 27.6 ± 5.1 kg/m^2. CME was successfully performed for right-sided, transverse colon and left-sided colon cancer in 5, 1 and 19 patients, respectively. The mean operative time and blood loss was 288,5 ± 141 min and 63 ± 61 ml, respectively. No intraoperative complications occurred in any patient except in two (8%): gonadal vein injury in one patient and inferior epigastric artery bleeding in the other. There were no conversions to laparoscopy or open surgery. Histopathologic examination revealed clear surgical margins in all the specimens. The median number of lymph nodes retrieved was 31 (range, 13-111), with lymph node metastasis identified in eight patients. The mean time to flatus, bowel movement, and oral intake was 2.0 ± 0.9, 3.7 ± 2.3, and 3.8 ± 2.2 days, respectively. The mean hospital stay was 6.8 ± 2.7 days. Postoperative 30-day complications included anastomotic leak in one (4%) patient and superficial surgical site infection in 2 (8%) patients. No disease recurrence has been identified during a mean follow-up period of 5.5 ± 3.1 months.

Conclusions: Robotic CME for colon cancer is a safe and feasible surgical procedure with acceptable morbidity and provides adequate oncologic profile. The broader capabilities of the robotic systems promise to make it a lot easier for laparoscopic surgeons to perform this complex procedure.

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PROGNOSTIC VALUE OF FDG-PET AND INGUINAL SENTINEL LYMPH NODE BIOPSY IN PATIENTS WITH ANAL CANAL CANCER.

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Purpose: Inguinal lymph node metastases, in patients with anal canal cancer, are an independent prognostic factor. Clinical examination, and currently available imaging techniques, are still inaccurate in the detection of metastatic inguinal lymph nodes. FDG-PET has been demonstrated to detect up to 20% of metastases not diagnosed by clinical or radiological examination. Sentinel lymph node (SLN) biopsy is an effective method for establishing the true inguinal node status. Aim of this study was to compare the diagnostic sensitivity of FDG-PET and SLN examination and to compare the prognostic value of the two techniques.

Methods: From May 2007 to December 2014, 28 patients, 11 males, mean age 62±11, with histologically confirmed squamous cell carcinoma of the anal canal, clinically negative inguinal nodes, and inguinal lymph node uptake at lymphoscintigraphy, were included in this prospective study. Clinical work-up included endoscopy and biopsy, pelvic RMI, endoanal ultrasound, total-body CT scan and total-body FDG-PET. Lymphoscintigraphy with 5 MBq of ^{99mTC}nanocolloid particles injected peritumorally followed by planar images, obtained by a Philips gamma camera, was also performed. All the patients underwent SLN removal under radio probe guidance (NEOPROBE Neo2000 Gamma Detection System), 16-18 hours after lymphoscintigraphy.

Results: FDG-PET showed the tracer uptake in the primary tumor in all cases and an uptake in the inguinal region in 9 patients (32%). The radio labeled SLN was detected intraoperatively and removed in all patients and metastases were found at pathological examination in 9 cases (32%). There was no correlation between FDG-PET uptake in inguinal region and SLN histology (Tab 1). At a median follow-up of 63 months (range 11-102), 19 patients are alive, 18 (64%) without signs of relapse. The overall survival and disease-free survival of patients with a negative SLN were significatively better than patients with a positive SLN (p= 0.05). The overall survival and disease-free survival of patients with and without inguinal tracer uptake at FDG-PET were not significatively different.

Conclusions: Inguinal sentinel lymph node, compared with preoperative total-body FDG-PET, shows better diagnostic accuracy in defining the inguinal nodes status and better prognostic value in predicting the patients' outcome.

Tab 1: Correlation between FDG-PET and SLN biopsy results

	PET +	PET -	
SLN +	5	4	9
SLN -	4	15	19
	9	19	28

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LAPAROSCOPIC-ASSISTED RECTAL SURGERY FOR RECTAL CANCER USING THE SIMPLE RECTUM CATCHER DEVICE AND AN INTRAOPERATIVE COLONOSCOPY: RESULTS OF OUR HOSPITAL STUDY IN 203 PATIENTS.

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Purpose: The gold standard of rectal surgery is TME and DST anastomosis. But actually the division of mesorectum in tumor specific mesorectal excision or total mesorectal excision is one of the very difficult procedure in rectal surgery. This study demonstrates the surgical technique and the results of surgical and oncological outcomes in 99 patients with rectal cancer with the use of the Rectum Catcher (RC) device and an intra-operative colonoscopy (CF).

Methods: The RC (Matsumoto et al. in Surg Endosc 22: 1905-1909, 2008) is made of stainless steel attached with a short-cut T-tube and a vessel tape. The location of the cancer is confirmed using a CF (Matsumoto et al. in Int J Colorectal Dis 27: 243-247, 2012). The RC easily occludes the distal rectum of the cancer and the rectal rumen is irrigated. Then the rectum is transected adequately at the distal rectum to the RC. We compared surgical and oncological outcomes of between the procedure with the RC and a CF (99 patients in 2011-2015) and the procedure without them (104 patients in 2003-2010).

Results: Rs cancer: Tumor size was significantly increased (p<0.0001) in the approach with RC and CF group. But still, operating time was faster (p=0.072), blood loss was significantly lower (p=0.028) and number of harvested lymph nodes was significantly increased (p=0.006) in the approach with RC and CF group. Ra cancer: There were almost no differences in the clinicopathological characteristics of the patients in two groups. Operating time was significantly faster (p=0.006) in the approach with RC and CF group. There was a tendency of lower (p=0.139) blood loss and shorter (p=0.216) fluid intake in the approach with RC and CF group. Rb cancer: BMI was significantly increased (p=0.029) in the approach with RC and CF group. But still, operating time (p=0.018) and fluid intake (p=0.010) were significantly faster, blood loss was lower (p=0.054) in the approach with RC and CF group. There was a tendency of shorter hospital stay (p=0.332) and decreased distant metastasis (p=0.139) in the approach with RC and CF group.

Conclusions: Laparoscopic rectal surgery using the RC and a CF is feasible in surgical and oncological outcomes even in lower rectal surgery. Since the mean follow-up time of 22.1 months is too short to evaluate the oncological outcomes in the approach with RC and CF, further recruitment of more cases and more long-term follow-up of the patients are needed to clarify the efficacy of this approach.

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LAPAROSCOPIC ANTERIOR RESECTION USING SINGLE-STAPLING TECHNIQUE (SST) FOR COLORECTAL ANASTOMOSIS WITH NATURAL ORIFICE SPECIMEN EXTRACTION (NOSE)-TECHNIQUE, FEASIBILITY.

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Purpose: There are various technical modifications for performing colorectal anastomosis and specimen retrieval for Natural Orifice Specimen Extraction (NOSE) – Laparoscopic Anterior Resection (LAR), but still none of the techniques are standardized.These reports lack the focus on the anatomical variations of the colon, mesentry and pelvis which can bring the technical modifications to perform LAR-NOSE procedure. Double stapling technique (DST) though frequently described for performing colorectal anastomosis have certain disadvantages with use of linear stapler. Evidence of safety is lacking with Single Stapling Technique (SST) for colorectal anastmosis in minimal access surgery. We analysed the feasibility of laparoscopic LAR with SST anastomosis and specimen extraction from anal canal (NOSE). A comparative analysis was done to compare these patients with patients undergoing conventional LAR with DST anastomosis. Further, we tried to analyse technical modifications to perform NOSE-LAR procedure.

Methods: 159 patients undergoing LAR from January 2013 to December 2014 were divided in two groups (SST-NOSE and DST-LAR) . The patient in both the groups were matched for age, American Society of Anesthesiologists (ASA), body mass index (BMI), tumour size and tumour stage. Lesions 10-40 cm from anal verge were included in the current study.Patients underwent intracorporeal or extracorporeal anvil fixation in proximal loop depending upon the apparent length of colon or mesentry.Intracorporeal purse string suturing of the rectal stump was done in all cases.Specimen was retrived using double ring wound protector or TEO port from rectal stump depending upon length of stump.

Results: The success rate of completion of SST-NOSE technique was 94.6% with morbidity of 11% and no mortality. 5.3% patients initially planned for SST-NOSE technique required conversion to conventional DST-LAR group due to technical difficulties encountered during procedure. None of the patients in study required open conversion.Requirement of analgesia (p=0.007), presence of first bowel movement (p=0.001) and total hospital stay (p=0.025) were significantly lower in SST-NOSE group compared to DST-LAR group. Both groups had similar leak rate of 2%. 47% patients required proximal stump anvil fixation via intracorporeal purse string suturing. 42% patients required TEO for extraction of specimen while rest extracted by wound protector.

Conclusions: Laparoscopic Anterior Resection using SST for Colorectal Anastomosis with NOSE is safe and feasible technique. Technical alterations are required to deal with variable colonic and pelvic anatomy to accomplish the procedure. SST is equally safe to DST for colorectal anastomosis though surgical expertize with laparoscopic suturing remain essential.

Operative and Post-operative outcome of patients undergoing laparoscopic AR with Double Stapling Technique (DST) and Natural orifice specimen extraction (NOSE)-Single Stapling Technique (SST)

	DST-LAR (n=106)	SST-NOSE(n=53)	p- value
Operative time - min	218.1 +/- 57	227.9 +/- 55.8	0.304
Estimated Blood Loss - ml	71.2+/- 69.3	59.0+/- 29.1	0.119
Specimen length	15.3+/- 5.3	16.1+/- 5.3	0.384
Resection Margin(proximal/distal)	8.2+/- 3.3/4.2+/-2.3	8.5+/- 3.9/ 4.6+/-3.4	0.650/0.305
Harvested Lymph node - number	17.7+/-5.9	17.4+/-6.4	0.825
Meperidine Requirement after surgery - mg	62.5+/- 90.9	29.3+/-53.9	0.007
First bowel movement- days	1.8+/-0.9	1.2+/-0.5	0.001
Total Hospital Stay - days	5.9+2.4	4.8+/-3.4	0.025
Readmission rate	4/106 (3.8%)	2/53 (3.8%)	1
Anastomotic leak	1	1	0.615
Intraabdominal abscess	1	1	0.615
Prolong ileus(>72 hours)	3	1	0.720
Anastomotic bleed	1	1	1
Wound infection	4	0	0.615
Anal fissure	0	2	-
pneumonia	1	0	-
Cerebrovascular accident	1	0	-
Morbidity	12	6	1
Mortality	nil	nil	-

All summary data are presented as Mean + Standard Deviation

Total number of days in hospital, including Post-operative hospital stay and any readmission within 30 days.

P184

METACHRONOUS NEOPLASIA IN PATIENTS WITH HIGH-GRADE DYSPLASIA IN AN ADENOMA: A CALL FOR CLOSER SURVEILLANCE.

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Purpose: High grade dysplasia (HGD) in an adenoma means severely dysplastic cells exist but are confined to the epithelium. It is the penultimate change before cancer and is an alarming risk factor for the patient and endoscopist. Its implications for colonoscopic surveillance have not been well described. Current recommendations focus on all advanced adenomas (including at least three synchronous adenomas, and adenomas that are > 1 cm, or contain >25%villous component or HGD), and are for three-yearly colonoscopic surveillance. We wondered if the presence of HGD in particular demanded more aggressive surveillance.

Methods: Patients with adenomas containing high grade dysplasia were identified from a prospectively maintained, single endoscopist, institutional review board-approved, colonoscopic polypectomy database. Location, size, treatment and pathology of consecutive polyps removed between 1996 and 2010 were reviewed. Patients with no follow-up and with syndromes of hereditary colorectal cancer were excluded. A retrospective chart review of follow up colonoscopies was conducted.

Results: There were 125 polyps containing HGD or intramucosal cancer in 106 patients. The mean age of the patients was 67.7 years and 88 were men (83%). The mean endoscopic size of the index polyps was 13.4mm +/- 7.3 but 12 were <10mm diameter. 11/ 12 had >25% villous architecture, as did 111/113 of the polyps larger than 10mm. 87 patients had endoscopic follow-up. 13 patients had either residual or recurrent polyps but ultimately all were cleared or resected. 22 patients died (none of colorectal cancer) and 17 were lost to follow up. Mean length of follow-up was 47.2 months (Range: 1-195 months, SD: 59.3) and on average patients had 2.3 surveillance scopes (Range: 1-8, SD: 1.59). 65 patients had at least one metachronous adenoma (74.7%) of which 35 were advanced. 10 (10.3%) developed cancer at a mean duration of 32.1 months (Range: 6-73, SD: 23.9) from the index polyp and subsequently had surgical resection. 5.7% (n=5) developed HGD in a new polyp at a mean duration of 15.2 months (Range: 2-30 months, SD: 11). Of the 10 cancers, 6 were Stage I and 4 were Stage II. 7 were in the right colon. All were resected and no patient died of cancer. 2 patients had surgical resection for incomplete resection of the index polyp on repeated attempts. Figure 1 is a flow diagram of the patients' clinical courses.

Conclusions: Patients with an advanced adenoma containing HGD are a high risk group and develop advanced adenomas and cancer. Since most

patients were diagnosed with cancer before the currently adopted 3 yearly interval, we suggest earlier surveillance at two years.

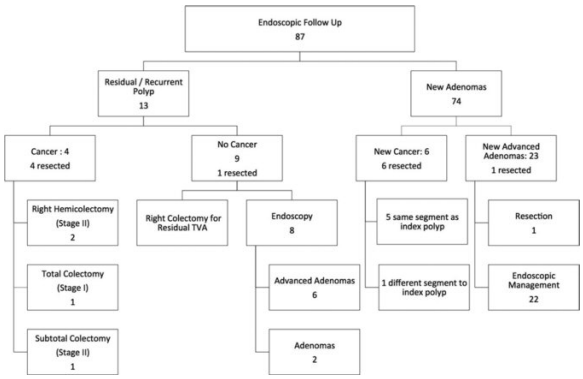

Figure 1

P185

A COMPARISON OF EARLY POSTOPERATIVE OUTCOMES BETWEEN FECAL IMMUNOCHEMICAL TEST (FIT)-SCREENED AND SYMPTOMATIC PATIENTS UNDERGOING SURGERY FOR COLORECTAL CANCER.

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Purpose: Fecal immunochemical testing (FIT) outperforms the traditional guaiac-based fecal occult blood test but the impact of FIT-based screening on early postoperative morbidity and mortality in patients undergoing surgery for colorectal cancer has not been studied. We compared hospital length of stay (LOS), post-operative morbidity and 30-day mortality between patients undergoing colonoscopy for positive FIT and to investigate symptoms (SYMP). We hypothesized that patients in the FIT group would have shorter LOS and lower morbidity and mortality compared with the SYMP group, possibly due to earlier stage at diagnosis.

Methods: The prospectively-maintained St. Paul's Hospital Colorectal Cancer Database in Vancouver, Canada was queried to identify patients with surgically resected CRC from November 2013 to April 2015, and divided into FIT or SYMP groups by indication for colonoscopy. Patients with inflammatory bowel disease, polyposis syndromes or personal or strong family history of CRC were excluded. Data analysis was performed using Student's t-test, ANOVA, Chi-squared or Fisher's Exact Test where appropriate. Institutional ethics approval was obtained.

Results: 191 patients were identified (59 FIT, 132 SYMP). FIT patients had significantly earlier stage CRC (Stage I/II/III/IV = 48%/22%/28%/2% FIT vs. 25%/30%/36%/9% SYMP, p=0.013) despite being older (68 (28-91) vs. 64 (30-92) years, p=0.02). Gender, ASA score, BMI, and Charlson-Deyo comorbidity index were similar between groups. There was no statistically significant difference in LOS (8.9 days (3-179) FIT vs. 12.2 days (3-39) SYMP, p=0.198). There was a trend toward lower overall 30-day postoperative morbidity (MI, VTE, surgical site infection, anastomotic leak) in the FIT group (46% vs. 36%, p=0.08). Mortality was not statistically different (0% FIT, 4% SYMP, p=0.13). There were significantly more right hemicolectomies performed in the FIT group (34% vs. 16%, p=0.005) and more anterior resections with diverting stoma in the SYMP group (64% vs. 44%, p=0.008). Length of operation was significantly shorter in FIT group (132 vs. 161 mins, p=0.001).

Conclusions: We did not find statistically significant differences in our outcomes of interest, though FIT patients had clinically meaningful improvements in LOS and mortality, and a trend toward lower early morbidity. Lack of statistical significance may be explained by the finding in chart review that some FIT patients may actually have had symptoms on directed history. Further subgroup comparison between truly asymptomatic FIT positive patients and symptomatic patients may be revealing. Importantly, a statistically significant earlier stage at diagnosis in the FIT group may result in improved oncologic outcomes over the SYMP group.

P186

ONCOLOGIC OUTCOMES OF COLORECTAL CANCER PATIENTS OVER AGE 80.

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Purpose: With continued population aging and an increasing life expectancy, surgeons will confront increasing numbers of older colorectal cancer patients in the near future. Compared with younger patients, fewer older colorectal cancer patients have received aggressive treatments. It remains unclear whether surgery and adjuvant therapy are effective in this population. Therefore, we assessed oncologic outcomes of older patients over age 80 compared with younger patients.

Methods: A total of 9562 colorectal cancer patients who underwent radical surgery from 2000 to 2011 at a single institution were evaluated. Older patients and younger patients were defined as over age 80 and under age 80, respectively. We performed matched and adjusted analyses comparing oncologic outcomes between these two groups.

Results: Among 9562 patients, 222 were older patients and 9340 were younger patients. Median age was 82.0 years in older patients and 59.0 years in younger patients. Disease-free survival (DFS) and overall survival (OS) were significantly lower for older patients compared with younger patients ($p < 0.001$ and $p < 0.001$, respectively). After matching, DFS was not significantly different between two groups ($p = 0.379$), however, OS was lower for older patients than younger patients ($p = 0.002$). In total older patients, advanced stage and presence of lymphatic invasion were independent poor prognostic factors of DFS ($P = 0.012$ and $P = 0.024$, respectively), and elevated preoperative CEA level and advanced stage were independent poor prognostic factors of OS ($P = 0.004$ and $P = < 0.001$, respectively). In addition, there were no significant differences in survival according to receiving adjuvant chemotherapy in older patients.

Conclusions: Older colorectal cancer patients had similar oncologic outcome as younger patients in terms of DFS. Radical surgery improved the prognosis of older patients, while adjuvant chemotherapy did not benefit older colorectal cancer patients.

P187

TAMIS IS A VALUABLE ALTERNATIVE TO TEM FOR RESECTION OF INTRALUMINAL RECTAL TUMORS.

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Purpose: Transanal Endoscopic Microsurgery (TEM) is the gold standard for resection of benign rectal lesions and early rectal cancers. More recently, transanal minimal invasive surgery (TAMIS) was introduced as an alternative to TEM. Although TAMIS is considered to be safe, there is a lack of comparative studies. This study aims to examine feasibility and early postoperative outcome of TAMIS compared to TEM for intraluminal rectal resections.

Methods: Between March 2009 and August 2014 all patients who underwent either TEM or TAMIS for rectal lesions in our centre were included in a prospective database. All procedures were performed by the same colorectal surgeon. Mann-Whitney U tests, Fisher's exact tests and analysis of covariance (ANCOVA) were used to compare both groups regarding perioperative outcome and pathology.

Results: Seventy-seven patients (53 TEM, 24 TAMIS) were included in our patient cohort. Both groups were comparable for patient characteristics with respect to age, gender, ASA class and BMI. Median distance from the anal verge was 8 (range: 1.0-16.0) cm in the TEM-group *versus* 6 (range: 1.0-15.0) cm in the TAMIS-group (p= 0.071). Lesion location was comparable in both groups. All patients were installed in lithotomy position for

TAMIS, whereas patient positioning was dependent on location of the tumor in TEM procedures. Blood loss was negligible for both groups. Operating time was significantly shorter for TAMIS compared to TEM: median of 42.5 (range: 10-85) minutes *versus* 65 (range: 20-195) minutes, respectively (P < 0.001). Lesion surface area appeared to be larger in the TEM group (median of 28 vs 20 mm2, P = 0.022). However, also when corrected for lesion surface area, the operating time remained significantly shorter in the TAMIS group: the mean difference equalled 18 minutes (95% CI: 4-32, p=0.013). Involvement of resection margins, lesion grade and invasion depth were similar for both groups. Postoperative morbidity rate was lower for TAMIS (13% *versus* 40%, P = 0.019). Median length of hospital stay was 2 days in both groups but there was a higher postoperative re-admission rate in the TEM group (17% versus 4%, P = 0.159).

Conclusions: TAMIS is a valuable alternative to TEM with better postoperative outcome. Resections can be done in lithotomy position, which shortens overall procedural time.

P188

ACCURACY OF RADIOLOGICAL IMAGING IN THE STAGING OF RECTAL CANCER AFTER NEOADJUVANT CHEMORADIATION.

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Purpose: Estimate the accuracy of radiological imaging in the staging of rectal cancer after neoadjuvant chemoradiation.

Methods: This is a prospective cohort study of patients who underwent neoadjuvant chemoradiation followed with curative radical surgery for rectal cancer between 2009 and 2010 at King Fisal Specialist and Research Center (tertiary care center in Saudi Arabia). The histopathological stage for each patient was compared to the radiological stage determined with Computed Tomography (CT), Magnetic Resonanace (MRI), Endorectal Ultrasound (EURS), and whole body Positron Emission Tomography Computed Tomography (PET-CT) after neoadjuvant chemoradiation. The accuracy of different radoilogical modailty was compared with regard the depth of tumor invasion (T) stage and lymph node (N) stage.

Results: A total of 99 patietns were recruited; 99, 93, 89 and 68 patients underwent CT, MRI, PET-CT and EURS respectively. When compared to the pathological stage, the accuracy for the depth of invasion (T) stage after neoadjuvant chemoradiation treatment on CT, MRI, and ERUS was 64.6%(Kappa 0.4), 64.8% (Kappa 0.6) and 60% (Kappa 0.3) respectively. The accuracy for lymph node stage (N) on CT, MRI, PET-CT and ERUS was 59.6%(Kappa 0.07), 56.7% (Kappa 0.4), 58.8% (Kappa 0.3) and 37% (Kappa 0.1) respectively. The median volume of the tumors decrases by 30.75% from median of 40 cm^3 orior to neoadjuvant chemoradiation to 12.3 cm^3.

Conclusions: After neoadjuvant chemoradition, all radiological imaging had poor accuracy with regard to the T and N stage except MRI which had fair accuracy for T stage only. **Limitations:** Small sample size of the study population.

P189

PROLONG TEGAFUR/URACIL AND LEUCOVORIN ADJUVANT CHEMOTHERAPY IMPROVING DISEASE-FREE AND OVER-ALL SURVIVAL IN HIGH-RISK STAGE II COLORECTAL CANCER.

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Purpose: The optimal treatment duration of adjuvant chemotherapy for high-risk stage II colorectal cancer is not known.

Methods: Patients who received curative colorectal cancer resection between January 1, 2004, and August 30, 2009, in the Linkou and Keelung branches of Chang Gung Memorial Hospital in Taiwan were included. All stage II colorectal cancer cases with pathological and clinical characteristics were also included. Patients who had early relapse within 6 postoperative months and received adjuvant chemotherapy with regimens other than UFT/leucovorin (LV) were excluded.

Results: The study cohort included 1107 patients, of whom 592 had at least one high-risk factor. Five-year disease-free survival (DFS; 89.2% vs. 75.1%, p = 0.0002) was significantly lower in the high-risk group. For this group, postoperative oral UFT/LV adjuvant therapy significantly improved the 5-year OS (91.0% vs. 75.2%. p < 0.0001). We further divided the patients who received adjuvant chemotherapy into 2 groups according to treatment duration (5–7 and 8–12 months). Long-term UFT/LV therapy improved the 5-year DSF and overall survival of the patients with high-risk stage II colorectal cancer.

Conclusions: From this study, we found that long-term UFT/LV therapy had a positive effect on the survival of patients with high-risk stage II colorectal cancer.

P190

PREOPERATIVE CEA AS A PREDICTOR OF RESPONSE TO NEOADJUVANT RADIOTHERAPY.

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Purpose: Rectal cancer is a common malignancy with significant mortality. Adjuvant radiation therapy has demonstrated its benefit in improving local control and survival after resection of stage 2 and 3 disease, but debate still exists for the role of neoadjuvant therapy and at what stage it should be used. With increased complications associated with radiation treatment, potential exists to tailor use to those who would benefit most from it. To date there are few studies that have evaluated risk-factors which might predict a differential effect of neoadjuvant radiotherapy on recurrence or mortality, in order to tailor treatment selectively. Elevated pre-operative CEA has been shown in numerous studies to be an independent risk-factor for increased recurrence and mortality. To this end, we analyzed whether the effect of neoadjuvant radiation was predicted by pre-operative CEA levels, and could thus be used to refine selection for neoadjuvant radiotherapy beyond disease stage.

Methods: A retrospective cohort study of stage 2 and 3 rectal cancer patients was conducted. All patients with pre-operative CEA levels were included. Groups were separated by neoadjuvant radiotherapy and by CEA level >3 or <=3, resulting in 4 groups per stage based on high vs low CEA and neoadjuvant radiation vs initial resection. Endpoints included local recurrence, disease-free interval, and disease-specific and overall survival. Data was analyzed by Fisher's exact or chi-square tests for categorical variables, and Wilcoxon rank sum test for quantitative variables. Survival was analyzed by Kaplan-Meier curves.

Results: A total of 219 patients were included in the study, 43% with stage 2 and 57% with stage 3 disease. Forty-eight percent had CEA levels greater than 3. Average followup was approximately 2.75 years. Only 8 (4%) local recurrences occurred. Results show pre-operative CEA >3 as a significant risk-factor of mortality (HR 1.79 +/-0.69, p<0.001). Neoadjuvant radiation did not show an improvement in survival (HR 1.39 (0.71-2.55, p=0.31). When stratified by CEA value, neoadjuvant radiation failed to show differential effect on recurrence or mortality. Additionally, in patients with elevated CEA >3, there was no improvement in outcome for patients given neoadjuvant radiation compared to those who underwent surgery initially (HR 1.01 (0.45-2.22, p=0.99).

Conclusions: While large studies have shown that neoadjuvant radiation can improve survival in advanced rectal cancer, this treatment is not without complications. As such, pre-treatment predictors to determine who would benefit from this modality are needed. While our data demonstrates that CEA is indeed a predictor of mortality, they fail to prove that the association between neoadjuvant radiation and overall survival is predicted by the pre-operative CEA level. CEA is not a use-

ful marker to help refine selection for neoadjuvant radiotherapy beyond disease stage.

P191

VALIDATION OF THE BRAZILIAN VERSION (PORTUGUESE LANGUAGE) OF THE LOW ANTERIOR RESECTION SYNDROME SCORE.

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Purpose: The population of rectal cancer survivors has increased in the recent years and has received special attention regarding their quality of life since most of patients develop serious bowel dysfunction symptons after surgery leading to the Low Anterior Resection Syndrome (LARS). In 2012, a simplified LARS Score with five items questionnaire for objective and easy evaluation of bowel function was developed in Denmark. The LARS score has been validated in different languages but it still has not been tested in a poor population with low level of education. The aim of this study was to translate and validate the LARS score in Portuguese languange.

Methods: The LARS score was translated into Portuguese following internacional recommendations by forward and back-translation procedures. The questionaire was completed by 127 patients. The convergent validity was confirmed by comparing the LARS score with the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core Module 30 (EORTC QLQ-C30) and with patients opinion about their quality of life. The discriminant validity of the score was investigated by testing the ability to differentiate among group of patients regarding to radiotherapy, type of surgery and tumor distance from the anal verge. The test-retest reliability was estimated in a subgroup of 36 patients that answered the survey again in two weeks.

Results: The LARS score demonstrated strong correlation with five of six items from the EORTC QLQ-C30 analyzed ($p<0.05$) and good concordance with patients self reported quality of life (95.3%) . The score was able to discriminate between groups with different clinical characteristics related to LARS ($p< 0.001$). The investigation of agreement between the first test and the retest showed 86.1% of the patients remained in the same LARS category, 8.4% differed by one category and 4.8 % differed by two categories between tests, indicating good reliability overall.

Conclusions: The Brazilian version in Portuguese language of the LARS score is a valid and reliable instrument for measuring bowel dysfunction after sphincter-preserving surgery for rectal cancer treatment with good psychometric properties.

P192

IS LOCAL EXCISION A BETTER OPTION THAN RADICAL RESECTION FOR STAGE I RECTAL CANCER IN OCTOGENARIANS?

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Purpose: Octogenarians are at increased risk of morbidity and mortality after radical rectal resection. Local excision can reduce the risk of postoperative complications, but may result in worse oncologic outcomes. The aim of this study was to compare perioperative and oncologic outcomes following local excision vs. radical resection for stage I rectal cancer in octogenarians.

Methods: An institutional database was queried to identify octogenarians with pT1-T2Nx or pT1-2N0 rectal adenocarcinoma, electively operated with curative intent between 1980 and 2013. Exclusion criteria were neoadjuvant therapy, recurrent rectal cancer, inflammatory bowel disease, or hereditary colorectal cancer. Outcomes of patients undergoing local excision (LE) were compared with those undergoing radical resection (RR). Univariate, multivariate, and Kaplan-Meier survival statistical analyses were performed.

Results: Out of 105 patients that met the inclusion criteria, 51 underwent LE (46 traditional trans-anal excision and 5 trans-anal endoscopic surgery), and 54 underwent RR (41 low anterior resection and 13 abdominoperineal resection). The main reasons for LE were high operative risks, patient preference, and preoperative diagnosis of adenoma. The mean follow-up was 5.9 years for all patients (5.0 years for patients who are alive (n=24), and 6.2 years for patients who died (n=81)). Age, gender distribution, and ASA classification were comparable between groups (table). While pT1 tumors were more frequently treated with LE, pT2 tumors more often underwent RR. Postoperative morbidity was much higher, and length of hospital stay much longer after RR, compared to LE. Adjuvant treatments were solely used among LE group patients, who also suffered a significantly increased risk of local recurrence, for both pT1 and pT2 patients. However, overall survival, disease-free survival, and cancer-specific survival were comparable between LE and RR. Cox regression multivariate analysis using age, gender, ASA, pT stage, type of surgery (LE vs RR), postoperative complications, and adjuvant treatment as covariates, showed age, ASA and pT stage as independent variables for overall survival ($p=0.002$, $p=0.002$, and $p=0.038$, respectively), and disease-free survival ($p=0.001$, $p=0.002$, and $p=0.032$, respectively). Type of surgery was not an independent factor, neither for overall ($p=0.678$), nor disease-free survival ($p=0.535$).

Conclusions: The use of local excision for stage I rectal cancer in octogenarians is a compromise between reduced morbidity and increased local recurrence rate, and can be used selectively without adversely influencing survival outcomes.

Patient characteristics and outcomes by surgery type

	Local Excision (n=51)	Radical Resection (n=54)	p value
Age (mean/SD)	83.3 (3.1)	83.0 (2.6)	0.573
Female Gender	27 (52.9%)	28 (51.9%)	0.911
ASA Classification			0.203
ASA 1-2	13 (25.5%)	20 (37.0%)	
ASA 3-4	38 (74.5%)	34 (63.0%)	
Pathological T Stage			<0.001
pT1	32 (62.7%)	10 (18.5%)	
pT2	19 (37.3%)	44 (81.5%)	
Length of Stay - days (median, range)	1 (0 - 31)	10 (4 - 84)	<0.001
Postoperative Morbidity	5 (9.8%)	16 (29.6%)	0.014
Reoperation	1 (2.0%)	4 (7.4%)	0.364
Readmission	3 (5.9%)	3 (5.6%)	0.943
Mortality	1 (2%)	-	0.486
Adjuvant Chemoradiotherapy	6 (11.8%)	-	0.011
Combined 5-yr overall survival	54%	57%	0.703
pT1	62%	68%	0.719
pT2	40%	55%	0.225
Combined 5-yr disease-free survival	50%	57%	0.589
pT1	59%	68%	0.679
pT2	36%	55%	0.158
Combined 5-yr cancer-specific survival	93%	92%	0.722
pT1	97%	100%	0.346
pT2	87%	90%	0.616
Combined 5-yr local recurrence	15%	2%	0.015
pT1	14%	0%	0.150
pT2	16%	2%	0.124
Combined 5-yr overall recurrence	15%	4%	0.098
pT1	14%	0%	0.150
pT2	16%	5%	0.404

P193

MUCINOUS HISTOLOGY SIGNIFIES POOR ONCOLOGIC OUTCOME IN YOUNG COLORECTAL CANCER PATIENTS.

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Purpose: There are inconsistencies in the literature regarding the prognostic significance of mucin in colorectal cancer (CRC), perhaps due to heterogeneous patient populations in studies. We made a clinical observation that young patients with mucinous CRC seemed to have more frequent and early disease recurrence. This is particularly relevant as the incidence of young CRC is increasing and this population tends to have worse outcomes.

Thus, this study examines the association of mucinous CRC histology and oncologic outcomes for young CRC patients.

Methods: A single-institution prospectively maintained colorectal cancer database was queried for patients with CRC under age 40 years. Medical records were reviewed for patient demographics, tumor characteristics, treatments, and oncologic outcomes. The population was analyzed according to the presence of mucinous histology based on the pathology report. Statistical analyses were performed using t test, Chi-square, Log-Rank and Cox proportional hazards regression.

Results: 254 patients less than age 40 years with colorectal adenocarcinoma diagnosed between 1990 and 2010 were identified. The mean age was 34.7 years and 51.5% were female. 165 patients (65%) had rectal cancer and 89 (35%) had colon cancer. 36 patients (14%) had mucinous histology and 218 (86%) had no evidence of mucin. The mucin and non-mucin study populations were not statistically different in terms of age, gender, tumor location, pathological stage, T stage, N stage, M stage, degree of differentiation, or the use of neoadjuvant and adjuvant therapy. 19 patients with mucin and 105 without mucin received adjuvant chemotherapy (p= 0.61). Mucinous CRCs were larger (4.9 ±2.8 cm vs 3.4 ±2.7 cm, p=0.0059) and were more likely to have angiolymphathic invasion (27.8% vs 7.7%, p < 0.001) compared to non-mucinous CRCs. Five-year disease free survival (DFS) was 23% vs 67% (p < 0.0001) and five-year overall survival (OS) was 53% vs 75% (p < 0.001) for young patients with mucin compared to non-mucin (Figure). In univariate analysis mucin was associated with DFS (HR=2.83, CI: 1.82-4.41, p<0.001) and OS (HR=2.33, CI: 1.37-3.95, p=0.002). On multivariate analysis accounting for angiolymphatic invasion (HR=2.96, CI: 1.88-4.64, p<0.001), pathological stage (HR=2.00, CI: 1.27-3.16, p=0.003), and differentiation (HR=2.28, CI: 1.44-3.61, p<0.001), mucin was still associated with DFS (HR=2.28, CI: 1.44-3.61, p<0.001) and OS (HR=1.79, CI: 1.04-3.07, p=0.036)

Conclusions: Mucinous histology is a negative prognostic factor in young CRC patients. This is associated with a high recurrence rate and in a relatively short time, despite use of standard neoadjuvant and adjuvant regimens. Physicians need to be aware of this association and possible novel treatment options explored.

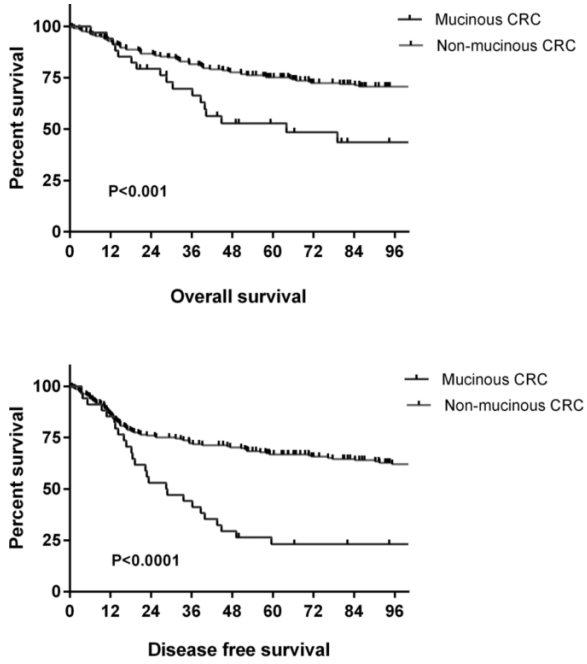

Figure 1. Overall and disease free survival

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SPHINCTER-PRESERVING SURGERY FOR RECTAL CANCER IN THE UNITED STATES - AN ANALYSIS OF TRENDS AND RISK FACTORS FOR COLOSTOMY.

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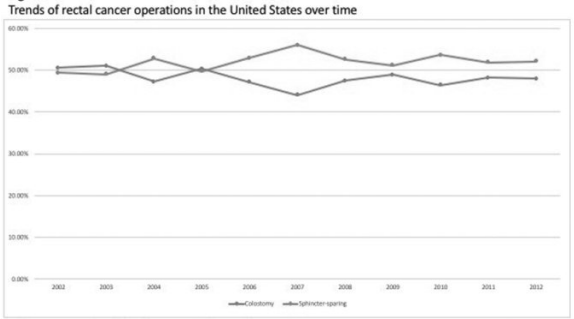
Purpose: The presence of a colostomy after rectal resection for cancer can significantly affect a patient's quality of life. There is a paucity of data evaluating the rates of colostomy creation after oncologic rectal resection. We sought to evaluate the rate of sphincter-preserving surgery for rectal cancer in the United States and identify risk factors for colostomy utilizing a large national database.

Methods: The 2002 to 2012 National Inpatient Sample database was used to identify patients who underwent surgical treatment of rectal cancer. Sphincter-sparing surgery was defined as elective low anterior resection (LAR) with or without proximal diverting stoma. Colostomy surgery was defined as LAR with colostomy or abdominoperineal resection (APR). The trends of sphincter-preserving surgery over time were evaluated. Multivariate regression analysis was used to identify risk factors associated with colostomy creation.

Results: We identified 26,715 cases that met the inclusion criteria. Overall 52% of patients underwent sphincter-preserving surgery for treatment of their rectal cancer. Over the study period, the use of sphincter preserving surgery increased from 49% to 52%. The majority of rectal cancer operations were performed at urban medical centers (92%). The use of sphincter preserving surgery at urban medical centers increased from 50.5% in 2002 to 52.5% in 2012. In 2002, 52% of the operations for rectal cancer occurred at teaching institutions; this increased to over 65% in 2012. The use of sphincter preserving surgery at teaching institutions increased from 51% in 2002 to 52% in 2012. Multivariate regression analysis revealed that patients who underwent colostomy were more likely to be male (AOR: 1.22, 95% CI: 1.15-1.29, P < 0.0001), African Americans (AOR: 1.21, 95% CI: 1.08-1.35, P=0.03), and have Medicaid insurance (AOR=1.46, 95% CI: 1.27-1.68, P<0.0001). Patients with anemia (AOR: 1.44, 95% CI: 1.32-1.57, P < 0.0001) and preoperative weight loss (AOR=1.47, 95% CI: 1.27-1.71, P < 0.0001) were also more likely to receive a colostomy. Those with private insurance (AOR: 0.78, 95% CI: 0.72-0.85, P < 0.001), and patients treated at urban medical centers (AOR: 0.83, 95% CI: 0.74-0.93, P=0.04) were more likely to have sphincter-preserving surgery.

Conclusions: A surprisingly high number of patients (48%) in the United States did not undergo initial sphincter-preserving operations for rectal cancer. The use of sphincter-preserving operations has increased only modestly over time. Patients with private insurance and those treated at an urban medical center are more likely to have sphincter preserving surgery.

Figure:
Trends of rectal cancer operations in the United States over time



Sphincter-sparing defined as LAR without colostomy.
Colostomy defined as LAR with colostomy or APR.

P195

IMPACT OF ANASTOMOTIC LEAKAGE AND RELATED FACTORS ON LONG-TERM ONCOLOGIC OUTCOME AFTER LOW ANTERIOR RESECTION FOR RECTAL CANCER.

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Purpose: Anastomotic leakage (AL) is well-known cause of morbidity after low anterior resection (LAR) for rectal cancer with the incidence from 3.9% to 19.2%. But, the impact on oncologic outcome is still debatable because the oncologic result in each individual with AL is unpredictable. The aim of present study is to investigate whether AL have impact on long-term oncologic outcome and searching for the AL related factors that can be associated with the prognosis after LAR for rectal cancer.

Methods: A total of 1258 patients who underwent curative resection for rectal cancer without diverting stoma from January 2006 to December 2012 were enrolled. Patients' medical records including survival data were analyzed retrospectively. To investigate AL related factors that can be associated with oncologic outcome, Clavien-Dindo grade, prognostic nutritional index (PNI) and inflammatory indices such as leukocyte count, proportion of neutrophil in total leukocyte at that point of diagnosis of AL were included in the analysis.

Results: Among the total 1258 patients, 101 patients presented AL with a rate of 8.0%. Comparing disease-free survival (DFS), patients with AL showed inferior result (69.8% of three-year DFS and 56.1% of five-year DFS) than patients without AL (78.0% of three-year DFS and 76.1% of five-year DFS) and it was statistically significant. (p=0.011) On the multivariate analysis, AL was found to be significantly related to poorer outcome (hazard ratio [HR]=1.6; 95% confidence intervals [CI]: 1.1-2.5; p=0.01) with the other factors such as elevated preoperative carcinoembryonic antigen level, advanced TNM stage and presence of lymphovascular invasion. Comparing overall-survival (OS), there was no significant difference between two groups of patients (p=0.531). In the subgroup analysis of the patients with AL, multivariate analysis revealed that, age over 60 (HR=2.2; 95% CI: 1.1-4.7; p=0.033), advanced TNM stage (HR=2.4; 95% CI: 1.4-4.0; p=0.001), absence of increased proportion of neutrophil in total leukocyte above normal range (≤80%) (HR=2.6; 95% CI: 1.2-5.8; p=0.019) and PNI less than 36 (HR=3.5; 95% CI: 1.2-9.6; p=0.018) were associated with the poor DFS. In the aspect of OS, age over 60 (HR=6.4; 95% CI: 1.8-23.7; p=0.005) and advanced TNM stage (HR=4.1; 95% CI: 1.6-10.7; p=0.004) were associated with poor OS.

Conclusions: AL was associated with poor oncologic outcomes, especially in DFS. In the case of AL, not only the known poor prognostic factors such as age over 60 and advanced TNM stage but also absence of high neutrophil proportion above normal range and decreased PNI under 36 that might be related to patients' immunity were associated with tumor recurrence.

P196

A SINGLE INSTITUTION EXPERIENCE WITH TRANSANAL MINIMALLY INVASIVE SURGERY (TAMIS) VS. TRANSANAL EXCISION (TAE) FOR RECTAL NEOPLASMS.

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Purpose: To compare the effectiveness of TAMIS and TAE for the excision of rectal neoplasms.

Methods: A single institution retrospective review was performed between 2010 and 2015 identifying 57 patients who underwent TAMIS (n=35) or TAE (n=22) for rectal neoplasms. Medical records were reviewed to determine patient demographics, operative details, pathologic variables, complications, and recurrence.

Results: Patient demographics were similar with the exception of TAMIS patients being of more advanced age (TAMIS 64.5 years vs. TAE 57.4 years, p=0.04). Resected neoplasms were of comparable size but TAMIS lesions were located farther from the anal verge (TAMIS 7.6 ± 2.6cm vs. TAE 2.8 ± 1.3cm, p<0.01) and were more likely to be stage T1. No specimen fragmentation occurred during TAMIS resection compared to 6 (27.3%) in the TAE group (p<0.01). Rates of full thickness and R0 resection were equivalent between the two groups. No differences were noted in length of stay, complications, or 30-day readmission rates. Operative time was longer with TAMIS (80 minutes vs. 47 minutes, p=<0.01) and 2 cases (5.7%) required removal of the TAMIS device for defect closure. One patient with a T2 rectal lesion experienced local recurrence 10 months after TAMIS and no patients have had recurrent adenocarcinoma after TAE with a mean follow-up of 7.5 ± 8.5 and 10.2 ± 10.3 months, respectively.

Conclusions: In our experience, TAMIS offers the ability to reach more proximal rectal lesions without compromising the R0 resection margin or full thickness quality of the specimen. Although the operative times were slightly longer for TAMIS the specimens excised were less likely to be fragmented. Long-term follow-up is needed to determine oncologic equivalency.

P197

STANDARD ABDOMINOPERINEAL RESECTION FOR LOW RECTAL CANCER. ARE WE DOING IT RIGHT? RESULTS FROM A DISTRICT GENERAL HOSPITAL, UNITED KINGDOM.

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Purpose: Standard Abdomino- perineal Resection (APER) for low rectal cancer, has attracted criticism due to the perceived high margin positivity and subsequent impact on local recurrence and survival. Extralevator APER (ELAPE) has been proposed as a better technique. However there is an ongoing debate between the two techniques because of the higher morbidity after an ELAPE operation. The aim of this study is to evaluate our outcomes after a standard APER in terms of circumferential resection margins (CRM) positivity and local recurrence

Methods: : Data was collected for patients undergoing a standard APER between the periods of 2005-2009. We collected demographics along with radiological, pathological and operative details. Patients were followed up (FU) for five years according to Yorkshire cancer protocol. Primary outcome measures were circumferential margin positivity and localized recurrence. Five year survival rates were calculated.

Results: Fifty seven patients underwent a standard APER between the periods of 2005 and 2009. (M:F 38:19). Postoperative pathology showed a CRM positivity in 6 out of 52 patients (11%). Within the 5 year FU period 4 patients had local recurrences and 8 had distant Metatases. Five-year survival for the whole group was 64.9 %.

Conclusions: Standard APER in a District hospital can be carried out with acceptable results in terms of resection margin positivity and local recurrence rates. ELAPE should be reserved for selected cases

P198

DISCREPANCY IN EMVI STATUS BETWEEN MRI AND PATHOLOGY IN COLORECTAL CANCER PATIENTS UNDERGOING PRIMARY SURGERY.

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Purpose: Extramural venous invasion (EMVI) predicts poor prognosis in colorectal cancer and can be identified by both pre-operative MRI and post-operative pathology. However, detection rates have been shown to be inconsistent between the radiology and pathology when patients have undergone neoadjuvant chemoradiation. Discrepancy is seen in up to 50% of cases which can have a profound effect on treatment decisions and ultimately, survival. Whether this applies to cases in which primary surgery is

offered is not known. This pilot study investigated detection rates of EMVI between MRI and pathology in patients with colorectal cancer who have undergone primary surgery.

Methods: A prospective study was conducted of patients with colorectal cancer who underwent primary surgery at a single tertiary referral cancer centre. All patients included underwent pre-operative staging with MRI and CT followed by curative surgery and routine histopathological analysis. Treatment decisions were based on the pre-operative staging and made in the multidisciplinary team meeting. The MRIs and pathology samples were centrally reviewed and blinded to the each other. Comparison was made between MRI and pathology EMVI status and further sub-analysis between colonic and rectal cancers. Fisher's exact test was used where appropriate.

Results: A total of 76 patients were included in the analysis. 56 patients presented with colonic cancers and 20 with rectal cancer. MRI staged 34 (45%) patients as EMVI positive compared with pathology - 24 (32%) patients. There was agreement between MRI and pathology in 58 (76%) of cases - the EMVI detection rate in this group was 35%. In 14 of the 18 (78%) discrepant cases, MRI was interpreted as being EMVI positive compared to pathology negative. Sub-analysis of tumour site demonstrated agreement in 40/56 (71%) cases in colonic cancers compared with 18/20 (90%) for rectal cancers (p=0.12).

Conclusions: MRI stages more patients as EMVI positive than pathology. Despite there still being a discrepancy between MRI and pathology, detection rates of EMVI are more consistent between the two staging modalities for patients undergoing primary surgery compared with the existing literature for patients that have undergone neoadjuvant chemoradiation treatment. This appears to be most pronounced in patients with rectal cancer compared with colonic cancer although not statistcially significant. A possible explanation for the discrepancy may be the 3-D view afforded by MRI which allows for better detection compared with pathology.

P199

PROGNOSTIC IMPACT OF SERUM CEA(CARCINOEMBRYONIC ANTIGEN) LEVEL FROM TUMOR DRAINAGE VEIN IN COLON CANCER.

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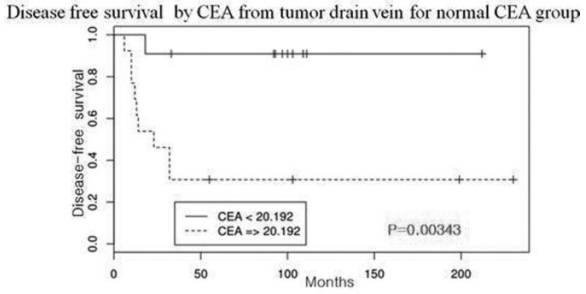
Purpose: The main use of serum CEA as a tumor marker to predict prognosis, detect recurrence, monitoring their treatment response and screen for hepatic metastasis of colon cancer. However, some patients do not elevate serum CEA at all. The aim of this study is to analyze the relationship between CEA level from the tumor drainage vein and prognosis in colon cancer.

Methods: A total of 52 patients who underwent curative resection between 2004 and 2005 were enrolled and they were confirmed colonic adenocarcinoma pathologically. Blood sample was taken from peripheral vein and tumor drainage vein(superior mesentric vein or inferior mesenteric vein). Sampling from peripheral vein was performed in operation room just before incision was made. Tumor drainage vein sampling was done before the ligating SMV or IMV. Serum CEA level was analyzed with ELISA(Enzyme-Linked ImmunoSorbent Assay) using commercially availabe kit.

Results: The overall survival duration by CEA from tumor peripheral vein was not different between normal CEA(<5ng/dL) and elevated CEA level(≥5ng/dL) group. However the overall survival and disease-free survival by CEA from tumor drain vein was significantly decreased in patients with an elevated CEA(≥20ng/dL)(p=0.0328, p=0.00896). Moreover, the measure of the CEA from tumor drain vein for only normal CEA group(n=24) was the poor overall survival rate and disease-free survival rate in an elevated CEA(≥20)(p=0.0777, p=0.00343).

Conclusions: Certain portion of colorectal cancer patients may have normal CEA level from peripheral veins. This means a significant number of patients will miss an opportunity on prognostic evaluation before surgery. In this group, the CEA level from tumor drainage vein could be more sensitive to use as a prognostic factor in colorectal cancer.



P200

NONELECTIVE COLON CANCER RESECTION: A CONTINUED DETRIMENTAL PUBLIC HEALTH PROBLEM.

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Purpose: The overall death rate from colon cancer has declined over the past decade in the United States. However, little is known regarding recent trends in the rate of non-elective colon cancer resection compared to elective surgery and its impact on both short-term and long-term outcomes.

Methods: The New York State Cancer Registry and Statewide Planning & Research Cooperative System (SPARCS) were utilized to identify patients who underwent resection of stage I-III colon cancer from 2004-2011 in NY State. Patients who were urgently or emergently admitted to the hospital were characterized as undergoing non-elective surgery. Bivariate and mixed-effects multivariable survival analyses were performed to compare 30-day, 5-year disease-specific, and 5-year overall survival between elective and non-elective colon cancer resection. For the 5-year survival analyses, patients who died within 60 days of surgery were excluded. Further analyses were then performed to assess patient, surgeon, and hospital-level factors associated with non-elective resection as well as short-term and long-term survival within the non-elective surgery group.

Results: Among 26,420 patients who met inclusion criteria, 9,121 of the cases (34%) were non-elective. There was no significant trend in the rate of non-elective surgery from 2004-2011 (p=0.18). Factors and outcomes associated with non-elective resection are presented in the table. After controlling for oncologic stage and patient, surgeon, and hospital-level factors, non-elective surgery was independently associated with higher odds of 30-day mortality (OR=3.43, 95%CI=2.90, 4.09) and shorter 5-year disease-specific (HR=1.84, 95%CI=1.70, 2.00) and overall survival (HR=1.69, 95%CI=1.60, 1.79) compared to elective resection. After performing a stratified analysis of factors associated with outcomes for non-elective surgery, other than an independent association between high-volume surgeons and lower 30-day mortality (OR=0.58, 95%CI=0.45, 0.75), no other surgeon or hospital-level factors were significantly associated with short-term or long-term survival following non-elective resection.

Conclusions: Non-elective colon cancer resection remains a concerning public health issue with over a third of cases being performed on a non-elective basis and an independent association with poor short-term and long-term survival compared to elective surgery. Given that surgeon and hospital-level factors do not appear to have a significant impact on survival following non-elective surgery, these findings emphasize the importance of adherence to colon cancer screening guidelines to limit the number of non-elective colon cancer resections performed in the U.S.

Table: Patient, surgeon, and hospital-level factors and outcomes associated with non-elective colon cancer resection in New York State

	Elective (N=17,299) (66%)	Non-Elective (N=9,121) (34%)	P-Value
Patient-Level Factors			
Age (Median) (Interquartile Range)	71 (60-79)	76 (64-83)	<0.0001
Race			<0.0001
White	13,069 (75.5)	6,443 (70.6)	
Black	1,865 (10.8)	1,376 (15.1)	
Other	1,815 (10.5)	1,057 (11.6)	
Unknown	550 (3.2)	245 (2.7)	
Medicaid Insurance	4,245 (24.5)	3,651 (40.0)	<0.0001
Comorbidities			
Congestive Heart Failure	1,191 (6.9)	1,472 (16.1)	<0.0001
Diabetes Mellitus	2,779 (16.1)	1,830 (20.1)	<0.0001
Renal Failure	776 (4.5)	807 (8.8)	<0.0001
AJCC Stage			<0.0001
I	5,949 (34.4)	1,434 (15.7)	
II	6,070 (35.1)	3,939 (43.2)	
III	5,280 (30.5)	3,748 (41.1)	
Time Period			0.18
2004-2005	4,516 (26.1)	2,486 (27.3)	
2006-2007	4,552 (26.3)	2,239 (25.5)	
2008-2009	4,286 (24.8)	2,239 (24.5)	
2010-2011	3,945 (22.8)	2,075 (22.7)	
Surgeon-Level Factors			
Board-Certification			<0.0001
General Surgery	12,934 (74.8)	7,952 (87.2)	
Colorectal Surgery	4,365 (25.2)	1,169 (12.8)	
Annual Colon Cancer Resection Volume			<0.0001
Low (1-5)	4,242 (24.5)	3,665 (40.2)	
Medium (6-10)	4,715 (27.3)	2,677 (29.4)	
High (> 10)	8,342 (48.2)	2,779 (30.5)	
Hospital-Level Factors			
Major Academic Hospital	8,077 (46.7)	3,312 (36.3)	<0.0001
Annual Colon Cancer Resection Volume			<0.0001
Low (1-30)	4,691 (27.1)	3,598 (39.4)	
Medium (31-55)	5,149 (29.8)	2,755 (30.2)	
High (≥ 55)	7,459 (43.1)	2,768 (30.4)	
Outcomes			
≥ 12 Lymph Nodes Examined	12,095 (71.1)	5,747 (70.4)	0.23
Adjuvant Chemotherapy for Stage III	3,098 (58.7)	1,660 (44.3)	<0.0001
30-Day Mortality	224 (1.3)	659 (7.2)	<0.0001
5-Year Disease-Specific Mortality	1,343 (7.9)	1,455 (17.7)	<0.0001
5-Year Overall Mortality	2,900 (17.1)	2,872 (34.9)	<0.0001

P201

VARIABILITY IN RADIATION THERAPY FOR RECTAL CANCER BETWEEN ACADEMIC AND COMMUNITY CENTERS.

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Purpose: Colorectal cancer is the third most common cancer in the United States. Mortality rates have decreased recently but variability still exists in the treatment of rectal cancer nationally. Radiation therapy is considered standard of care for stage II or higher rectal cancer but compliance with national guidelines is variable. We aimed to evaluate appropriateness of stage-specific radiation therapy across various age groups nationally and locally.

Methods: Data for all patients undergoing rectal cancer treatment between 2003- 2013 was gathered from the National Cancer Database. Retrospective analysis was performed and stratified by cancer stage for variables including patient demographics, academic status & location of treating center, and therapy received.

Results: A total of 253,218 patients were reported during the 10 year period of which 49% received radiation therapy as part of their treatment. Radiation therapy became more prevalent over the 10 years studied for all stages. Majority of stage I rectal cancer patients were treated with surgery alone but 27% of stage I patients also received radiation as part of their treatment. Patients with stage I disease who underwent local excision rather than radical resection were not separately identifiable in the database. Similarly, most of the stage II and III patients were treated with chemoradiation and surgery but nationally 25% and 22% of stage II and III patients, respectively, were not radiated pre or postoperatively. Determination of causes for failure to comply with treatment guidelines was not possible in this study. Possible biases may be as a result of local excision for stage I disease versus patient refusal or physician preference for stage II or III disease. Significantly more patients with stage I disease in Florida received radiation therapy (34%) versus nationally (27%, p=0.02). Also, significantly more patients with stage II (31%) and stage III disease (27%) in Florida did not receive radiation therapy during their treatment compared to the rest of the country (p=0.009 and 0.004 respectively). When stratified by age, there is a linear association between increasing age and failure to radiate both stage II and stage III patients (p<0.006) (Figure 1). Community centers radiated younger (<30 years) stage I patients more frequently than academic centers and also failed to offer radiation therapy for stage II disease more frequently than academic centers.

Conclusions: Substantial numbers of patients nationally are potentially being over treated (stage I) or undertreated (stage II and III) with radiation therapy. Radiation treatment for rectal cancer offered across various age groups differs for similar stages across the nation. With increasing age, more patients are not receiving radiation therapy appropriately for stage II or III disease. Establishing Rectal Cancer Centers of Excellence may further help standardize treatment.

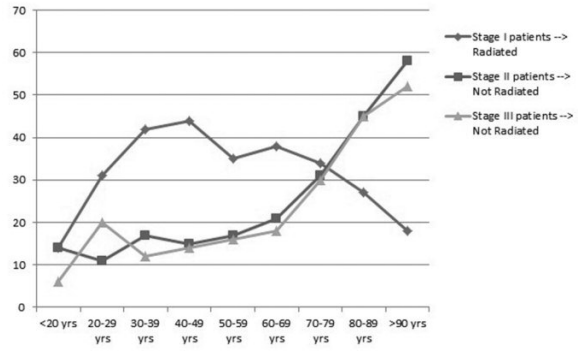

Figure 1: Percentage of patients possibly over treated for stage I disease and under treated for stage II & III disease with regards to radiation therapy by age nationwide

P202

ANAL SQUAMOUS-CELL CANCER: SURGICAL ALTERNATIVES TO CHEMORADIATION JUST AS EFFECTIVE?

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Purpose: While chemoradiation is currently the primary treatment for anal cancer and avoids an ostomy, it is associated with some treatment failures. **Aim:** To study long term oncologic outcomes after alternative treatment strategies including surgery and local excision followed by adjuvant therapy as compared to nonsurgical treatment with chemoradiation.

Methods: From the Surveillance, Epidemiology, and End Results (SEER) database, patients with squamous cell cancer of the anus diagnosed from 2004 and 2012 were identified. Patients who underwent radiation, suggesting treatment with chemoradiation as primary treatment (RT) were compared to those who underwent local excision (LE), abdominoperineal resection (APR) alone, and abdominoperineal resection after previous radiation (RT+APR). Kaplan Meier estimates was performed to estimate overall (OS) and cancer specific survival (CSS). Cox regression with and without adjustment was used to investigate the effect of variables on survival.

Results: 3379 (77.6%) patients underwent RT, 715 (16.4%) LE, 146 (3.4%) APR, 116 (2.7%) RT+APR. Median age for the 4 groups was 60, 57, 67.5, and 55.5 years (p<0.001) and 32%, 52.6%, 45.5%, 37.1% were male gender (p<0.001) respectively. Median tumor size in RT, LE, APR and RT+APR was 3.5, 1.6, 3.75, 4 cm respectively (p<0.001). Other characteristics were as in table. 5 year OS of RT, LE, APR, RT+APR groups was 62%, 72.9%, 42.6% and 36.5% while CSS was 78.5%, 88.9%, 79.6%, 52.2% respectively (p<0.001). Unadjusted hazard ratios for OS for LE, APR and RT+APR with radiation only as reference were 0.687 (0.579 – 0.814), 1.805 (1.396 – 2.333), and 1.868 (1.430 – 2.440) respectively. For tumor size <2.5 cm the hazard ratios were 0.566 (0.443 – 0.722), 1.166 (0.668 – 2.035), and 1.552 (0.849 – 2.835) and

for well differentiated tumors only were 0.626 (0.430 – 0.911), 1.181 (0.432 – 3.229), and 1.303 (0.477 – 3.568) respectively.

Conclusions: These data suggest that APR does not provide better outcomes and considering the need for a permanent colostomy, chemoradiation remains the gold standard for the majority of cases with anal squamous cell cancer. Local excision alone should be considered for select patients with low grade and early stage tumors since this is associated with equivalent outcomes.

Comparison of groups

		RT only n=3379, 77.6%	APR n=146, 3.4%	RT followed by APR n=116, 2.7%	LE only n=715 16.4%	P value
Age		60	67.5	55.5	57	<0.001
Male		1080 (32%)	67 (45.5%)	43 (37.1%)	376 (52.6%)	<0.001
T size cm		3.5	3.75	4	1.6	<0.001
Stage N (%)	I	437 (12.9%)	20 (13.7%)	2 (1.7%)	433 (60.6%)	<0.001
	II	1455 (43.1%)	72 (49.3%)	44 (37.9%)	233 (32.6%)	
	IIIA	430 (12.7%)	41 (28.1%)	32 (27.6%)	14 (2%)	
	IIIB	797 (23.6%)	6 (4.1%)	30 (25.9%)	18 (2.5%)	<0.001
	IV	260 (7.7%)	7 (4.8%)	8 (6.9%)	17 (2.4%)	
Differentiation	Well	258 (7.6%)	13 (8.9%)	8 (6.9%)	215 (30.1%)	
	Moderate	1114 (33%)	78 (53.4%)	40 (34.5%)	221 (30.9%)	
	Poor	1005 (29.7%)	51 (34.9%)	55 (47.4%)	80 (11.2%)	<0.001
	Anaplastic	30 (0.9%)	2 (1.4%)	2 (1.7%)	3 (0.4%)	
	Unknown	972 (28.8%)	2 (1.4%)	11 (9.5%)	196 (27.4%)	
5 year OS		62%	42.6%	36.5%	72.9%	<0.001
5 year CSS		78.5%	79.6%	52.2%	88.9%	<0.001

RT: radiotherapy

APR: abdominoperineal resection

LE: local excision

OS: Overall Survival

CSS: Cause Specific Survival

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THE IMPACT OF TIMING TO INITIATE POSTOPERATIVE CHEMOTHERAPY ON ONCOLOGIC OUTCOME AFTER RECTAL CANCER SURGERY.

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Purpose: Postoperative chemotherapy (POCT) for colorectal cancer has been established as a current standard of treatment but there is no guideline for the timing to initiate POCT. Despite of some reports of the association between delayed POCT and prognosis in colorectal cancer, few researches are available in rectal cancer which follows a different treatment course than colon cancer. The aim of this study is to identify the timing to initiate POCT and investigate its impact on oncologic outcome in rectal cancer.

Methods: A total of 997 patients who underwent curative resection and received POCT for rectal cancer from January 2006 to December 2012 were enrolled. Patients' medical records including survival data were analyzed retrospectively. Distributing the data by the calculated cut-off point for the initiation time of POCT, survival results and POCT induced toxicity were compared with Cox proportional hazard model and multiple logistic regression analysis. Dividing the patients into two groups whether underwent preoperative chemoradiotherpy (CRT), comparison of survival was performed.

Results: For the total 997 patients, mean interval time for the initiation of POCT was 29.1 days and calculated cut-off point was 20th day after surgery. Comparing disease free survival (DFS), patients received POCT after 20th day showed worse result than within 20th day on both univariate (5-year DFS: 64.8 vs. 75.8%; p=0.01) and multivariate analysis. (hazard ratio [HR]=1.5; 95% confidence intervals [CI]: 1.1-2.1; p=0.01) In the aspect of overall survival (OS), there was no significant difference. Analyzing the toxic effect of POCT between these two groups, there was no significant difference in the occurrence of chemotherapy induced complication over grade 3 and dose reduction of agents or discontinuation of chemotherapy due to toxicity. For the 719 patients who did not received preoperative CRT, mean interval time for the initiation of POCT and calculated cut-off point was 27.6 days and 19th day, respectively. Comparing DFS, patients received POCT after 19th day showed worse result on both univariate (5-year DFS: 65.7 vs. 78.5%; p=0.01) and multivariate analysis. (HR=1.7; 95% CI: 1.2-2.5; p=0.01) There was no significant difference in OS. For the 258 patients who received preoperative CRT, mean interval time for the initiation of POCT and calculated cut-off point was 33.4 day and 56th day, respectively. Patients received AC after 56th day showed worse trend of DFS but it was not statistically significant. (p=0.156) In OS, patients received POCT after 56th day showed worse results but it was not significant on multivariate analysis.

Conclusions: Initiation of POCT beyond 3 weeks after surgery in rectal cancer was associated with poor oncological outcome, especially in DFS. In the patients who received preoperative CRT, POCT could be delayed until 8 weeks without the impact on oncologic outcome.

P204

INCIDENCE OF PULMONARY EMBOLISM IN PATIENTS WITH NEWLY DIAGNOSED COLORECTAL CANCER.

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Purpose: To establish the incidence of pulmonary embolism (PE) in patients with newly diagnosed Stage III or IV colorectal cancer prior to treatment.

Methods: Consecutive patients presenting to a single health service with a new diagnosis of stage III or IV colorectal cancer were identified from a prospective database, for the period between January 2011 and September 2014. The diagnosis of pulmonary emboli was made on chest computerized tomography (CT) done for cancer staging prior to treatment. Contemporaneous clinical data was reviewed.

Results: Of 330 patients identified 224 had baseline CT chest imaging available for review, of which 107 (47.8%) were technically adequate scans. Pulmonary emboli were identified on five (4.7%) of these 107, including one of 5 patients (1.7%) with Stage III and four of 5 patients (8.3%) with stage IV disease. Overall, four cases had been described in the original report, of which one had symptoms suggestive of pulmonary emboli. None of the 107 patients with technically adequate scans had postoperative pulmonary emboli or deep vein thrombosis.

Conclusions: There is a clinically significant baseline rate of asymptomatic pulmonary emboli in patients with stage III and IV colorectal cancer that can be demonstrated on the staging chest CT scan. Pulmonary emboli described as a postoperative event in previous series may have been present prior to surgery.

P205

THE ANALYSES OF RAS AND BRAF MUTATIONS AND DNA MISMATCH REPAIR STATUS IN CHINESE SPORADIC COLORECTAL CANCER PATIENTS.

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Purpose: To investigate All RAS and BRAF gene mutations and DNA mismatch repair (MMR) protein abnormality in Chinese sporadic colorectal cancer (CRC) patients and their correlations with clinicopathologic features.

Methods: Clinical and pathological information for 400 patients was reviewed and recorded. Mutation analyses for exon 2,3,4 of KRAS gene, exon 2,3,4 of NRAS gene and BRAF V600E were performed by Sanger sequencing. Expression of MMR proteins including MHL1, MSH2, MSH6 and PMS2 was evaluated by immunohistochemistry. Correlations of KRAS, NRAS and BRAF mutation status and the expression status of MMR proteins with gender, age, preoperation CEA level tumor location, pathologic type, differ-

entiation, TNM stage, lymphovascular invsion and perineural invasion were analyzed. Correlations between KRAS,NRAS or BRAF mutations and MMR protein expression were also studied.

Results: The overall frequencies of KRAS, NRAS and BRAF mutations were 43.75%, 3.5% and 2.5% respectively. KRAS mutation in codon 12 or 13 of exon 2 was observed in 36% of patients, and 7.75% of mutations were detected in other exons of KRAS. The All-RAS mutation rate was 47.25%. RAS mutants were higher in tumors located in the right colon (61.9% vs 41.6%, P=0.001), with distant metastasis (55.8% vs 42.5% without distant metastasis, P=0.014). The frequencies of BRAF mutation were higher in females patients(4.6% vs males 1.2%, P = 0.047). MMR deficiency was associated with patients' age, preoperative CEA, proximal location, mucinous type, metastasis status and early cancer stage. MMR status was not related to RAS or BRAF mutations.

Conclusions: The rate of RAS mutation in Chinese colorectal cancer patients was close to the rate in Europe and US, while BRAF mutation rate was lower than that in Western population. RAS mutation may be related with tumors' location and distant metastasis.

P206

COMPARING THE EFFECT OF OBESITY BETWEEN ROBOTIC AND LAPAROSCOPIC S URGERY FOR RECTAL CANCER IN OBESE PATIENTS.

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Purpose: Recently minimal invasive surgery for colorectal cancer has been increased. Laparoscopic surgery shows better postoperative and comparable oncological outcomes compared with open surgery. But, laparoscopic surgery has many limitations due to two-dimensional views, poor ergonomics. Those make pelvic dissection difficult and time-consuming in rectal cancer, especially for male, obese patients and patients with narrow pelvis. Although robot surgery is considered to overcome them and have many benefits, there is no definite evidence to prove it. Thus, it is certainly worth comparing perioperative outcomes between robot and laparoscopic surgery for rectal cancer with difficult condition. The aim of this study is to compare the effect of obesity between robotic and laparoscopic surgery for obese rectal cancer patients.

Methods: A total of 869 patients with rectal cancer were evaluated retrospectively between Jan 2th, 2007 and Dec 31th, 2011 in our institution. 106 Patients were excluded from analysis who underwent combined operation. They were classified into a robotic surgery (RS) (n=358) and a laparoscopic surgery (LS) (n=405). They were compared operative time in terms of tumor location and body mass index(BMI) according to WHO Asia-pacific perspective(BMI: obesity≥25kg/m^2). The primary end point was operative time according to tumor location and BMI. The secondary end point was postoperative outcome and oncologic outcome between two groups.

Results: There is no difference between groups in preoperative characteristics except age and tumor location in total 763 patients. There are more low rectal cancer (AV≤5cm) and operation time is longer in RS. In RS group with BMI≥25kg/m^2, operative time dose not increased as the tumor location is lower. Specifically operative time for low rectal cancer is not longer than it for mid rectal cancer (5cm<AV≤10cm). Two groups show no difference in preoperative characteristics and postoperative outcomes such as the ratio of circumferential resection margin positive, postoperative leakage, LN harvest number, the ratio of LN positive. While operation time becomes longer as tumor location is lower in LS with BMI≥25kg/m^2. When compared operative time for low rectal cancer with BMI≥25kg/m^2 between RS and LS, it shows no difference from each other. Surprisingly operative time in RS was much shorter than in LS although not having statistical significance.

Conclusions: Although tumor location is lower and pelvic cavity is narrower, operative time does not become longer in robot surgery for obese rectal cancer patients. It means that robot surgery does not be affected by obesity in low rectal cancer. In robot surgery for low rectal cancer, there are benefits in spite of difficult conditions, such as obesity, narrow pelvis or low rectal cancer.

P207

THE IMPACT OF PREOPERATIVE CHEMORADIOTHERAPY FOR ANASTOMOTIC LEAKAGE IN MID AND LOW RECTAL CANCER SURGERY: A PROPENSITY SCORE MATCHING ANALYSIS.

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Purpose: Preoperative chemoradiotherapy (CRT) is regarded as the standard treatment for locally advanced rectal cancer because it has the advantages of down-staging tumors and anal sphincter preservation. However, the effect of preoperative CRT for anastomotic leakage is still controversial. We aimed to investigate whether preoperative CRT affects anastomotic leakage after mid and low rectal cancer surgery by using propensity score matching.

Methods: We evaluated a total of 1775 patients, between June 2004 and May 2012, who underwent low anterior resection or ultra-low anterior resection for mid and low rectal cancer at two hospitals of the Yonsei University Health System, retrospectively. These patients were compared as a preoperative CRT group (n=535) and as a non-preoperative CRT group (n=1240). Propensity score was calculated for each patient with identified variables (age, sex, BMI, ASA, tumor location, operative type, stoma formation, and intraoperative transfusion). After propensity score matching, 415 patients in each group were evaluated. Anastomotic leakage was analyzed by leakage subtypes, grading of leakage, and development time. Postoperative outcomes and risk factors that affected anastomotic leakage were assessed.

Results: The overall incidence of anastomotic leakage was 8.7%. The rate of anastomotic leakage after preoperative CRT was higher than non-preoperative CRT: 11.6% vs. 7.5% (before matching, p=0.005), and 13.0% vs. 6.5% (after matching, p=0.002), respectively. The incidence of free leakage was similar between the two groups. However, contained leakage developed more frequently in the preoperative CRT group. The operation time of the preoperative CRT group was longer than the non-preoperative CRT group (320.6±105.3 min vs. 270.0±97.7 min, p<0.001). Tumor location, minimally invasive surgery, malnutrition and preoperative CRT were the risk factors that increased anastomotic leakage after rectal cancer surgery in both univariate and multivariate analyses.

Conclusions: Preoperative CRT increased the risk of anastomotic leakage after rectal cancer surgery in patients with mid or low rectal cancer. Especially, according to the analysis between leakage subtypes, preoperative CRT did not affect free leakage, while it increased the risk of contained leakage.

P208

OUTCOMES OF CYTOREDUCTIVE SURGERY COMBINED WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR SYNCHRONOUS OR METACHRONOUS PERITONEAL METASTASIS FROM COLORECTAL CANCER.

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Purpose: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) has showed a survival advantage for patients with peritoneal metastasis from colorectal cancer. This study aimed to reveal the difference of outcomes between synchronous and metachronous peritoneal metastasis treated by CRS and HIPEC.

Methods: Twenty one consecutive patients diagnosedwith peritoneal metastasis from colorectal cancer and suitable for potentially curative treatment with CRS and HIPEC at our single institution from September 2010 to June 2015 were identified from a prospective database. Peritoneal Cancer

Index (PCI), short-term outcomes and recurrence free survival were compared between patients with synchronous [n=11; 3 males and 8 females, mean age 50 years] and metachronous [n=10; 5 males and 5 females, mean age 58 years] peritoneal metastasis treated by CRS and HIPEC.

Results: Median disease free interval was 12.5 (range, 5-3) months for patients presenting with metachronous peritoneal metastasis. Median PCI was 18 (range, 2-33) for the synchronous metastasis group and 9 (range, 5-20) for the metachronous metastasis group (p=0.271). Operative time, estimated blood loss, length of stay in intensive care unit and postoperative stay were similar in both groups. Postoperative complications occurred in 6 patients (54.5%) in the synchronous metastasis group and 5 patients (50.0%) in the metachronous metastasis group. With a median follow-up time of 12.3 months, the recurrence rate was 54.5% for the synchronous metastasis group and 20.0% for the metachronous metastasis group. The mean recurrence free survival tended to be longer in the metachronous metastasis group, but not statistically significant (17.6 vs 47.5 months; p=0.207).

Conclusions: CRS and HIPEC may be more beneficial for patients with metachronous peritoneal metastasis from colorectal cancer.

P209

TRANSANAL MINIMALLY INVASIVE SURGERY, A VERSATILE TOOL IN THE COLORECTAL SURGEON'S ARMAMENTARIUM – OUTCOMES OF 122 PATIENTS.

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Purpose: Transanal Minimally Invasive Surgery (TAMIS) is an evolving technique for the treatment of rectal pathology. The purpose of this series is to demonstrate the versatility of TAMIS as a diagnostic tool in cases of uncertain pathology, management of various non-malignant rectal pathologies, as well as a definitive treatment option for selected rectal neoplasms. Feasibility, peri-operative and oncologic outcomes were evaluated.

Methods: A retrospective review was conducted of consecutive patients who underwent a TAMIS procedure. The procedures were completed by 2 colorectal surgeons at a tertiary care centre over a 27-month period. TAMIS procedures included TAMIS local excision (LE), hybrid transabdominal-transanal total mesorectal excision (taTME), TAMIS completion proctectomy, control of bleeding, repair of rectourethral fistula and stricturoplasty. Inclusion criteria for TAMIS LE were benign rectal neoplasms, cT1N0 histologically favorable rectal carcinomas, and cT2-4 carcinomas in patients too unfit for traditional abdominal TME. The primary endpoints evaluated were peri-operative and oncologic outcomes. Preoperative and postoperative pathology were compared.

Results: 122 TAMIS procedures were identifed, including 85 LE, 23 taTME, 10 TAMIS proctectomy, 2 control of bleeding, 1 repair of rectourethral fistula and 1 stricturoplasty. The mean age of patients was 65.6, with 60.7% male and 39.3% female. The mean tumor size for LE was 3.6cm (range 0.5-7.5cm) and the mean distance from the anal verge was 6.3cm (range 2-15cm). All LE and TME specimens had grossly negative margins with 13% microscopic margin positivity. For TaTME, the mesorectal envelope was graded as complete in 83% of specimens and near complete in 8.7%. TAMIS allowed for the successful completion of proctectomies, treatment of rectal stricture, rectourethral fistula and rectal bleeding. The mean operative time was 63.5 minutes (range 20-180min) for LE and 243 minutes (range 105-483min) for taTME. The mean hospital length of stay was 0.55 days (range 0-4 days) for LE and 8 days (range 3-20 days) for taTME. 30-day morbidity for all TAMIS procedures was minor in 11% (Clavien-Dindo I+II) and major in 9% (Clavien-Dindo III+IV+V).

Conclusions: TAMIS is a safe and effective platform for the treatment of a wide variety of benign and malignant rectal pathologies. With the propensity for imaging and biopsy to overstage rectal lesions, TAMIS LE is a useful diagnostic tool to help accurately stage and guide treatment algorithms. Furthermore, TAMIS LE provides curative resection in benign neoplasms and histologically favorable rectal carcinomas, minimising the morbidities associated with conventional abdominal TME. TaTME provides a technical advantage over conventional TME while maintaining good quality TME. Larger series with long-term follow-up are needed to draw definitive conclusions on oncologic outcomes.

P210

SURGICAL OUTCOMES OF RESECTION FOR COLORECTAL CANCER IN PATIENTS WITH LIVER CIRRHOSIS.

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Purpose: Although perioperative risk factors in patients with liver cirrhosis have been established in general, evidence for risk stratification in those who undergoing surgery for colorectal cancer (CRC) remains limited. This study aims to evaluate the clinical predictive factors for perioperative morbidity and oncologic outcomes in CRC patients with liver cirrhosis (LC).

Methods: A retrospective analysis of prospectively collected data was conducted. LC was diagnosed by compatible histological or imaging (CT scan, ultrasound and MRI) findings, in addition to laboratory test features of hepatic dysfunction. A total 161 LC patients who underwent surgery for CRC were identified in this analysis between January, 2001 and December, 2010.

Results: The mean age was 59.91±9.64 years and median follow up period was 54.01 months (range, 0.46-170.02). The Child-Pugh classification of LC was as follows: Child A (N=118, 73.3%), Child B (N=39, 24.2%), Child C (N=4, 2.5%). Median model for end-stage liver disease (MELD) score was 8 (range 6-21). Postoperative morbidity rate was 37.3% (60/161). Thrombocytopenia (< 150K) (Odds ratio (OR), 2.480 95% confidence interval (CI), 1.252-4.913, *p* value=0.009), hyperbilirubinemia (>1.2mg/dL) (OR, 6.500, 95% CI, 2.833-14.914, *p*<0.001), prothrombin time (PT) prolongation (>1.3) (OR, 9.035, 95% CI, 2.456-33.242, *p*=0.001), and hypoalbuminemia(<3.3 mg/dL) (OR, 2.414. 1.248-4.669, *p*=0.009) associated with 30-days morbidity in univariate analysis. Hyperbilirubinemia (OR, 4.105, 95% CI, 1.638-10.287, *p*=0.003) and PT prolongation (OR, 4.152, 95% CI, 1.005-17.146, *p*=0.049) sustained their significance in multivariate analysis. Five-year progression-free survival rate and 5-year overall survival rate were 82.5% and 55.8%, respectively. The significant clinical risk factors influencing overall survival were TNM stage of CRC (Hazard ratio (HR), 2.075, 95% CI, 1.342-3.208, *p*=0.001), MELD score (>8 points) (HR, 2.129, 95% CI, 1.384-3.277, *p*=0.001) and co-existence of hepatocellular carcinoma (HCC) (HR, 1.638, 95% CI, 1.023-2.623, *p*=0.040) in multivariate analysis.

Conclusions: Hyperbilirubinemia and PT prolongation were significant risk factors for postoperative morbidity in LC patients who underwent surgery for CRC. In addition, not only advanced TNM stage of CRC, but high MELD score and co-existence of HCC were significantly associated with poor overall survival in CRC patients with LC.

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ONCOLOGIC OUTCOMES IN PATIENTS UNDERGOING PROCTECTOMY WITHOUT NEOADJUVANT RADIATION FOR RECTAL CANCER.

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Purpose: Surgical technique is a vitally important determinant of rectal cancer outcomes and achieving high-quality surgery may minimize the effect of widely-accepted prognostic factors such as tumor- and nodal-stage. Predictors of oncologic outcome in patients undergoing high-quality rectal cancer surgery should be reassessed in order to better predict prognosis and to help guide decision-making regarding neoadjuvant and adjuvant therapy.

Methods: Patients undergoing curative intent proctectomy with TME from Jan-2008 to Apr-2012 included in a prospectively maintained colorectal cancer database with stages I-III at pathology, who did not undergo neoadjuvant RT were evaluated. Exclusion criteria were history of pelvic

radiation, neoadjuvant chemotherapy (CT) or adjuvant RT use. Oncologic outcomes including overall survival (OS), cancer specific survival (CSS) and local (LR) were assessed. Likewise, factors associated with adverse oncologic outcomes were determined.

Results: Of 138 patients evaluated, 84 (61%) were male, with a mean age at resection of 62 ± 14 years, and had a mean BMI of 26.3 ± 5. Tumor distance to the anal verge was 8.4 ± 4 cm. Restorative procedures were performed in 115 (83%) patients. There were 63 (47%), 19 (14.2%) and 52 (38.8%) patients with stages I, II and III at pathology, respectively, while 4 patients had T0N0 disease. Complete mesorectal intactness was achieved in 116 (94%) cases. Involvement of the radial margin at pathology occurred in 6 (4.3%) cases. Mean follow-up was 46 ± 18 months. Adjuvant CT was given to 37 (26.8%) patients. OS and CSS at 3 years were 89%, and 95.4%, with a LR rate of 3.2%. Significant factors associated with adverse oncologic outcomes in univariate analysis were included multivariate models (Table). A composite of ASA 3 and 4 was associated with decreased OS, while node positive disease (only N2) and postoperative complications were associated with decreased CSS. Diabetes Mellitus was the only factor associated with increased LR. Adjuvant CT use did not predict OS or CSS. While the radial margin could not be assessed in multivariate models due to confounding with the other tested factors, individual univariate models identified a significant association between radial margin involvement and OS, CSS and LR (HR 18.3 (95% CI, 6.2–54; p<0.0001), HR 29.7 (95% CI, 6.7–129.8; p<0.0001), and HR 27.2 (95% CI, 2.4–301.1; p=0.007)) respectively.

Conclusions: In our institution, select rectal cancer patients treated with high-quality TME and no neoadjuvant therapy achieve excellent oncologic outcomes. Widely-accepted prognostic factors for survival and local recurrence have minimal, if any, impact.

Risk factors associated with adverse oncologic outcomes (Multivariate analysis)

	HR (95% CI)	P-value
Overall survival		
ASA score: 3 and 4 vs. 1 and 2	3.27 (1.29-8.31)	0.012
Cancer specific survival		
N category (TNM) at pathology: N2 vs. N0	10.12 (1.50-67.94)	0.017
Postoperative complications: Yes vs. No	3.85 (1.22-12.12)	0.021
Local recurrence		
Diabetes Mellitus: Yes vs. No	8.23 (1.37-49.49)	0.021

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WHAT ARE THE DIFFERENCES ON ONCOLOGIC OUTCOMES AND QUALITY OF LIFE AMONG RIGHT COLON, LEFT COLON, AND RECTAL CANCER?

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Purpose: Right colon, left colon and rectal cancer have unique characteristics in their presentation and treatment options. Recent studies have suggested that the oncologic outcomes of rectal cancer have progressively improved as a result of advancements in surgical technique, and may have surpassed those of colon cancer. This study aims to compare the differences among right colon, left colon, and rectal cancer in patients operated on in a single high-volume institution.

Methods: A single-institution prospectively maintained database was queried to identify patients with pathological stages I-III colorectal adenocarcinoma, electively operated on with curative intent between 2000 and 2010. Exclusion criteria were metastatic disease, emergent operation, inflammatory bowel disease, and hereditary colorectal neoplasm. Patients were divided into 3 groups based on cancer location: right colon cancer (RCC), left colon cancer (LCC), and rectal cancer (RC). Patient characteristics, perioperative and oncologic outcomes, and quality of life were compared among the 3 groups using univariate, multivariate and Kaplan-meier survival analyses.

Results: 2065 patients met the inclusion criteria (606 RCC, 366 LCC, and 1093 RC). Patients with RCC tended to be older, female, with higher ASA compared to LCC and RC. Laparoscopic approach was more commonly used in colon cancers than RC. RC was associated with higher postoperative complications, and a longer hospital stay. RC was treated with neoadjuvant radiotherapy in 44.6% of patients, and received more adjuvant treatment than colon cancers. LCC had better overall survival and disease-free survival in non-adjusted analysis, and in multivariate analysis adjusted by age, gender, ASA, and pathological stage. Although RCC had worse overall and disease-free survival in non-adjusted survival analysis compared to LCC and RC, when adjusted for the factors above, RCC had better survival outcomes than RC, but not LCC. COX regression analysis showed age (p<0.001), gender (p=0.016), ASA (p<0.001), pathological stage (p<0.001), adjuvant chemotherapy (p=0.043), and cancer location (p=0.024) independently associated with overall survival. When assessing quality of life, 560 patients answered the questionnaire (134 RCC, 93 LCC, and 333 RC) in a mean follow-up time of 6.1 years. RC patients reported more sexual and work restrictions than colon cancers (p=0.015 and p<0.001, respectively).

Conclusions: Cancers from right colon, left colon and rectum were proven to be distinctive entities, with different presentation, outcomes, and singular patient experience. In contrast to non-adjusted studies, our institutional data did not support the contention that rectal cancer oncologic outcomes are better than those of colon cancer, once appropriately adjusted for relevant covariates.

Patient characteristics, perioperative and oncologic outcomes by cancer location

	Right Colon Cancer (n=606)	Left Colon Cancer (n=366)	Rectal Cancer (n=1093)	p value
Age (mean/SD)	70.0 (13.1)	64.8 (12.9)	61.1 (13.1)	<0.001
Female Gender	278 (45.9%)	149 (40.7%)	382 (34.9%)	<0.001
ASA Classification*				<0.001
ASA 1-2	155 (26.2%)	152 (42.3%)	486 (45.6%)	
ASA 3-4	436 (73.8%)	207 (57.7%)	579 (54.4%)	
Patient Symptomatic	459 (76.0%)	295 (81.0%)	951 (88.2%)	<0.001
Pathological Stage				<0.001
I	154 (24.4%)	109 (29.8%)	414 (37.9%)	
II	257 (42.4%)	131 (35.8%)	291 (26.6%)	
III	195 (32.2%)	126 (34.4%)	388 (35.5%)	
Laparoscopy use	140 (23.1%)	95 (26.0%)	87 (8.0)	<0.001
Intraoperative complications	13 (2.1%)	14 (3.8%)	48 (4.4%)	0.059
Postoperative complications	133 (21.9%)	83 (22.7%)	299 (27.4%)	0.029
Reoperation	24 (4.0%)	14 (3.8%)	72 (6.6%)	0.026
Readmission	45 (7.4%)	24 (6.6%)	98 (9.0%)	0.266
Mortality	14 (2.3%)	6 (1.6%)	12 (1.1%)	0.151
Length of Stay - days (median, mean)	6 / 8.34	6 / 7.66	7 / 8.38	0.003
Neoadjuvant radiotherapy	-	-	488 (44.6%)	-
Adjuvant chemotherapy*	148 (31.3%)	109 (36.8%)	409 (60.6%)	<0.001
Non-adjusted analysis				
5-yr overall survival	67%	78%	74%	<0.001
5-yr disease-free survival	61%	70%	67%	<0.001
5-yr cancer-specific survival	86%	91%	88%	0.095
5-yr overall recurrence	17%	17%	16%	0.294
Adjusted analysis**				
5-yr overall survival	76%	79%	73%	0.024
5-yr disease-free survival	67%	71%	66%	0.101
5-yr cancer-specific survival	89%	92%	88%	0.140
5-yr overall recurrence	17%	16%	14%	0.287

* ASA and adjuvant chemotherapy information not available for all patients

** Data adjusted for age, gender, ASA, pathological stage, and postoperative chemotherapy

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ROLE OF STAGING LAPAROSCOPY AND DIVERSION STOMA IN LOCALLY ADVANCED CA RECTUM WITH IMPENDING OBSTRUCTION AND PLANNED FOR NEOADJUVANT CONCOMITANT CHEMORADIOTHERAPY (NACTRT).

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Purpose: Rectal adenocarcinoma patients with cT3,4/N+ disease undergo NACTRT as a standard protocol. A significant number of patients in the Indian setting present with imminent or impending obstruction. Such patients undergo trephine stoma or mini laparotomy and stoma. The study aims to assess the role and feasibility of staging laparoscopy and stoma in a tertiary cancer centre

Methods: 37 locally advanced rectal cancer patients with impending obstruction were planned for NACTRT as per the clinic-radiological staging based on CECT and MRI pelvis. As a unit protocol they underwent staging laparoscopy and stoma creation from 18.09.2013 to 16.06.2015

Results: Out of the 26 non metastatic patient on imaging, 7 turned out to be metastatic. Out of the 11 patients with metastasis on imaging, 2

turned out to be non metastatic. Transverse loop stoma was done in 13 patients. Sigmoid stoma was done in 17 patients. Loop ileostomy was done in 7 patients. Blood loss was minimal in all patients. Staging laparoscopy done during stoma creation changed the intent of treatment in 9 patients out of the 37 patients in the study.

Conclusions: Staging laparoscopy is safe, can assess intra abdominal metastases which are missed on preoperative staging CT scan and MRI and which may be missed on trephine stoma/ mini laparotomy with imparts minimal intra abdominal exposure. We recommend routine use staging laparoscopy during stoma creation for locally advanced CA rectum patients with impending obstruction planned for NACTRT.

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TRANSANAL MINIMALLY INVASIVE SURGERY VERSUS TRANSANAL ENDOSCOPIC MICROSURGERY FOR LOCAL EXCISION OF BENIGN AND MALIGNANT TUMORS OF THE RECTUM: A MATCHED COHORT ANALYSIS.

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Purpose: The use of transanal endoscopic microsurgery (TEM) for the local excision of rectal tumors remains limited due to the high start-up costs for equipment and steep learning curve. Recently, transanal minimally invasive surgery (TAMIS) has emerged as an alternative with potential advantages in cost that may encourage more widespread adoption. The purpose of this study was to review our early experience with TAMIS and compare it to outcomes achieved via TEM in a matched patient cohort.

Methods: A retrospective analysis was conducted of consecutive patients undergoing TAMIS for benign or malignant rectal lesions by surgeons from or affiliated with the University of Minnesota between March 2011 and March 2015. These patients were matched in a 2:1 ratio with patients who underwent TEM from January 1997 to June 2014 for tumors with comparable distances from the anal verge and specimen size.

Results: A total of 30 patients underwent TAMIS for local excision of rectal tumors. Five were excluded due to the use of a transanal approach for a portion of the procedure, leaving 25 patients (benign n=17, malignant n=3, carcinoid n=5) for analysis. These were matched to 50 TEM patients. Both groups were similar with respect to age, specimen size, operative time and estimated blood loss (Table 1). Procedure-related morbidity was similar between the two procedures for margin positivity (p=0.41 by Fisher's exact test), rectal seepage or gas incontinence (p=0.16), postoperative fever (p=0.66) and intraoperative conversion to radical operation (p=0.11); urinary retention was more common in the TEM group (30% TEM vs. 4% TAMIS, p=0.01). Two patients in the TAMIS group required conversion to anterior resection versus none in the TEM group.

Conclusions: Our early experience demonstrates that TAMIS is a safe and effective alternative for the same clinical indications as TEM, with possible advantages in perioperative morbidity. However, two TAMIS patients required conversion to anterior resection vs. none in the TEM group, so caution may need to be exercised in using TAMIS for high rectal lesions. Further studies are needed to validate the long-term results of TAMIS in local recurrence, oncological outcome, and technical equivalency to TEM.

Table 1: Characteristics of TEM and TAMIS patients

	TEM	TAMIS
Number of patients	50	25
Age (yr)	63.4 (25-88)	60.6 (48-95)
M:F	36:14	9:16
Specimen size (cm2)	15.8 (0.75-45.65)	16.71 (1.76-48)
Tumor distance from anal verge (cm)	8.76 (5-15)	9 (5-15)
Operative time (min)	86.7 (13-230)	87.9 (42-161)
EBL (mL)	12.4 (0-200)	15 (1-100)
Length of stay (days)	2.5 (0-24)	1.1 (0-5)

P215

OVERALL VALUE OF LAPAROSCOPY IN COLON CANCER- BENEFITS FOR PAYERS AND PATIENTS.

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Purpose: While laparoscopy has been proven to be safe, oncologically comparable, and clinically beneficial over open surgery for colon cancer, utilization remains low. Our goal was to evaluate the financial benefits of MIS from the payer's perspective to show the additional value of laparoscopic colectomy for colon cancer.

Methods: Commercial claims data from Truven MarketScan® for 2013 was reviewed for inpatient colectomy cases for colon cancer. Colon cancer cases were identified by ICD-9 diagnosis code, and stratified into open or laparoscopic approaches by ICD-9 procedure codes (Open 45.71-45.76. 45.79, 45.82, 45.83; Laparoscopic 17.31-17.36, 17.39, 45.81). Emergent, metastatic, and robotic cases were excluded. Care episodes (inpatient stay and 30 days post-discharge) were compared for average allowed costs (amount paid to providers by the payer plus member cost sharing) and readmission rates after adjusting for comorbidities, demographics, and geographic region. Total and postoperative costs were calculated with readmissions capped at $100,000.

Results: 1,299 elective inpatient colectomies were identified for colon cancer- 558 (43%) open and 741 (57%) MIS. In the adjusted analysis, open cases had greater ICU utilization (3.4% open vs. 2.2% laparoscopic), a significantly longer LOS (5.94 open vs. 4.25 laparoscopic days, p<.001), and significantly higher costs for the inpatient colectomy episode ($37,105 open vs. $31,552 laparoscopic, p<.001). Post-discharge, the laparoscopic cohort had significantly lower readmission rates per 100 cases (6.61% vs. 10.93%; p=0.0165), lower average readmission costs ($1,676 vs. $3,151, p=0.0309), and lower total 30-day healthcare utilization costs ($4,842 vs. $7,121, p=0.0047) than open colon cancer cases, respectively. The total overall allowed costs were significantly lower laparoscopic than open ($36,395 vs. $44,226, p<0.001), resulting in $7,831 savings per patient with laparoscopic colectomy for colon cancer.

Conclusions: In a commercially-insured population undergoing elective colectomy for colon cancer, the risk-adjusted inpatient, outpatient, and total healthcare costs were significantly lower with laparoscopic than open surgery- almost $8,000 less per patient. The reduction in cost, complications, and readmissions with laparoscopic colectomy could result in an overall benefit to the healthcare system. While the incidence of colon cancer is low in the commercially insured population, our results demonstrate a great opportunity for the Medicare population and groups participating in bundled payments to dramatically reduce healthcare utilization by cost shifting to minimally invasive approaches for colon cancer.

	Open	Laparoscopic	Shift Open-Laparoscopic	p-Value
n	558	741		
Average Age	52.6	53.1		0.2748
Gender				0.9782
Male	54.3%	54.3%		
Female	45.7%	45.7%		
Intensive Care Unit Stay	3.4%	2.2%		0.0615
Length of Stay	5.94	4.25		<.001
Readmission rate	10.93	6.61		0.0165
Total Inpatient Average Allowed Cost	$37,105	$31,552	$5,552	<.001
30 Day Post-Anchor Readmission Average Allowed Costs***	$3,151	$1,676	$1,475	0.0309
30 Day Postoperative Average Allowed Costs	$7,121	$4,842	$2,279	0.0047
Total Inpatient and 30 Day Postoperative Average Allowed Costs	$44,226	$36,395	$7,831	<.001

P216

IS ONCOLOGICALLY SAFE THE SHORT DISTAL RESECTION MARGIN IN LOW RECTAL CANCER PATIENTS WHO UNDERWENT NEOADJUVANT CHEMORADIATION THERAPY?

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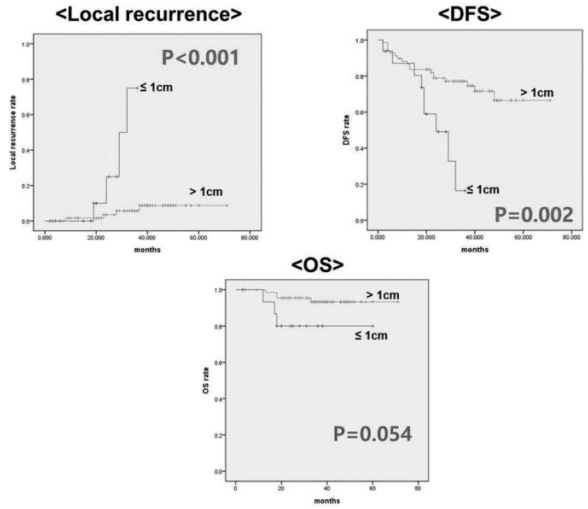
Purpose: Because of subclinical distal bowel intramural spread within 1 cm distally from primary lesion, ≥ 1 cm of distal bowel clearance is recommended as minimally acceptable for patients with low-lying rectal cancer who are undergoing low anterior resection. However, this 1 cm rule is occasionally violated, particularly after neoadjuvant radiation therapy. The aim of this study was to evaluate whether a distal resection margin of <1 cm jeopardizes oncologic safety in patients undergoing sphincter saving surgery.

Methods: From January 2009 to January 2013, 97 rectal cancer patients with biopsy proven adenocarcinoma below 7 cm from anal verge underwent neoadjuvant chemoradiation therapy followed by sphincter saving surgery. With above 97 rectal cancer patients, we analyzed data associated with oncologic outcome retrospectively.

Results: Mean follow-up length was 34.65±13.8 months. 5 patients (5.2%) had local recurrences and 24 patients (24.7%) had distant metastases. Three-year disease free survival (DFS) rate was 70.3% and 3-year overall survival (OS) rate was 89.4%. In multivariate analysis, distal resection margin of ≤ 1cm (p=0.004, CI: 1.780-20.733), radial margin of ≤ 5mm (p=0.012, CI: 1.321-9.894), and serum CEA level after radical surgery (p<0.001, CI: 3.919-68.406) were independent risk factors associated with DFS. Also, radial margin of ≤ 5mm (p=0.017, CI: 1.673-183.735) and serum CEA level after radical surgery (p=0.019, CI: 1.605-205.959) were independent risk factors associated with OS.

Conclusions: Based on above results, we observed that a short distal resection margin could threaten patient's oncologic outcome. We think that the importance of patient and tumor selection for sphincter saving surgery with short distal margin in low-lying rectal cancer must be emphasized.



P217

THE EFFECT OF BIOFEEDBACK THERAPY DURING INTERVAL OF TEMPORARY STOMA ON ANORECTAL FUNCTION: THE INTERIM REPORT OF RANDOMIZED CONTROLLED STUDY (NCT01661829).

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Purpose: Impaired functional outcome is common after a low anterior resection. There are currently no specific treatment options for this impaired functional outcome. Recently, some investigators have reported the favorable effect of pelvic floor rehabilitation on anorectal function. Especially, biofeedback therapy has an advantage that the patient gets information about the activity of the pelvic floor muscles by way of a visual display. We intended to evaluate the effect of biofeedback therapy (BF) during the interval of temporary stoma (TS) after sphincter saving surgery (SSS) of rectal cancer on anorectal function (ARF) after stoma closure.

Methods: Patients were randomized whether patient would be treated by BF during interval of TS (Group 1) or not (Group 2). BF was performed two times a week during interval of TS. To evaluate the ARF, we performed anorectal manometry at before nCRT (period 1), after nCRT (period 2), before the reversal of TS (period 3), 6 months after SSS (period 4), and 12 months after SSS (period 5). From March 2012 to Feburary 2014, total 56 patients who underwent neoadjuvant chemoradiation therapy (nCRT) following SSS with TS were enrolled in our study. We evaluated treatment response as the change rate of manomteric data based on data in period 1 (manometric data in each period / manmetric data in period 1). Also, we evaluated symptom using CCIS at every period. Till now, we completed follow-up to period 4.

Results: We performed the reversal of TS in all our patients. Total 48 patients including 21 patients in Group 1 and 26 patients in Group 2 was evaluated by anorectal manometry. The results of change rate on each factors of manometry in period 4 are as follows: MRP (0.88 in Group 1 vs 0.79 in Group 2, p=0.582), MSP (0.71 vs 0.83, p=0.304), first rectal sensory threshold(RST) (0.63 vs 0.77, p=0.330), maximal RST (0.59 vs 0.51, p=0.513), and rectal compliance (0.88 vs 0.81, p=0.764). Mean CCIS at period 4 were 11.29 in Group 1 and 9.12 in Group 2, respectively (p=0.180). Based on 9 points of CCIS, 12 patients (57.1%) in Group 1 and 13 patients (50%) in Group 2 had an above 9 points of CCIS which is reference value of fecal incontinence (p=0.770).

Conclusions: Based on above result, BF during interval of TS had a little effect for treating anorectal dysfunction after reversal of TS. But, patients who underwent BF kept better the anal resting pressure.

P218

TOTAL MESORECTAL EXCISION AFTER TRANSANAL ENDOSCOPIC MICROSURGERY FOR EARLY RECTAL CANCER: CAN WE SALVAGE UNEXPECTEDLY ADVANCED OR RECURRENT DISEASE? A CASE-MATCHED STUDY.

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Purpose: Transanal Endoscopic Microsurgery (TEM) is as a reasonable alternative to conventional radical excision in cases of select T1 rectal cancers. However, patients with unexpectedly more advanced cancers after TEM and patients with subsequent recurrence can be treated with salvage with total mesorectal excision (TME). The aim of this study is to evaluate the feasibility and safety of salvage TME after TEM.

Methods: Since 2007, TEM has been performed at St. Paul's Hospital for rectal adenomas and early cancers. Demographic, surgical, pathologic and follow up data has been prospectively collected and maintained in the SPH-TEM database. All consecutive patients treated with salvage TME after primary TEM (S-TME) were identified. A comparison cohort of primary TME (P-TME) treated patients, matched for age, gender, ASA score, BMI, tumor height, neoadjuvant chemoradiation and tumor stage. Operative and surgical outcomes as well as quality of the surgical specimen were analyzed using student t test and fisher's exact test.

Results: Between 2007 and 2015, 514 patients were treated by TEM at SPH. Of these, 34 patients (6.6%) underwent salvage TME and were included in the S-TME group. They were matched to 34 patients in the P-TME cohort. Indications for salvage TME were adverse features (n=19, 55.9%), positive margins (n=10, 29.4%) and cancer recurrence (n=5, 14.7%). The S-TME group had lower rates of sphincter preservation (88.2% vs 52.9%, p = 0.007) and increased operative time (193 min vs 168 min, p = 0.038). Estimated blood loss (346.3 cc vs 283.8 cc, p = 0.352), length of stay (8.9 days vs 9.4 days, p =0.669), time to resume full diet (5.6 days vs 5.3 days, p

= 0.676) and ileus (23.5% vs 23.5%, p = 1) were similar in the 2 groups. Anastomotic leak rate (2.9% vs 2.9%, p =1) and overall complication rate (41.2% vs 44.1%, p = 0.566) was also similar between groups. There were no differences between groups in oncologic surgery quality, rates of adequate mesorectal excision (94.1% vs 94.1%, p = 1), negative circumferential radial margin (91.1% vs 97.1%, p = 0.887) and clear distal/proximal margins (100% vs 100%, p=1).

Conclusions: Salvage TME after TEM is technically challenging surgery, with longer operative times and lower rates of sphincter preservation in our study. However, similar rates of R0 resection and post-operative outcomes to primary TME surgery suggest it can be successfully performed by experienced colorectal surgeons.

P219

NEOADJUVANT CHEMOTHERAPY IN UNRESECTABLE COLON CANCER.

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Purpose: Neoadjuvant chemotherapy prior to surgical resection is a relatively new strategy for treating locally advanced colon cancer. This multicenter study aims to identify the surgical and oncological complications and analyze survival outcomes in patients who were treated with this regimen.

Methods: The records of all patients who received neoadjuvant therapy for locally advanced colon cancer in three dedicated colorectal centers between 2009 and 2014 were retrospectively reviewed. Patient and tumor characteristics, as well as surgery and chemotherapy related complications and survival outcomes were collected.

Results: Twenty-eight patients underwent neoadjuvant chemotherapy prior to surgery. All patients had clinically T4 locally advanced tumors without signs of distant metastases. Median age was 62 years (range 30-80) and the majority were female (n=19; 68%). The majority of patients had an adenocarcinoma (n=23; 89%), five patients had a mucinous subtype (11%). Tumors were localized in the sigmoid (n= 13; 46%) and the cecum (n=8; 29%) or other parts of the colon (7; 25%). The main choice of chemotherapy was 5-FU in combination with oxaliplatin (n=27, 96%), one patient received capecitabine monotherapy. Additional targeted therapy was given in five patients (bevacizumab (n=4) or panitumumab (n=1)). Median number of cycles was 5.5 (range 1-17). Nine patients (32%) experienced more severe complications, CTCAE grade III or IV (e.g. diarrhea, sepsis, liver failure). In eleven patients (39%) dose reduction of was necessary, mainly the dose of oxaliplatin. Eleven patients (39%) did not finish systemic therapy due to complications and surgery was put forward. The majority of patients underwent a multivisceral resection (n=19, 76%). Downsizing of the tumor based on T-stage was seen in eleven patients (39%) with a complete response in one patient. Downstaging in lymph node status was seen in 47% (15 cN+ à 7 ypN0). Radical resections (R0) were achieved in 25 patients (89%). Of 25 patients with an anastomosis, three suffered from an anastomotic leakage (13%). Median follow-up was 25 months (range 1-72). 2-year overall survival was 82% and 2-year disease free survival was 69%.

Conclusions: A significant number of patients with clinical T4 locally advanced colon cancer showed downsizing after neoadjuvant chemotherapy, making a radical resection possible in the majority of patients. This treatment strategy seems to be safe and feasible with excellent survival outcomes and should be considered in patients with baseline unresectable tumors.

P220

EXTRALEVATOR WITH VERTICAL RECTUS ABDOMINIS MYOCUTANEOUS FLAP VS. NONEXTRALEVATOR ABDOMINOPERINEAL EXCISION FOR RECTAL CANCER: THE RELAPE TRIAL.

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Purpose: A randomized controlled trial (RCT) was conducted to test the null hypothesis that there is no difference between extralevator abdominoperineal excision (ELAPE) with vertical rectus abdominis myocutaneous (VRAM) flap and non-ELAPE for rectal cancer in terms of circumferential resection margin (CRM) and postoperative complication rates.

Methods: This was a prospective, multicenter, parallel arm, superiority RCT registered as NCT01702116. Eligible patients with rectal cancer involving the anal sphincter were randomized to ELAPE with VRAM flap or non-ELAPE following long-term neoadjuvant chemoradiation. Randomization was carried out according to CONSORT guidelines. Primary endpoint was CRM in mm. The institution pathologists and the centralized pathology review were blinded to the patients' study arm. A sample size calculation showed that 14 subjects per arm would suffice to reject the null hypothesis. The secondary endpoint was 30-day postoperative complications. Participating surgeons were credentialed and retrained prior to enrolling patients.

Results: 34 patients underwent the allocated intervention. 17 ELAPE patients were comparable to 17 non-ELAPE patients for age, gender, BMI, ASA class and pre-existing comorbidities. CRM was significantly increased in ELAPE patients [5mm (IQR: 3.5-10.5) vs. 1mm (IQR 0.1-3.7), p=0.003]. CRM was ≤1mm in 1 ELAPE vs. 8 non-ELAPE patients (p=0.39). CRM was ≤2mm in 3 ELAPE vs. 8 non-ELAPE patients (p=0.15). There was no significant difference in postoperative complications in ELAPE and non-ELAPE patients (p=0.38). Rectal perforation occurred in 1 ELAPE patient (6%) and 2 non-ELAPE patients (12%). Two non-ELAPE patients died of myocardial infarction and respiratory failure (p=0.6).

Conclusions: ELAPE with VRAM flap was associated with statistically increased CRM with no difference in postoperative complication rates as compared to non-ELAPE for rectal cancer involving the anal sphincter.

P221

RESECTED IRRADIATED RECTAL CANCERS: ARE TWELVE LYMPH NODES REALLY NECESSARY IN THE ERA OF NEOADJUVANT THERAPY?

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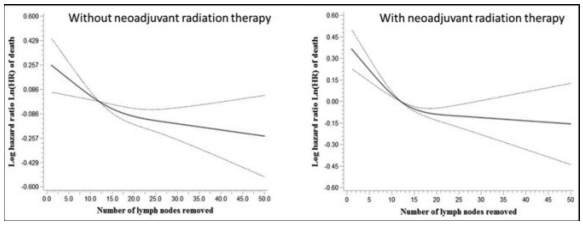
Purpose: Current guidelines dictate a minimum yield of 12 lymph nodes (LN) from surgical resection of rectal cancers to avoid under staging potentially node positive disease. Neoadjuvant radiation therapy (NRT) is associated with a lower LN yield as well as a lower number of metastatic LNs. Our aim was to identify the minimum number of LNs that is associated with improved survival in patients who underwent NRT for stage II-III rectal cancer.

Methods: Adults with clinical stage II and III rectal adenocarcinoma who underwent R0 low anterior resection (LAR) or abdominoperineal resection (APR) in the National Cancer Data Base (1998-2012) were grouped by receipt of NRT. Multivariable Cox regression modeling with restricted cubic splines was used to determine the minimum number of LNs associated with improved survival.

Results: 38,363 patients were included, of whom 29,149 (76%) received NRT. Use of NRT steadily increased over the study period from 51% in 1998 to 82% in 2012. Patients receiving NRT were likely to have fewer comorbidities (18% vs. 20%, p<0.0001), more pathologically node negative tumors (58% vs. 47%, p<0.0001), fewer LNs removed (median 12 vs. 14, p<0.0001),

and a lower LN yield ≥12 (55% vs. 66%, p<0.0001). Median follow-up was 45 months (range 1-188). After adjustment for patient and clinicopathologic characteristics, increasing LN yield was associated with improving survival up to 12 LNs regardless of receipt of NRT (Figure). With adjustment, a yield of ≥12 LNs vs. <12 LNs is associated with improved survival among patients receiving NRT (HR 0.79, p<0.0001) and among those not receiving NRT (HR 0.88, p=0.04). Among patients receiving NRT, factors independently associated with a yield of ≥12 LNs vs. <12 LNs were younger age, insurance status, low comorbidity score, a recent year of diagnosis, higher T stage (T2/T3 vs. T1), high-grade tumors, APR resection, treatment at an academic institution, and treatment in the Midwest and Northeast (vs. South).

Conclusions: In this large analysis, a minimum LN yield of 12 remains essential to confer a survival benefit for rectal cancer patients regardless of receiving neoadjuvant radiation therapy. Further investigations are required to standardize treatment regimens across regions and facility types to improve LN yield in this group of patients.



P222

NO SURVIVAL BENEFITS OF PREOPERATIVE RADIOTHERAPY FOR RECTAL CANCER WITH CURATIVE RESECTION IF INSUFFICIENT DOWNSTAGE EFFECT OF RADIOTHERAPY.

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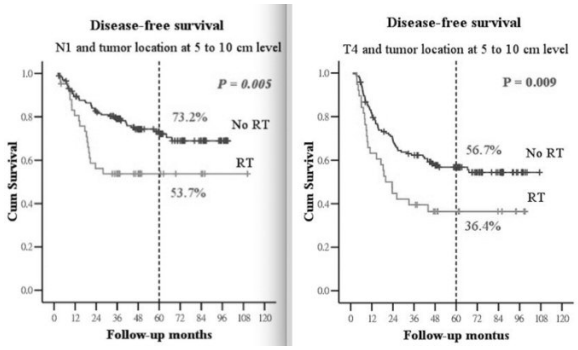
Purpose: Radiotherapy (RT) is an adjuvant therapy for rectal cancer, will be performed preoperatively or postoperatively. In this study, we retrospectively reviewed the survival benefits of radiotherapy based on postoperative pathologic stage of curative resection tumor, to evaluate the survival benefit related to the degree of radiotherapy downstage effect.

Methods: Since 2002 to 2007, totally 1130 cases of pathologic non-stage IV rectal cancer (tumor location ≤ 10 cm from anal verge) received radical curative resection of tumor were enrolled in this study. Among these patients, 271 cases had received radiotherapy including 232 cases of preoperative RT and 39 cases of postoperative RT. The other 859 cases did not receive RT. The disease-free survival of patients of each group will be evaluated by Kaplan-Meier method with Log rank test based on the pathologic stage of resection tumor.

Results: Based on same pathologic T and N classification, the 5-year disease-free survival rates of RT vs. no RT group were 92.7 vs. 89.5% of T0-2, 63.2 vs. 65.9% of T3 and 33.8 vs. 53.8% of T4 group, respectively; were 84.1 vs. 86.1% of N0, 47.5 vs. 67.2% of N1 and 37.2 vs. 32.2 of N2 group, respectively. Worse survival was significantly found in T4 and N1 classification of patients received RT than those of not (P < 0.01). In the patients with tumor location < 5 cm level from anal verge, the survival of T0-2 or N0 patients with RT is better than those of without RT but not achieved statistical significance (P=0.08 of T0-2 and P=0.07 of N0), the survival of T3, T4 or N1,N2 patients was not different between the two groups. In patients with tumor location between 5 to 10 cm level from anal verge, the survival of T4 or N1 patients with RT was significantly worse than those of not (RT vs. no RT, 36.4 vs. 56.7% of T4 and 53.7 vs. 73.2 of N1, both P < 0.01). The survival of other groups was no significant difference between the group of RT and no RT. As compared to preoperative RT group, the survival was significantly worse in patients with postoperative RT when tumor location at 5 to 10 cm level (P < 0.01).

Conclusions: The survival benefit of preoperative RT for rectal cancer is resulted from the downstage effect of RT. If the downstage is not enough, that means the presence of N positive or T4 tumor invasion after RT, there was no survival benefits by RT also maybe worsen the survival by incomplete response of RT. How to evaluate the RT response is the challenge for further evaluation.



Disease-free survival of pT4/N1 tumor location at 5~10 cm level

P223

PROGNOSTIC FACTORS AFFECTING OUTCOMES IN MULTIVISCERAL EN BLOC RESECTION FOR COLORECTAL CANCER.

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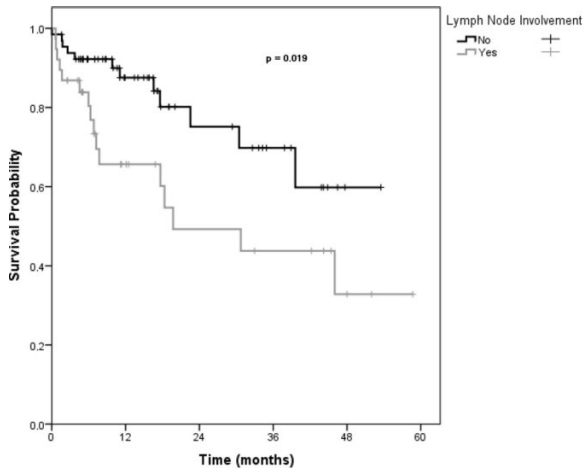
Purpose: To determine clinical and pathological factors associated with perioperative morbidity and mortality, and oncological outcomes after multivisceral en bloc resection (MVEBR) in patients with colorectal cancer (CRC).

Methods: Between January 2009 and February 2014, 105 patients with primary CRC selected for MVEBR were selected from a prospective database. Clinical and pathological factors, perioperative morbidity and mortality and outcome were verified from medical records. Estimated local recurrence, and overall survival were compared using the log rank method, and Cox regression analysis was used to determine the independence of the studied parameters.

Results: Median age was 60(23-86), 66.7% were female, 80% of tumors were located in rectum, 11.4% had stage IV disease, and 54.3% received neoadjuvant chemoradiotherapy. Organs most frequently resected were ovaries and annexes of them (37%). 30.5% of patients had an abdominoperineal resection. Invasion of other organs was confirmed histologically in 53.5%, and R0 resection was obtained in 72%. The overall morbidity rate was 37.1%. Ureter resection and intraoperative blood transfusion were independently associated with a higher rate of complications. The 30-day postoperative mortality rate was 1.9%. After 27(5-57) months of follow-up, mortality and local recurrence rates were 23% and 15%, respectively. Positive margins were associated with higher recurrence rate. On a univariate analysis, positive margins, lymph node involvement, stage III/IV, and stage IV alone, were associated with lower overall survival rates. On a multivariate analysis, the only factor associated with lower survival was lymph node involvement (Figure 1).

Conclusions: MVEBR for primary CRC can be performed with acceptable rates of morbidity and mortality, and may lead to good oncological outcomes.



P224

ROBOTIC TRANSANAL MINIMALLY INVASIVE SURGERY, A CASE SERIES.

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Purpose: Rectal lesions not amenable to endoscopic resection and those above the reach of conventional transanal excision can present a technical challenge to the surgeon. Various methods including transanal endoscopic microsurgery (TEM) and laparoscopic transanal minimally invasive surgery (TAMIS) platforms have been used to address these lesions. We present our experience with robotic TAMIS.

Methods: A retrospective review of patients undergoing robotic TAMIS between May 2012 and November 2015 was performed. One resection was done using the Da Vinci SI platform; the remainder were completed using the XI platform. The Applied Medical Gelpoint path was used for access. The robotic camera and two working robotic arms were used. One assistant port was used for suction. The full thickness defect was closed using a running 3-0 v-loc suture.

Results: 17 patients underwent robotic TAMIS during the study period. One of these patients had concomitant robotic right colon resection for benign disease. The majority of resections were for benign disease. However, two patients had excision for margin of rectal cancer arising in a resected polyp, and a third underwent palliative resection of a symptomatic rectal cancer. Surgical margins were negative, with the exception of a positive margin (tubulovillous adenoma) in the palliative resection. Median length of stay was 1 day (0-3). Median operative time was 81 min (30-357), and median console time was 50 min (20-300). Median distance from anal verge was 10 cm (6-18). Median size of pathologic specimen was 2.5 cm (1.2-5.5). Two cases had violation of the peritoneum, which was closed without sequelae. No other complications were observed. There have been no recurrences to date.

Conclusions: The robotic platform is a safe and viable option for transanal resection of rectal lesions.

Robotic TAMIS

Procedure	Operative Time, min	Console Time, min	Complications	Distance from anal verge, cm	Size of specimen, cm	Pre-operative pathology	Post-operative pathology	Margin	BMI	ASA
Robotic TAMIS	87	61	Violation of peritoneum	14	2.2	TV adenoma	TV adenoma	Negative	36.4	2
Robotic TAMIS	65	43	None	8	1.7	TV adenoma with dysplasia	Xanthoma, no residual polyp	Negative	22	2
Robotic TAMIS	100	65	None	11	4	TV adenoma	Adenocarcinoma Tis	Negative	25.5	3
Robotic TAMIS	65	45	None	7	2.3	Adenocarcinoma in a polyp	No residual cancer or adenoma	Negative	29.7	3
Robotic TAMIS	100	70	Violation of peritoneum	18	3.7	TV adenoma	TV adenoma	Negative	30	3
Robotic TAMIS	50	30	None	8	3.2	TV adenoma with dysplasia	TV adenoma	Negative	35.7	3
Robotic TAMIS	32	20	None	10	3	TV adenoma	Tubular adenoma	Negative	33	3
Robotic TAMIS	210	180	None	15	5.5	TV adenoma	Tubular adenoma	Negative	30	2
Robotic TAMIS	40	25	None	11	3.1	TV adenoma	Villous adenoma	Negative	32.8	2
Robotic TAMIS	30	20	None	8	2.2	Adenocarcinoma	Intramucosal adenocarcinoma	Positive for villous adenoma	22.4	4
Robotic TAMIS	120	77	None	6	1.2	TV adenoma	TV adenoma	Negative	31	2
Robotic TAMIS	58	40	None	10	1.5	Tubular adenoma	Tubular adenoma	Negative	33.8	2
Robotic TAMIS/ Right colectomy	289	240	None	10	1.8	Tubular adenoma	TV adenoma with HGD	Negative	38.1	2
Robotic TAMIS	81	50	None	8	1.8	Tubular adenoma	Tubular adenoma	Negative	20.9	2
Robotic TAMIS	159	110	None	8	3.5	TV adenoma with dysplasia	TV adenoma with HGD	Negative	41.3	3
Robotic TAMIS	357	300	None	10	4.6	Adenocarcinoma in a polyp	No residual cancer, one neg node	Negative	43.4	3
Robotic TAMIS	65	40	None	6	2.5	Villous adenoma	TV adenoma	Negative	31	3

P225

FACTORS WHICH PREDICT ADEQUACY OF TOTAL MESORECTAL EXCISION FOR RECTAL CANCER: A SINGLE INSTITUTION STUDY.

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Purpose: To determine factors that predict complete or near complete total mesorectal excision (TME) versus incomplete TME at our institution.

Methods: Over the course of 2.5 years, we collected data on patients undergoing resection of rectal cancer at our institution and entered it into a database. Following excision, pathologic evaluation determined adequacy of the TME labeling each specimen either complete, near complete, or incomplete based on the presence of an intact mesorectal envelope. Following data collection we performed multivariate analysis to determine which factors were predictive of a complete TME.

Results: From January of 2013 until August of 2015 we determined the sufficiency of resection for a total of 81 patients undergoing either low anterior resection (LAR) or abdominoperineal resection (APR) performed by 9 colorectal surgeons. Trained pathologist evaluated all specimens. Overall 43%, 74.1%, 30.9%, 25.9% patients had complete, complete/near complete, near complete, or incomplete TME, respectively. The median age of the patients was 59.3 years. The average BMI was 27.7 kg/m^2, while 42 patients were male. Fifty-two patients had an LAR with the remaining having an APR. Sixty-one patients underwent neoadjuvant chemoradiation. Factors found on multivariate analysis to predict complete TME included robotic resection versus open resection (OR = 3.78), robotic resection versus laparoscopic resection (OR = 6.09) and patients with T4 tumors were more likely to have a complete TME than patients with lower T staged tumors (OR = 17.44). Patients undergoing LAR were also more likely to have a complete TME than patients having an APR (OR = 3.3).

Conclusions: Total mesorectal excision involves careful sharp dissection of the rectal mesentery under direct visualization. Compared to the traditional blunt dissection, which violates the circumference of the mesorectum, this technique removes the rectum along with its fatty connective tissue, lymph nodes, and lymphatic vasculature intact thereby lowering the chance of recurrence and improving overall survival. TME can

serve as a proxy for oncologic outcome and has been used as a metric to determine quality of rectal resection at our institution. We aim to determine which factors predict a complete TME amongst the surgeons in our group. Our results show that BMI and gender were not predictive of complete mesorectal excision contrary to popular belief while robotic surgery is shown to be more effective than laparoscopic or open techniques with regard to completeness of TME. In open techniques, our data favors LAR versus APR. The reasons for these findings are discussed.

Risk Factors for Prediction of TME Outcome From a Multivariate Logistic Regression Model

	Complete / Near Complete	Complete / Near Complete	Complete	Complete
	OR (95% CI)	P-Value	OR (95% CI)	P-Value
Age	1.01 (0.97-1.06)	0.57	1.04 (0.99 - 1.09)	0.08
Sex - Female	1.17 (0.34 - 4.01)	0.79	0.71 (0.22 - 2.27)	0.57
Race - Ethnicity (Non-Hispanic White)	2.92 (0.77 - 11.0)	0.11	1.78 (0.44 - 7.13)	0.42
BMI	0.97 (0.89 - 1.06)	0.52	1.01 (0.93 - 1.10)	0.81
Surgery Abdominoperineal Resection vs. Low Anterior Resection	0.26 (0.07 - 0.90)	0.03	0.30 (0.09 - 1.03)	0.05
Surgery Laparoscopic vs. Open	0.43 (0.11 - 1.74)	0.24	0.63 (0.14 - 2.92)	0.55
Surgery Robotic vs. Open	3.15 (0.56 - 17.82)	0.19	3.78 (1.03 - 13.88)	0.04
Adenocarcinoma vs. Non-Adenocarcinoma	1.87 (0.41 - 8.55)	0.41	1.39 (0.32 - 6.03)	0.65
Stage T4 vs. Lower T stage	1.73 (0.26 - 11.37)	0.56	17.44 (2.29 - 132.29)	0.01
Pre op Chemo/Radiation vs. No Pre op Chemo/Radiation	0.89 (0.19 - 4.12)	0.88	0.73 (0.17 - 3.15)	0.67

P226

CHALLENGING THE MYTHS OF INTRODUCING ROBOTIC COLORECTAL SURGERY – CONCERNS AND EXPECTATIONS.

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Purpose: One of the commonest misconceptions when a new surgical technique is introduced is that it increases length of operation which creates resistance from theatre and anesthetic teams and a concern regarding prolonged in patient care. We aimed to study and compare the newly introduced robotic colorectal cancer surgery to established laparoscopic colorectal practice by experienced laparoscopic surgeons in an unselected group of patients and simultaneously compare operating times and postoperative stay.

Methods: We collected prospective data of all patients undergoing colorectal surgery both in laparoscopic and robotic surgery groups since its introduction in February 2015 till October 2015 using consecutive sampling technique. Data collected included patient demographics, comorbidities, ASA status, robotic docking times, anesthetic time, operating times and postoperative length of stay. Patients were subdivided into groups based on type of surgery, i.e., colonic resection, anterior resection, extralevator abdominoperineal resection (ELAPE) and ventral mesh rectopexy and had standard anesthetic approach and enhanced recovery protocol for postoperative management. Statistical analyses were performed on SPSS.

Results: During the period of study 39 patients underwent laparoscopic colorectal surgery and 35 patients had robotic assisted colorectal surgery. The demographic data in terms of age of patients and ASA score was comparable in both groups. There were no statistically significant differences between the numbers of patients in the individual subgroups. Anesthetic times were similar in both groups. The mean docking time in the robotic arm varied between 40 minutes in the first 5 patients and reduced to 14 minutes in the last 5 patients. Total mean operating time in the laparoscopic Vs robotic groups include (4.14 vs 4.18 in anterior resections, 4.52 vs.4.27 in ELAPE Resection, 3.5 vs 3 in colonic resection and 3.13 vs 2.23 in the rectopexy groups). Mean length of hospital stay was shorter in robotic arm with maximal benefit seen in the ELAPE and rectopexy resection subgroups.

Conclusions: Early results show that introducing robotic colorectal surgery has shown advantages in reducing operating time in pelvic surgery and postoperative stay in all robotic surgery subgroup patients.

P227

RISK FACTORS FOR COLORECTAL PERITONEAL CARCINOMATOSIS: A POPULATION-BASED STUDY.

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Purpose: Peritoneal carcinomatosis (PC) is the third most frequent site of colorectal cancer spread and a leading cause of morbidity and mortality. Identification of subjects at high risk of PC might enable proactive and more effective treatment. The aim of this study was therefore to analyze factors associated with synchronous and metachronous PC.

Methods: Baseline and histopathology data were retrieved from the Swedish Colorectal Cancer Registry for all patients with colorectal adenocarcinoma undergoing an abdominal resection between 2007 and 2015 (n=35120). Risk factors were analyzed with uni- and multivariate analyzes.

Results: The prevalence of synchronous PC was 2.5% and the 5-year cumulative incidence of metachronous PC was 2% among patients with stage I-III colorectal cancer. Female gender [Odds ratio (OR) 1.3 with 95% confidence interval (CI 1.1 – 1.5)], age below 50 [OR 1.7 (CI 1.3 – 2.4)], right-sided colonic cancer [OR 4.0 (CI 2.9 – 5.5)], T3 tumor stage [OR 2.2 (CI 1.1 – 4.4)], T4 tumor stage [OR 14.4 (CI 7.3 – 28.2)], N1 nodal stage [OR 2.5 (CI 2.0 – 3.3)], N2 nodal stage [OR 4.1 (CI 3.2 – 5.3)], mucinous tumor [OR 1.8 (CI 1.5 – 2.2)] and vascular invasion [OR 1.4 (CI 1.1 – 1.7)] were independently related to synchronous PC. The strongest predictors of metachronous PC were right sided colonic cancer [Hazard ratio (HR) 1.8 (CI 1.3 – 2.4)], T4 tumor stage [HR 9.2 (CI 4.8 – 17.3)], N2 nodal stage [HR 2.8 (CI 2.1 – 3.8)], mucinous tumor [HR 1.6 (CI 1.2 – 2.1)] and vascular invasion [HR 1.7 (CI 1.3 – 2.2)]. Tumor differentiation or perforation was not related to an increased risk of PC.

Conclusions: Right sided colonic cancer, mucinous tumor, T4 stage, nodal involvement, and vascular invasion markedly increased the risk of PC. Patients with these characteristics might benefit from upfront prophylactic hyperthermic intraperitoneal chemotherapy or planned second look surgery.

P228

LAPAROSCOPIC VS. OPEN SURGERY: IS THERE A DIFFERENCE IN TIME TO ADJUVANT CHEMOTHERAPY IN STAGE III COLON CANCER PATIENTS?

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Purpose: Even with the addition of adjuvant chemotherapy to surgical resection, the five-year survival for patients with stage III colon cancer is only 70.4%. The timing from surgery to adjuvant chemotherapy in stage III patients is shown to affect both overall and disease-free survival. Minimally invasive surgery for colon patients has been shown to decrease the overall time of post-operative recovery, with patients leaving the hospital and returning to regular activities in a shorter time period. This study examined the impact of operative approach on time to adjuvant chemotherapy (TTAC) at our institution.

Methods: IRB approved retrospective chart review was conducted using our tumor registr to identify pateints with stage III colon cancer that were treated at Robert Wood Johnson University Hospital from 2008-2014. Data related to surgery and medical oncology were collected to assess TTAC at our institution.

Results: 128 charts were reviewed, 58 patients did not receive adjuvant chemotherapy (patient's choice, lost to follow-up, >150 days from surgery). 70 patients were included in our final analysis. Mean time from surgery to adjuvant chemotherapy was found to be 49.6 days. There was a statistically significant difference between minimally invasive (laparoscopic or robotic, mean 42.6 days) and open surgery (mean 55.3 days) on TTAC (p=0.003). The post-operative complication rate was not found to be significantly different between the two groups (p=0.19), though post operative complications did delay chemotherapy overall.

Conclusions: This study investigated TTAC in stage III colon cancer at our institution and found a significant difference in time to adjuvant chemotherapy among patients who underwent minimally invasive sugery, when compared to open surgery. Post-operative complication was found to have a significant impact on TTAC, but did not differ when comparing surgical approaches. Minimally invasive surgery for stage III colon cancer decreases time to adjuvant chemotherapy.

P229

STAGING COLORECTAL CANCER: OUTCOMES FROM CHEST IMAGING.

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Purpose: Determining an accurate clinical stage of colon and rectal cancer (CRC) at the time of diagnosis is necessary to adequately direct therapeutic decisions. Current recommendations for clinical staging of colon and rectal cancer include performing a colonoscopy, blood work (CBC, chemistry profile, CEA) and a computed tomography (CT) scan of the chest, abdomen and pelvis. Although the use of chest CT has an increased sensitivity for detection of pulmonary metastasis compared to a chest x-ray (CXR), it also detects a number of lesions that ultimately turn out to not impact the care a patient receives. Indeterminate pulmonary nodules (IPN) are thought to be imaged in 15-25% of patients. IPN necessitate repeat imaging, possible invasive procedures, and follow-up to determine their significance.

Methods: We performed a retrospective review of patients at a single center who received surgical management for CRC to assess the impact that their chest imaging had on their management for CRC. The tumor, node, metastasis (TMN) stage of these patients was recorded together with any subsequent imaging or procedures that were performed.

Results: In our patient population, 123 (56.9%) patients underwent a chest CT and 47(21.8%) underwent a CXR to stage their CRC. Synchronous lung metastases were diagnosed in thirteen patients (6.0%) at the time of initial imaging and indeterminate pulmonary nodules (IPN) or suspicious lesions were detected in 26 patients (12.0%). Of the patients with IPNs, eleven patients underwent a total of twenty repeat chest CTs, one patient underwent a positron emission tomography (PET) scan, and one patient underwent CT guided biopsy. Two patients (15%) were subsequently shown to have metastatic lung disease and ten (38.4%) were downgraded to benign lesions. Nodal status did not appear to predict the outcome of an IPN. Further imaging studies in nine patients discovered the presence of pulmonary metastasis.

Conclusions: Our results illustrate that the utilization of a chest CT for staging CRC will result in over 10% of patients having indeterminate findings, of which most do not develop into anything of significance. Although chest CT has an increased sensitivity to discover pulmonary lesions when compared to a chest x-ray, it very rarely impacts patient management and commonly detects indeterminate findings that require follow-up investigations, placing additional stress on the health care system.

P230

PALLIATIVE MANAGEMENT OF LARGE BOWEL OBSTRUCTION FROM STAGE IV COLORECTAL CANCER: SURGERY OR STENT?

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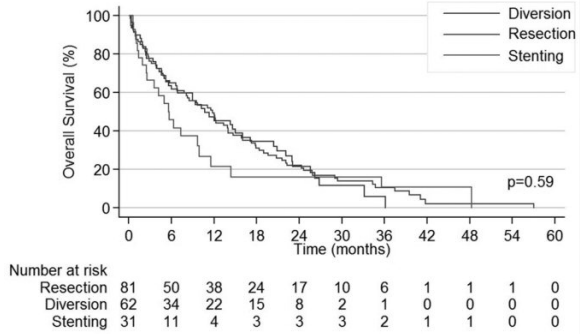
Purpose: Management of large bowel obstruction in the setting of incurable metastatic colorectal cancer (CRC) is challenging. Surgical and endoscopic interventions focus on palliation of symptoms while minimizing morbidity and improving quality of life. However, there is limited long-term data on their effectiveness, associated complication rates, and impact on survival. The purpose of this study was to assess the periprocedural and long-term outcomes associated with these interventions.

Methods: Patients with large bowel obstruction and incurable metastatic CRC who underwent palliative interventions between January 1995 and June 2015 at a single institution were identified. Treatment groups were defined based on intention to treat as follows, Resection: primary tumor removed with or without ostomy; Diversion: Ostomy creation or bypass for fecal diversion; and Stenting: endoscopically deployed metal stent. Clinicopathologic characteristics, 30-day periprocedural, and oncological outcomes were analyzed using t test, Chi-square, and Log-Rank survival tests.

Results: 174 patients were included. The mean age was 60.8 years and 45.4% were female. The primary tumor was in the right colon in 40 (23%), in the left colon in 70 (40.2%) and in the rectum in 64 (36.8%) patients. 81 (46.6%) patients underwent resection, 62 (35.6%) diversion and 31 (17.8%) stenting. Median survival was 7.5 (range 0.1-57) months. Age and gender were similar between the groups. There was no association between the elected intervention and overall survival (p=0.59, Figure). Across the entire cohort, 30-day minor and major complication rates were 8.6% and 12.6% respectively, with 11.5% readmission rate and 14.9% mortality rate. No statistically significant differences were observed in these short-term outcomes between the 3 groups. Median post-procedure length of stay was 2 days after stenting (10/31 were outpatient procedures), 6 days after diversion, and 8 days after resection (p<0.001). Ten (32%) patients in the stenting group required additional surgical or endoscopic intervention, either due to inability to deploy the stent or subsequent complications. Permanent ostomy was ultimately avoided in 64% (52/81) of patients in the resection group, 8% in the diversion group (5/62, all underwent enteric bypass), and 87% (27/31) in the stenting group. Initiation of chemotherapy was possible in 48% of patients, with similar rates among the groups.

Conclusions: The short-term and oncological outcomes of patients presenting with large bowel obstruction and unresectable, metastatic CRC are dismal and primarily determined by the underlying disease rather than the elected intervention. Stenting is associated with shorter length of stay, however surgery offers more durable results with less need for additional procedures. Treatment decisions should be based on available resources and estimated patient life-expectancy.



P231

MELD SCORE PREDICTION IS THE HEPATIC METASTASES IN COLORECTAL CANCER?

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Purpose: Colorectal cancer (CRC) is the most common hematogenous metastasis is the liver. In our study, preoperative calculated MELD (Model FR endstag Liver Disease) score, we investigated the role of the prediction of liver metastases.

Methods: Intraoperative liver metastases in patients who were operated with a diagnosis of CRC diagnosed patients (Group 1) and non-metastasis patients (group 2) were divided into 2 groups. The MELD score is calculated from the parameters were compared between groups looking to predict and assess the effect of the liver metastases. MELD score for each patient (3.78x log (Bilirubin mg / dL) + 11.2 * log (INR) + 9.57xlog (creatinine mg / dL) + 6.4) was calculated by the formula.

Results: 432 patients with a mean age of 62.6 ± 11.9 were male / female ratio was 1:48. 295's of patients (68.2%) tumor mass while seated rectosigmoid junction, in the 95's (21.9%) were located in the right column. The most common Grade 2 (25.3%) with stage 3B (21.8%) and Phase 3C (17.4%) tumors were detected in patients, according to the TNM staging system. In 58 patients (13.4%) had intraoperative liver metastases. age, gender and colon segment that homogeneous distribution and inclusion difference was observed ($p = 0.766$, $p = 0.247$ and $p = 0.685$) between the groups. 30-day postoperative mortality rate was higher ($p = 0.006$) in group 1. The MELD score between the groups studied were found to be significantly higher in Group 1 of the MELD score ($p = 0.007$). When the cut-off value of 7.5 basis for MELD scores sensitivity of the 65.2%, specificity when it was 55.0% and independent of age, sex, and concomitant disease of the MELD score, we reached the conclusion may predict liver metastasis ($p < 0.0001$)

Conclusions: In colorectal cancer patients, we concluded that the MELD score may be effective in the detection of liver metastases.

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RESULTS OF NATIONAL COLORECTAL CANCER SCREENING PROGRAM IN TURKEY (2012-2015).

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Purpose: To study the epidemiologic indicators of uptake and characteristic colonoscopic findings in the Turkey National Colorectal Cancer Screening Program

Methods: The Turkey National CRC Screening Program was established by the Ministry of Health and Social Welfare, and its implementation started in September, 2012. The coordinators were recruited in each county institute of public health with an obligation to provide fecal occult blood testing (FOBT) to the participants, followed by colonoscopy in all positive cases and 51-61 age colonoscopy. The test and short questionnaire were delivered to the home addresses of all citizens aged 50-70 years consecutively during a 2-year period. A descriptive analysis was performed.

Results: A total of 6.000.000 individuals (born between 1942-1962 were invited to screening by the end of September 2014. In total, 1.995.000 (33.1%) persons returned the envelope with a completed questionnaire, and 1.811.102 of them returned it with a correctly placed stool specimen on FOBT cards. Until now, 88 743 (4.9 %), FOBT-positive patients have been found, which is expected values in European Guidelines for Quality Assurance in CRC Screening and Diagnosis [European Union (EU) Guidelines]. Colonoscopy was performed in 37.272 cases (uptake 42%). Screening has identified CRC in 1.714 patients (4.6 % of colonoscopied, positive, and 0.09% of all screened individuals). This is also in the expected range according to EU Guidelines. Polyps were found and removed in 17.517 (47 % of colonoscopied) patients. The largest number of polyps were found in the left half of the colon: 64% (19%, 37% and 8% in the rectum, sigma, and descendens, respectively). The other 36% were detected in the proximal part (17% in the transverse colon and 19% in ceco-ascending colon). Small polyps in the rectum (5-10 mm in diameter), sigmoid and descending colon were histologically found to be tubular adenomas in 60% of cases, with a low degree of dysplasia, and 40% were classified as hyperplastic. Polyps of this size in the transverse or ceco-ascending colon in almost 20% had a histologically villous component, but still had a low degree of dysplasia. Polyps sized 10-20 mm in diameter were in 43% cases tubulovillous, and among them, 32% had areas with a high degree of dysplasia, especially those polyps in the ceco-ascending or transverse part. The characteristics of the Turkey CRC Screening National Program in the first 3 years were as follows: relatively low percentage of returned FOBT, higher number of FOBT-positive persons but still in the range for population-based programs, and higher number of pathologic findings (polyps and cancers).

Conclusions: These results suggest a need for intervention strategies that include organizational changes and educational activities to improve awareness of CRC screening usefulness and increase participation rates.

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THE DISTINCTIVE DIAGNOSTIC AND THERAPEUTIC ROLE OF TES IN THE MANAGEMENT OF RECTAL LESIONS.

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Purpose: The purpose of this study was to examine the role of transanal endoscopic surgery (TES) in the diagnosis and treatment of rectal pathology.

Methods: A single-institution's electronic medical record was queried to identify all TES cases from 2010-2015 using any of the recognized minimally invasive techniques. Indications and ability to change patient management as a result of TES were assessed.

Results: 90 cases were identified. In 4/90 (4%) cases, TES was immediately aborted due to inability to insufflate the rectum or visualize the lesion secondary to angulation. 41/90 (46%) patients were female, mean age was 62 (±13) years, mean BMI was 29.8 (±8.4) Kg/m^2 with 9 patients having a BMI greater than 40 Kg/m^2, and 51/90 (57%) patients had an ASA score of 3 or 4. The mean size of the lesion was 29 (±19) mm and 50/90 (56%) had its distal edge located more than 7 cm proximal to the anal verge. The mean operative time was 109 (range 26-523) minutes. Full thickness resection was carried out in 74/90 (82%) lesions and the defect was closed primarily in 65/90 (72%) cases. Out of 9 (10.4%) cases resulting in peritoneal violation, 7 underwent TES repair, one of which also required diverting loop ileostomy. The 2 remaining patients underwent laparoscopic repair and conversion to open repair, respectively. 34/90 (38%) cases were managed as outpatients. Of those that required admission, the mean length of stay was 3.2 (range 1-28) days. 10 patients (11%) had Clavien-Dindo class 3 or 4 complications (5 with bleeding requiring endoscopic intervention, one patient each having anal fistula requiring colostomy, rectovaginal fistula, extraperitoneal leakage from suture repair managed with TPN, intraperitoneal leakage from suture repair requiring secondary open Hartmann's procedure, and myocardial infarction). Indications for TES and change in management based on TES findings are summarized in the table. In 60/86 patients (70%), TES resulted in some change in patient management.

Conclusions: TES plays a distinctive role in the treatment, but also diagnosis of rectal lesions, particularly when endoscopic resection, traditional transanal resection, or major surgery, are not feasible.

Indications for TES and change in management

Indications for TES (n=90)	Final Pathology (n=86)	Patients (number)	Change in management (60/86, 70%)
Masses not amenable to endoscopic resection (n=45, 50%) 4 not completed by TES	Benign non-adenomatous lesion*	3	Clarification of diagnosis, surveillance plan
	Adenocarcinoma	6	Clarification of diagnosis and T staging, management and/or surveillance plans Radical resection (n=3) Surveillance only (n=3)
	Adenoma, negative margins	28	Clarification of diagnosis, surveillance plan
	Adenoma, positive margins	4	No change
Unclear/insufficient margins following endoscopic excision (n=14, 16%)	Mucosal neuroma	1	Treatment completion, surveillance plan
	Neuroendocrine tumor < 1 cm, negative margins	7	Treatment completion, surveillance plan
	Adenoma, negative margins	5	Treatment completion, surveillance plan
	Neuroendocrine tumor < 1 cm, positive margins	1	No change
Recurrence after ≥ 1 endoscopic polypectomy (n=13, 14%)	Adenoma, negative margins	9	Treatment completion, surveillance plan
	Adenoma, positive margins	4	No change
Biopsy-proven adenocarcinoma (n=18, 20%)	Adenocarcinoma	17	Excision for treatment, no change
	Adenocarcinoma	1	Clarification of T staging, radical resection

*Endometriosis, mucosal prolapse, foreign body giant cell reaction

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MORBIDITY ASSOCIATED WITH DIVERTING LOOP ILEOSTOMIES: THE CLAIRVOYANT SURGEON?

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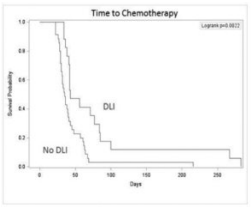
Purpose: Anterior resection (AR) is the procedure of choice for patients with sigmoid/high rectal cancer with sphincter function. Infrequently, due to perceived case complexity and subtle intraoperative findings, surgeons may perform a diverting loop ileostomy (DLI) in an attempt to prevent an anastomotic leak. But an ostomy is not without complication. We hypothesize that having a DLI would not decrease the incidence of postoperative complications and may delay adjuvant chemotherapy.

Methods: We performed a retrospective analysis of all patients undergoing AR for sigmoid/high rectal cancer receiving postoperative chemotherapy from 2012-2015 at a tertiary care hospital. Cases were grouped according to whether or not they received a DLI. Demographic, peri-operative, complication, and chemotherapy related data was gathered.

Results: 57 patients (mean age 54.1yo, 57.1% male) were identified. 21 patients (36.8%) received a DLI. DLI vs. non DLI groups were similar in age, gender, BMI, percentage of patients with Charlson Comorbidity Index >3, ASA classification, tumor stage and rates of laparoscopic surgery. DLI group nevertheless had higher rates of pre-op neoadjuvant therapy (81% vs. 22%, p<.0001), higher EBL (431.7ml vs. 192.1, p=.03) and a longer operation (3.7hrs vs. 2.3 hours, p=.0007). Post operatively, DLI was associated with double the length of stay (6.66 days vs. 3.06 days, p = .0003), higher composite complications including AKI, superficial wound infection, dehydration and ileus (57% vs. 14%, p=.0003), and higher 60-day re-admission or ED visits (43% vs. 8%, p=.002). Anastomotic leak and pelvic abscess rates were elevated despite diversion (19% vs. 0%, p=.006). Ultimately, despite DLI, these patients took nearly twice as long to start adjuvant chemotherapy (80.9 days vs. 44.1, p = .02; FIGURE).

Conclusions: This study highlights the surgeon's ability to predict postoperative complications and the inadequacy of DLI alone to fully prevent their development in complex cases. The presence of DLI as marker of surgical complexity is associated with almost double the time to begin adjuvant chemotherapy, an increased length of stay, complications, and 60-day readmission. Based on this evidence, we propose that surgeons consider the increased morbidity associated with an unplanned ostomy and institute a more proactive approach towards identification and prevention of subsequent complications, including consideration of a longer period of perioperative antibiotics coverage, consideration of home TPN for treatment of malnutrition and dehydration, discharge with better monitoring and early assessment to identify and intervene on pelvic sepsis.



Complication	DLI Group (n, %) n=21	Non DLI Group (n, %) n=36
Post-op bleed	1, 4.7%	1, 2.8%
Post-op hematoma	0, 0%	1, 2.8%
Post-op pressor requirement	2, 9.5%	0, 0%
New Afib	1, 4.7%	0, 0%
New Oxygen Requirement	1, 4.7%	0, 0%
PNA	0, 0%	1, 2.8%
Superficial wound infection	2, 9.5%	0, 0%
Ileus	5, 23.8%	0, 0%
SBO	1, 4.7%	1, 2.8%
Dehydration	2, 9.5%	0, 0%
AKI	1, 4.7%	1, 2.8%
Urinary retention	2, 9.5%	1, 2.8%
UTI	1, 4.7%	1, 2.8%
Pelvic abscess/anastomotic leak	4, 19.0%	0, 0%
PE	1, 4.7%	0, 0%
Rectal stenosis/anal fissure/incontinence/anal pain	3, 14.3%	2, 5.6%
Stoma prolapse	1, 4.7%	n/a
Stoma mucosal necrosis	1, 4.7%	n/a
High Ostomy Output	1, 4.7%	n/a
Priapism	0, 0%	1, 2.8%

P235

HOSPITAL COST OF LAPAROSCOPIC LOW ANTERIOR RESECTION VS TRANSANAL ENDOSCOPIC MICROSURGERY FOR RECTAL LESIONS.

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Purpose: Despite the increasing application of transanal endoscopic microsurgery (TEM) for rectal lesions elsewhere in the world, this technology is only available at a limited number of centers in Canada. The cost of the TEM equipment may play a role in a hospital's hesitancy to invest in the TEM system. This study assessed the costs of TEM in comparison to low anterior resection (LAR) in a case-matched analysis of benign and selected malignant rectal lesions from the view point of the hospital.

Methods: Patients who underwent laparoscopic or laparoscopic hand-assisted LAR (n=24) for either a benign polyp or a stage 1 rectal cancer at the Victoria General Hospital in Winnipeg, Manitoba between 2006 and 2014 were designated as index cases. They were case-matched based on sex, age, comorbidities, tumour size and tumour location to patients who underwent TEM (n=24). The initial procedure-related costs and any additional hospital costs associated with readmissions for complications, salvage surgery, reversal of ileostomies, or surgery for recurrences in the first 3 years after the initial procedure were included into the cost calculation.

Results: The LAR group was composed of 3 (13%) benign and 21 (87%) malignant lesions, while the TEM group was composed of 18 (75%) benign and 6 (25%) malignant lesions. The total number of hospital admissions was 42 in the LAR group (283 days total in hospital, mean 1.75 hospital admissions per patient, mean 11.8 days in hospital per patient); and 25 hospital admissions in the TEM group (31 days total in hospital, mean 1.04 hospital admissions per patient, mean 1.3 days in hospital per patient). There were a total of 43 operations in the LAR group and 25 in the TEM group. Nine patients (38%) suffered minor complications and 4 patients (17%) suffered major complications in the LAR group, while only 1 patient (4%) suffered a major complication in the TEM group. Additional operations in the LAR group included 2 washout and diverting ileostomies (8%), 2 lysis of adhesions (8%), 4 ventral hernia repairs (16%) and 11 reversal ileostomies (46%). In the TEM group there was 1 additional operation for recurrence (4%). The average cost of LAR was $15,750 (95% CI $11,381 - $20,118) Canadian dollars (CAD) including all related hospital costs in the subsequent 3 years. The average cost of TEM in comparison was $2396 (95% CI $2,104 - $2,687) CAD, with a savings of $13,354 CAD per patient.

Conclusions: TEM for benign and selected malignant lesions was associated with significantly lower hospital costs than LAR, which far outweigh the costs of acquiring and maintaining the technology. This study is unique because it includes not only the costs of the initial procedure, but also takes into account re-admissions and additional late procedures, which may provide a more complete look at the actual costs associated with these surgical approaches.

P236

ENHANCED RECOVERY AFTER SURGERY VERSUS CONVENTIONAL PERIOPERATIVE CARE IN COLONIC AND RECTAL LAPAROSCOPIC SURGERY FOR CANCER.

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Purpose: Enhanced recovery after surgery (ERAS) protocols have been widely adopted in the management of colorectal cancer patients, in order to improve patient's postoperative course, and to decrease the complication rate. The aim of this study was to compare outcomes of conventional perioperative care with those of an ERAS pathway including both colonic and rectal laparoscopic surgery performed for cancer.

Methods: Data were collected from 96 consecutive cases of laparoscopic colorectal cancer resections between 2007 and 2015. Surgery was performed according to ERAS protocol since 2010. A retrospective analysis was conducted, including length of postoperative hospital stay, readmission, complication and mortality rate.

Results: Conventional perioperative care was offered to 24 patients and the remaining 72 patients were managed within the ERAS pathway. Mean (95% CI) post-operative hospital stay was 9.8 (7.45 to 12.21) days in the conventional group and 6.8 (5.95 to 7.61) days in the ERAS one (p=0.018). Readmission and complication rates were not significantly different between the two groups. There was one death and one readmission in the ERAS group within 30 days. Patients undergoing to laparoscopic rectal surgery showed a significant reduction of postoperative complications in the ERAS group (5 out of 15 in the conventional perioperative care group versus 2 out of 43 in the ERAS one, p=0.013), together with a significant reduction of mean hospital stay (11.8 days in the conventional perioperative care group versus 7.8 days in the ERAS one, p=0.019).

Conclusions: Patients submitted to elective laparoscopic surgery for cancer and managed within the ERAS pathway had shorter hospital stays without increased morbidity or mortality. In patients submitted to laparoscopic rectal surgery postoperative morbidity was significantly reduced when ERAS protocol was applied.

P237

MISSING THE BOAT: UNDERESTIMATING THE INCIDENCE OF ATZ NEOPLASIA AFTER IPAA IN PATIENTS WITH FAMILIAL ADENOMATOUS POLYPOSIS.

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Purpose: The anal transition zone (ATZ) is a "hot spot" for neoplasia in patients undergoing ileal pouch anal anastomosis (IPAA) for FAP. Surveillance of the ATZ and treatment of the neoplasia is important in preventing cancer. However, the ATZ is notoriously difficult to survey because of the presence of the pouch-anal anastomosis, perianal pain due to excoriation, and the tendency to stricture, especially handsewn anastomoses. Furthermore the appearance of adenomas in this area can be subtle. We have therefore designed a study to assess the relative incidence of ATZ neoplasia performed by different physicians.

Methods: All patients with FAP who had undergone restorative proctocolectomy were identified through the Jagelman Polyposis registry and Cologene database and approved by the institutional review board. Patients with endoscopic evaluation of the ileal pouch and anal transition zone (ATZ) were included. The protocol calls for yearly surveillance of the ATZ by flexible endoscopy. This is done either in the clinic or in the endoscopy suite with sedation, as part of pouchoscopy. All ATZ lesions may not be biopsied or removed. We compared the results of ATZ surveillance by one experienced endoscopist with those of other colorectal surgeons and gastroenterologists in the same institution. Patients were stratified according to time from pouch creation of <10 years, 10-20 years, or >20 years, and methods of treatment were noted.

Results: Two hundred ninety-four patients underwent endoscopic surveillance of the ATZ and are presented in the table according to categories of time since IPAA creation. In the table, the results of the single experienced endoscopist are compared to all the others. There is a clear difference in incidence between groups. The incidence of neoplasia decreases with time for the single endoscopist, possibly reflecting the results of treatment. Treatment of the ATZ by the single endoscopist included snare in the office (33), snare in the operating room (7), ATZ strip (5) and IPAA redo (2). The rate of cancers is less reflective of surveillance as most of these patients were symptomatic.

Conclusions: The incidence of ATZ polyp formation is constant over time but is higher in patients with a stapled IPAA. It also varies considerably with the experience of the endoscopist. Surveillance of the ATZ must be meticulous.

Incidence of ATZ neoplasia based on time from IPAA formation between endoscopists

Years since IPAA	ATZ neoplasia		Handsewn		Stapled		Cancer	
	All	Single	All	Single	All	Single	All	Single
<10	17/52 33%	11/17* 65%	1/8	1/3	6/40	10/14	0	0
10-20	49/135 36%	21/36** 58%	3/48	4/11	12/55	17/25	9	5
>20	38/107 36%	21/44*** 48%	3/48	5/18	4/90	16/26	4	2
Total	104/294 35%	53/97**** 55%	9/86	10/32	22/185	43/65	13	7

Chi Square *p = 0.0253, **0.0169, *** 0.1622, **** 0.0008

IPAA = ileal pouch anal anastomosis; ATZ = anal transition zone

P239

OUTCOMES OF NONSURGICAL TREATMENT IN PATIENTS WITH CLINICAL COMPLETE RESPONSE AFTER NEOADJUVANT THERAPY FOR RECTAL CANCER.

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Purpose: Total mesorectal excision remains the gold standard treatment after neoadjuvant chemoradiation (CRT) for patients with rectal cancer who have achieved a clinical complete response (cCR). However, there is increasing interest in protocols considering organ sparing strategies in this setting. The purpose of this study was to analyze the long term outcomes of patients with a cCR after neoadjuvant CRT for rectal cancer who did not undergo immediate surgery because of patient refusal or high surgical risk.

Methods: Retrospective review of patients with rectal cancer treated with neoadjuvant CRT between 2007-2011 that after restage were found to have a cCR and were submitted to a non-operative treatment because of patient refusal or high surgical risk.

Results: There were 15 patients with a cCR after neoadjuvant CRT that were not operated immediately. Reason for deferral of surgery were comorbidities associated with an increased surgical risk (3 patients) and patient refusal (12 patients). There were 9 (60%) men and 6 (40%) women. The mean age of the patients was 66 years (52 to 83). Pre-treatment stage of the patients were: stage I (1 patient), stage II (3 patients), stage III (8 patients). Three patients were considered stage X because they were staged and received chemoradiation in other institutions and were referred for follow up at our institution. Mean follow-up period was 4.5 years. Three (20%) patients developed local recurrences. Two of these patients were pre-treatment stage III, one patient was stage X. Time to recurrence was 7 months, 31 months and 33 months after completion of CRT. All 3 patients underwent radical resection of the local recurrence (2 rectosigmoidectomies, 1 abdominoperineal resection). Two of these patients are alive without evidence of disease. The other patient died 5 months after the rectosigmoidectomy due to clinical complications of chronic obstructive pulmonary disease (a morbid obese patient with many comorbidities that was not

immediately operated due to the high operative risk). There was one distant recurrence (lung) that was diagnosed 17 months after completion of chemoradiation. Thus, twelve (80%) of the 15 patients that presented with a cCR after chemoradiation did not undergo surgical resection.

Conclusions: In this series of patients that achieved a cCR after CRT for rectal cancer and were not immediately operated because of patient refusal or high surgical risk, 80% had a long term local control of the primary tumor after a mean follow up of 4.5 years. A non-operative treatment may be applicable to a subset of patients that achieved a cCR. Randomized clinical trials are needed in this setting, and we have established a randomized trial entitled "Observation Versus Surgical Resection in Patients With Rectal Cancer Who Achieved Complete Clinical Response After Neoadjuvant Chemoradiotherapy" (www.clinicaltrials.gov:NCT02052921).

P241

EVALUATION OF INTESTINAL PERFUSION USING ICG FLUORESCENCE IMAGING IN LAPAROSCOPIC COLORECTAL SURGERY WITH DST ANASTOMOSIS.

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Purpose: Decreased blood perfusion at an intestinal anastomosis is an important risk factor for postoperative anastomotic leakage (AL). Fluorescence imaging with indocyanine green (ICG) provides a real-time assessment of intestinal perfusion. This study aimed to evaluate the impact of ICG fluorescence imaging for determining the transection line of the proximal colon during laparoscopic colorectal surgery with double stapling technique (DST) anastomosis.

Methods: This was a prospective single-institution study of 68 patients with left-sided colorectal cancers who underwent laparoscopic colorectal surgery between August 2013 and December 2014. After distal transection of the bowel, the mesentery was extracorporeally divided to the planned transection line determined by the surgeons' judgement under normal white light. After ICG was injected intravenously, intestinal perfusion of the proximal colon was assesed in fluorescent imaging mode. Intestinal perfusion was examined in relation to patient-, tumor- and surgery-related variables by univariate and multivariate analyses.

Results: ICG fluorescence imaging showed that intestinal perfusion was present at 3 mm (median) distal to the initially planned transection line. ICG fluorescence imaging resulted in a proximal change of the transection line of more than 5 mm in 18 patients (26.5%), and, particularly, of more than 50 mm in three patients (4.4%), compared with the initially planned transection line. On univariate analysis, diabetes mellitus, anticoagulation therapy, preoperative chemotherapy and operative time were significantly associated with poor intestinal perfusion. Multivariate analysis identified anticoagulation therapy (OR, 9.42; 95% CI, 1.35-65.79; $P = 0.021$) and preoperative chemotherapy (OR, 8.41; 95% CI, 1.37-51.76; $P = 0.019$) as independent risk factors for poor intestinal perfusion. Three patients (4.5%) with a change of transection line developed in AL.

Conclusions: ICG fluorescence imaging is useful for determining the transection line in laparoscopic colerectal surgery with DST anastomosis. Important risk factors for poor intestinal perfusion were anticoagulation therapy and preoperative chemotherapy.

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CLINICOPATHOLOGIC CHARACTERISTICS AND LONG-TERM PROGNOSIS OF YOUNG-AGED PATIENTS WITH SPORADIC COLORECTAL CANCER.

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Purpose: The purpose of this study was to investigate the clinicopathologic characteristics and long-term prognosis of young patients under 50 years of age who had sporadic colorectal cancer in comparison with patients above 50 years.

Methods: A total of 8,847 patients who underwent curative intended surgery for sporadic colorectal cancer at Samsung Medical Center between 1994 and 2010 were included. Patients were classified into a young-aged group (under 50 years of age) and old-aged group (50 years or more) according to their age at the time of diagnosis. Clinicopathologic parameters, pattern of recurrence, cancer-specific survival (CSS), disease-free survival (DFS), local recurrence-free survival (LRFS), distant recurrence-free survival (DRFS) and predictors of cancer-related death were analyzed

Results: Among 8,847 patients, 1,878 (21.2%) young-aged patients and 6,969 old-aged patients were identified. Young-aged patients had higher incidence of rectal cancer ($p = 0.003$), larger tumor ($p = 0.009$), and stage III-IV cancer ($p = 0.001$.) In addition, young aged group showed more frequent microsatellite instability-high (MSI-H) tumor ($p = 0.001$), lymphatic invasion (LI) ($p = 0.008$), perineural invasion (PNI) ($p = 0.001$), higher number of harvested lymph nodes ($p = 0.001$) and aggressive cell-type such as poorly-differentiated adenocarcinoma, signet ring cell carcinoma and mucinous carcinoma ($p = 0.001$). With the median follow-up duration of 75.3 months in young-aged group and 64.9 months of old-aged group, younger patients showed worse 5- and 10-year DFS (75.4 % vs 78.2 %, and 72.6 % vs 74.9 %, p = 0.01), LRFS (92.9 % vs 94.4 %, and 90.9 % vs 93.2 %, p = 0.004), and DRFS (78.1 % vs 80.2 %, and 75.4 % vs 77.0 %, p = 0.057) than older patients. However, younger patients showed better 5- and 10-year CSS (86.3 % vs 85.0 %, and 82.3 % vs 78.4 %, p = 0.01) than older patients. When we look at the stage-specific CSS, younger patients only with stage II and III tumor showed better prognosis. Cox proportional hazard model revealed that young-aged group, preoperative serum CEA, location of tumor, LI, PNI, aggressive cell-type and TNM stage were the significant predictive factors for CSS.

Conclusions: Younger patients with sporadic colorectal cancer had many poor clinicopathologic characteristics except higher number of harvested lymph nodes and MSI-H tumor. Even though they showed worse DFS, LRFS and DRFS, their CSS were better than that of older patients.

P244

THE ASSOCIATION BETWEEN BMI AND TUMOR CHARACTERISTICS, CHOICE OF TREATMENT AND POSTOPERATIVE COMPLICATIONS IN DUTCH PATIENTS WITH COLORECTAL CANCER: RESULTS OF A RETROSPECTIVE COHORT STUDY.

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Purpose: The purpose of this study was to examine the effect of body mass index (BMI) on postoperative outcome in colorectal cancer (CRC) patients who underwent surgery. Identification of specific complications after colorectal resection in the obese or underweight population could facilitate the improvement of quality of surgical health care. Surgical resection is the only curative treatment for patients with CRC. Previously published studies suggest obesity and underweight as a risk factor for perioperative mortality and morbidity after various types of surgery. However, little more is known about the effect of BMI on perioperative outcome and long term survival in patients undergoing CRC surgery.

Methods: The South West Netherlands Comprehensive Cancer Organization database was queried from 2008 to 2013 for patients diagnosed with colorectal cancer stage I to IV. Exclusion criteria included unknown BMI and carcinoid tumors. Patients were categorized into four groups according to BMI as follows: underweight (UN) (BMI<18.5), normal (NW) (18.5≥BMI<25), overweight (OW) (25≥BMI<30), and obese (OB) (BMI>30). Demographics, tumor characteristics, treatment and postoperative data were compared between the four groups. Statistical methods included ANOVA, Kaplan-Meier and Cox proportional hazards multivariate analyses and were calculated using SPSS.

Results: A total of 10.621 patients were treated for CRC of which 7371 patients were included in this study (UN: 1,7%; NW: 41,4%; OW: 40,1%; OB: 16,7%). The groups varied in baseline characteristics such as hypertension and diabetes mellitus. Stage IV CRC was significantly more common diagnosed in NW patients compared to OW and OB (UN: 22,4%; NW: 26,0%; OW: 21,3%; OB: 23,0%, p<0,001). The UN group had higher postoperative complications rates (UN: 11,2%; NW: 8,7%; OW: 9,2%; OB: 9,2%, p<0,001), and higher mortality rates (UN: 6,7%; NW: 2,7%; OW: 2,8%; OB: 2,3%, p=0,005). Multivariate regression analyses showed significant differences in overall survival after adjusting for several factors including age, comorbidity, localization and complications. Stage I-III and IV patients were separately analyzed and UN patients were associated with lower survival rates in both groups. UN has a hazard ratio (HR) of 1,851 (p<0,001) compared to NW for all stages. OW has a HR of 0.860 compared to NW in all stages (P<0,001).

Conclusions: Underweight CRC patients have a significant higher percentage of postoperative complications and mortality compared to other weight patients. CRC patients with underweight also have a worse long-term survival, where OW patients have an improved survival compared to NW. Further research is required to determine the effect of contributing factors such as body fat and whether interventions on weight could improve survival rates in CRC surgery.

P245

LYMPH NODE COUNT AS A QUALITY METRIC IN RECTAL CANCER SURGERY AFTER NEOADJUVANT RADIATION.

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Purpose: Neoadjuvant radiation for locally advanced rectal cancer decreases lymph node (LN) yield. We have previously demonstrated that LN yield is independently associated with a worse overall survival and a cut-point of 9 LNs is optimal. Here we evaluate the utility of LN count as a quality metric.

Methods: This is a study of a contemporary cohort from California Cancer Registry database (2004-2011) that was merged with Office of Statewide Health Planning and Development inpatient database. Patients with locally advanced rectal adenocarcinoma who underwent neoadjuvant therapy and had pathologically negative LNs in resected specimens were included. Primary outcome was overall survival. Hospital Quality Score (HQS) was defined as the proportion of patients at a particular hospital that had adequate LN exam (at least 9 LNs). A multivariate Cox proportional hazards (standard and shared frailty) model was used to adjust for covariates.

Results: In 204 hospitals, a total of 1386 patients met the inclusion criteria. Of these 62% were males, 59.1% were white, and 51.8% were >60 years of age. Majority had T3(61.4%) and moderately differentiated (72.7%) tumors. Majority (97%) received adjuvant chemotherapy. Median LNs retrieved were 9 (IQR: 5-14). Median follow-up was 4.25 years (IQR: 2.75-6.08). A Cox shared frailty model failed to show an effect of hospital-level clustering. A multivariate cox proportional hazards model adjusted for age, hospital volume, race, sex, insurance, comorbidity, T-stage, response to neoadjuvant therapy, adjuvant chemotherapy, teaching-hospital status, demonstrated that patients undergoing surgery at a high HQS (>25%) hospital had a 35% lower risk of mortality compared to a low HQS(≤25%) hospital (HR 0.65; 95%CI 0.50-0.86; p=0.003).

Conclusions: This study establishes that evaluating at least 9 LNs is a quality metric for rectal cancer surgery after neoadjuvant radiation. Patients treated at hospitals that have a low compliance (≤25%) with this metric have a worse survival after adjusting for patient and disease characteristics (Figure)

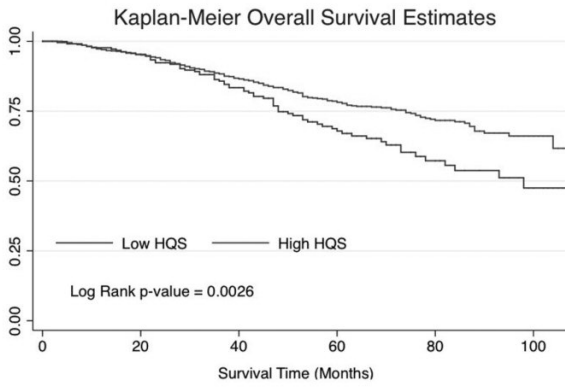

Figure. Patients treated at hospitals with low compliance to "at least 9 LNs" metric (HQS low) *vs.* those treated at high compliance (HQS high)

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INTERVAL COLORECTAL CANCERS: SOMETIMES PREVENTABLE, NOT NECESSARILY METHYLATED.

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Purpose: Interval colorectal cancers (ICRCs) are variably defined as those diagnosed within 3 to 5 years of a negative colonoscopy. They may be related to missed or incompletely treated precursor lesions at the original colonoscopy or aggressive tumor biology, as has been suggested for methylated CRCs . This study was designed to determine the relative contributions of missed/incompletely treated lesions versus biologically aggressive cancers in a population of ICRCs.

Methods: We performed chart review of 598 patients with colorectal cancer whose cancers had been genetically characterized. Their data were stored in an institutional tissue-bank. We identified patients who had a colonoscopy within 5 years of cancer diagnosis (ICRCs) and compared them to patients who had cancer diagnosed either during their first colonoscopy or >5 years after their last exam (non-interval cancers, nICRCs). Patients with hereditary colorectal cancer syndromes or inflammatory bowel disease were excluded. Primary endpoints were hypermethylation (CIMP) status, microsatellite instability (MSI), *BRAF* and *KRAS* mutation, and previous colonoscopic findings in patients with ICRC.

Results: 147 patients had data regarding a previous colonoscopy, or its definitive absence. There were 56 interval cancers and 91 non-interval. CIMP was available for 108, MSI for 99, *BRAF* for 124, and *KRAS* for 123. There were no differences in age at diagnosis, gender, tumor size, tumor differentiation and angiolymphatic invasion between ICRCs and nICRCs. 21.4% of ICRCs were CIMP+ (vs. 13.6% of nICRCs, p=0.3027 Fisher's Exact test[FET]), 25.6% were MSI-H (vs. 13.3% of nICRCs, p=0.1814, FET), 12.5% had a *BRAF* mutation (vs. 10.5% of nICRCs, p=0.3299, FET) and 27.6% had a *KRAS* mutation (vs. 36.8% of nICRCs, p=0.8594, Chi Square). While most CIMP+ tumors were proximal (83% vs. 46% of CIMP-, p<0.001, Chi Square), interval cancers were not associated with proximal location (ICRCs 57.1% vs. 48.3% nICRCs, p=0.3003, Chi Square). When interval cancers were defined as 3 years from a colonoscopy, we found a higher proportion of CIMP+ (ICRC 25.9% vs. 13.5% nICRCs, p=0.14,FET). Complete data on the baseline colonoscopy were available for 35 of the 56 ICRCs. Fifteen patients had no adenomas detected in the index colonoscopy, but 4 of them had inadequate prep. Twenty patients had baseline adenomas, including 12 fulfilling high-risk criteria. Out of these 12, 9 developed an interval cancer in the same location as a previous high-risk lesion, 2 had polyps reportedly not resected during index exam (and were diagnosed with cancer after 13 and 15 months), and one had poor prep in the index exam (see table).

Conclusions: Interval cancers are due to precursor lesions that are either missed or are biologically aggressive. Colonoscopists can control the former but not the latter. Our data suggest but do not prove a predilection for the methylation pathway in interval cancers.

	Index colonoscopies with technical issues†	Complete index colonoscopy/No high-risk lesion	p value
n	16	19	
Age (years)	73.6 (53-90)	71 (57-88)	NS
Time from last scope to cancer (months)	28 (2-60)	29 (1-50)	NS
CIMP+	36.7%	13.3%	0.35*
MSI-H	27.3%	16.7%	0.64*
Proximal tumor	75%	52.6%	0.17**

Continuous variables expressed in means and range.

Categorical data expressed in percentages.

* Chi square test. ** Fisher's Exact Test.

† Includes 9 patients with previous high-risk lesion in the same segment where cancer was diagnosed, 2 patients with previous polyps not removed, 3 index exams with poor prep and 2 with fair prep.

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DIFFERENTIAL MIR EXPRESSION PROFILE PREDICTIVE OF COLORECTAL CANCER METASTASIS IN NODE POSITIVE EARLY-ONSET COLORECTAL CANCER.

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Purpose: Colorectal cancer (CRC) remains a major cause of morbidity and mortality in the general population. The rate of early-onset colorectal cancer (EOCRC), CRC in patients less than 50 years old, has been on the rise worldwide. High-risk gene expression profiles hold the promise of being predictive of cancer progression. Node positive disease continues to be the known forbearer of metastatic CRC. We aim to determine if a known expression profile predictive of CRC metastasis is conserved across patients with node positive EOCRC.

Methods: We used The Cancer Genome Atlas (TCGA) to identify colorectal patients with node positive EOCRC. We analyzed the gene expression data of this subset and compared it to a known, miR expression profile that predicts CRC metastasis.

Results: We identified six patients with node positive EOCRC. Seven hundred and six possible total miRs where sorted in EOCRC patients from the CTGA database. Of those six miRs differentially expressed in metastatic CRC were identified within the CTGA EOCRC patient population. There was no cross over between the known miR expression profile and the chosen patient population.

Conclusions: The incidence of EOCRC continues to increase worldwide. Predictors of outcome in this patient population will allow for the tailoring of both treatment and surveillance in this small but growing subset of patients. Continued efforts to identifying these expression profiles holds promise for treating these patients.

P249

NEOADJUVANT RADIATION THERAPY IMPROVES SURVIVAL IN LOCALLY ADVANCED COLON CANCER.

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Purpose: Neoadjuvant radiation therapy (NRT) is an infrequently used modality in the management of locally advanced colon cancer. While retrospective studies evaluating adjuvant radiation therapy in colon cancer have shown some improvement in disease free survival and loco-regional control, the role of radiation therapy in colon cancer in the neoadjuvant setting is unclear. This study describes an institutional experience with NRT in colon cancer. We hypothesize that NRT will improve outcomes in patients with locally advanced colon cancer.

Methods: Patients with T4 adenocarcinoma of the colon treated at a single institution from 1996 to 2012 were identified using retrospective chart review. Only patients undergoing surgery with curative intent were included in this study. Patient demographics, pre- and post-operative TNM staging, details of surgery, adjuvant and neoadjuvant treatment modalities, margin status, post-operative complications and long term outcomes were recorded. The primary outcome was 5-year overall survival. Secondary outcomes included ability to obtain negative margins and post-operative complications.

Results: A total of 132 patients were included. Of these, 23 patients (17%) received NRT and 109 patients (83%) did not (control). Between the NRT and control groups, there was no difference in mean age at diagnosis (59.5 vs. 66.3, p=0.55), Charlson score (2.30 vs. 2.67, p=0.1), clinical lymph node status (13% vs. 8.2% p=0.28), tumor location (54.1% vs. 43.5% proximal to splenic flexure, p=0.24), use of postoperative chemotherapy (52.2% vs. 52.3%, p=0.58) and mean follow-up (4.44 vs. 5.13 years, p=0.45). Patients in the NRT group were more likely to have clinical T4b disease (87% vs 56%, p<0.01). Despite this, 95.3% of the patients in this group had R0 resections versus 88.7% patients in the control group (p=0.60). Complete pathologic response, with no residual tumor on final specimen was achieved in 2 (8.3%) patients treated with NRT. No difference in postoperative complications was seen between the two groups (13% vs. 8.3% P=0.43). Regarding long term outcomes, 5-year overall survival was significantly better in the NRT group compared to the control group (77.6% vs 50.4%, p=0.028, Fig 1).

Conclusions: The use of NRT is safe and is associated with improved overall survival in patients with locally advanced colon cancer. Despite having advanced (T4b) disease, margin negative resection could be achieved in > 95% of patients with use of neoadjuvant radiation without increasing the rate of post-operative complications.

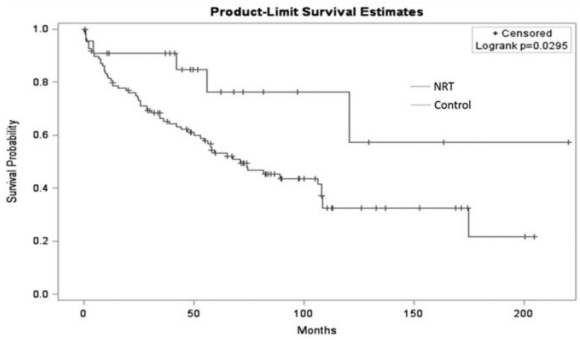

Figure 1 Kaplan Meier curve for overall survival for patients treated with neoadjuvant radiation (NRT group n= 23, red curve) versus those that did not receive neoadjuvant radiation therapy (Control Group n=109, blue curve)

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IS THERE A ROLE FOR PARA-AORTIC LYMPHADENECTOMY IN THE TREATMENT OF RECURRENT RECTAL CANCER?

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Purpose: Surgery for recurrent rectal cancer is the only therapy that offers the potential of cure. Historically paraortic node involvement is associated with a poorer prognosis. This study aims to assess the role of paraaortic lymphadenectomy with curative intent in the context of surgery for recurrent rectal cancer.

Methods: We analysed data from a prospectively maintained database of patients who underwent surgical resection along with paraaortic lymphadenectomy for recurrent rectal cancer and suspected paraaortic lymphadenopathy.

Results: We identified 39 patients who underwent paraaortic lymphadenectomy in the context of colorectal cancer between 1994 and 2014. 26 percent of these patients received paraaortic lymphadenectomy in the

context of recurrent rectal cancer. Seven of whom were male. The median age was 59 (53-65) years. The intra and 30-day post-operative mortality was zero. The median disease free survival was 14 months and median overall survival 46 months. **Figure 1.** Overall 5-year survival for patients that underwent surgery for recurrent rectal cancer with additional paraaortic lymphadenectomy

Conclusions: Our series demonstrates that paraaortic lymphadenectomy in the context of curative surgery for recurrent rectal cancer offers an overall 5–year survival of 42 percent. These results are comparable with previous data of surgery with curative intent for recurrent rectal cancer[1]. This study suggests that paraaoartic lymphadenectomy for curative intent may have a role in appropriately selected patients. Reference: 1. Heriot AG, Byrne CM, Lee P, Dobbs B, Tilney H, Solomon MJ, Mackay J, Frizelle F. Dis Colon Rectum. 2008 Mar;51(3):284-91.

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UNDERSTANDING THE BEST STRATEGY FOR RECTAL CANCER IN ORDER TO IMPROVE LENGTH OF STAY - DOES THE OPERATIVE APPROACH MATTER?

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Purpose: Despite recent data questioning the perceived benefits of laparoscopy on rectal cancer resections, new questions still remain whether any minimally invasive approach will improve perioperative outcomes. Our aim was to evaluate whether surgical approach or creation of an ostomy were driving forces in perioperative outcomes.

Methods: We retrospectively reviewed 6 years of rectal cancer data from a single institution, grouping cases in terms of approach (open, laparoscopy, robot-assisted, converted to open) and stoma creation (loop ileostomy, end colostomy and no stoma). We collected perioperative data and used multivariate analysis to identify factors associated with increased length of stay.

Results: From 2008-2014, 226 proctectomies were performed for rectal cancer. In terms of approach, 43% (n=98) were done open, 31% (n=71) were done laparoscopically, 14% (n=31) were done robotically and 12% (n=26) were converted to open. Although there was no difference in age and BMI, there was a significant difference in gender distribution between groups (p= 0.013, table 1). There was no significant difference in the operative times between the four groups. Length of stay was significantly lower in the no ostomy group when compared to creation of a diverting ostomy (4.7 vs. 6.7 days, p< 0.003). Length of stay was also significantly shorter in the laparoscopic group compared to open (2.0 days, p=001) and converted to open (2.4 days, p=0.021). Multivariate analysis showed that no stoma (22.0% shorter length of stay, 95% CI: 8.1% - 33.8%, p = 0.003) and laparoscopy (24.0% shorter length of stay, 95% CI: 11.4% - 34.9%, p = 0.001) remained significant predictors.

Conclusions: Although multivariate analysis found that the laparoscopic approach and absence of an ostomy were significantly associated with a decreased length of stay after rectal cancer surgery, direct comparisons between operative approaches may be suspect to selection bias between groups. Further research will be required to better delineate how patient selection can be optimized to provide the best outcomes for patients with rectal cancer.

Table 1

Approach	Age	BMI	Male (%)	Female (%)	Operative Time	LOS (days)
Open (n = 98)	63.10 ± 14.9	28.30 ± 5.2	66.33	33.67	217.5 ± 96.2	6.60 ± 3.5
Laparoscopic (n = 71)	64.60 ± 14.9	29.50 ± 6.0	53.52	46.48	233.3 ± 120.4	4.60 ± 2.7
Robot-assisted (n = 31)	58.50 ± 12.3	27.30 ± 5.2	77.42	22.58	243.5 ± 89.3	6.40 ± 4.7
Converted to open (n = 26)	64.80 ± 12.9	28.90 ± 6.8	84.62	15.38	201.8 ± 85.7	7.00 ± 3.9

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FACTORS ASSOCIATED WITH ADEQUATE LYMPH NODE HARVEST IN COLORECTAL CANCER: THE CLINICAL IMPACT OF THE NATIONAL QUALITY ASSESSMENT PROGRAM AND BIG DATA MANAGEMENT.

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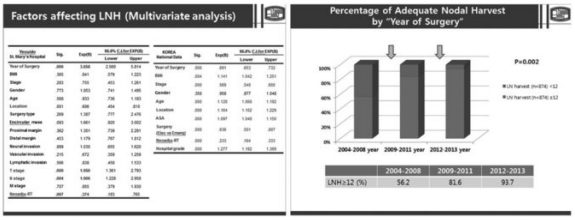
Purpose: To evaluate factors associated with lymph node harvest (LNH) in colorectal cancer (CRC) and analyze the clinical impact of the national quality assessment program and big data management

Methods: Retrospective study was carried on a prospectively collected data. Total 874 CRC patients who underwent curative surgery between 2004 and 2013 at a single institution were included for the study. Surgical procedures without lymph node dissection were excluded. Additionally, a national data regarding LNH provided by the Korean government was analyzed. Total of 23556 CRC surgical patients treated in one of the 322 hospitals between 2011 and 2013 were included. Factors and outcomes influencing LNH were studied and a comparative study was performed between the two data sets. Chi-square test, Fisher's exact test was performed for association analysis. Kaplan-Meier method was performed for survival analysis. The statistical analyses were performed with SPSS 18.0 (Statistical Package for Social Sciences, Chicago, IL).

Results: In the single institution data, cancer location, T stage, N stage, neoadjuvant radiation therapy, and year of surgery associated with LNH. In the national data, age, BMI, ASA score, cancer location, stage, neoadjuvant radiation therapy, hospital grade, and year of surgery associated with LNH. Regarding the Survival analysis, in the single institution data, disease free survival improved accordingly to adequate LNH. (p=0.012) However, overall survival did not differ significantly. Both data showed that the year of surgery was a significant factor. Notably, with the process of time, a gradual increase in the percentage of adequate LNH increased. The start of the national quality assessment program and big data management in 2011 had a significant positive impact on LNH.

Conclusions: Cancer location, stage, neoadjuvant radiation therapy, and year of surgery were common factors associated with LNH in both data sets. The year of surgery subgroup analysis showed that national quality control and data management had a positive impact in the increase of LNH.



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IMPLICATION OF CIRCUMFERENTIAL RESECTION MARGIN IN INTERSPHINCTERIC RESECTION OF LOW RECTAL CANCER.

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Purpose: Circumferential resection margin has been known as one of the important prognostic factors of rectal cancer. Intersphincteric resection is the only chance to preserve anal sphincter in patients with low rectal cancer. However, it demands skillful surgical techniques and a careful patient selection to achieve an adequate resection margin. In this study, we found the clinicopathological risk factors related to inadequate circumferential resection margin and the prognostic impact of circumferential resection margin in intersphincteric resection of low rectal cancer.

Methods: Between January 2003 and December 2013, 328 patients underwent intersphincteric resection for low rectal cancer at Kyungpook

National University Medical Center. Among them, 62 patients with stage IV, incomplete data, and T4 tumors were excluded in this study. Kaplan-Meier, Cox regression, and competing risk analysis were performed.

Results: Twenty three (8.6%) patients had circumferential resection margin 1 mm or less than 1mm. Involvement of circumferential resection margin was significantly related to distant recurrence and local recurrence. When local recurrence was divided to anastomotic recurrence and pelvic side wall recurrence, circumferential resection margin was not related to pelvic side wall recurrence but, related to higher anastomotic recurrence. Clinicopathological factors related to circumferential resection margin involvement were tumor height (2cm or less from the anal verge) (HR 8.85, 95% CI, 2.77-28.3; $p < 0.001$), direction of tumor (anterior) (HR 2.98, 95% CI, 1.01-8.75; $p < 0.047$), and tumor depth (T3) (HR 19.53, 95% CI, 4.11-92.83; $p < 0.001$). In patients with T3 tumor, tumor height (2 cm or less from the anal verge), direction of tumor (anterior), and histologic differentiation (mucinous or signet ring cell) were independent risk factors of involvement of the circumferential resection margin.

Conclusions: The current study found that the prognostic implications of circumferential resection for both local recurrence and distant recurrence in intersphincteric resection of low rectal cancer. Intersphincteric resection should be cautiously performed in patients with tumor located within 2 cm from the anal verge, anterior location, and mucinous or signet ring cell type tumor, and T3 tumor.

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PROGNOSTIC IMPACT OF STAGE MIGRATION ACCORDING TO INSUFFICIENT LYMPH NODE RETRIEVAL IN PATIENTS WITH RECTAL CANCER.

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Purpose: Lymph node metastasis is one of the most important prognostic factors in patients with rectal cancer and thus correct assessment of lymph nodes has important implication. As current staging system disregards the number of LNs harvested, there is concern that insufficient retrieval of lymph node may result in understaging, which will subsequently lead to suboptimal treatment. Although the NCCN guideline suggests 12 nodes are minimum requirement for the precise assessment of lymph node status, the optimal number of harvested nodes is different among researchers and its implication varies according to different treatment settings. The aim of this study was to investigate whether 12 nodes are sufficient to avoid stage migration and to evaluate prognostic impact of insufficient LNs retrieval in different treatment settings of rectal cancer.

Methods: Patients with biopsy proven rectal adenocarcinoma who underwent curative surgery between Jan 2005 and Dec 2012 were enrolled. It was excluded the patients who had emergency operation, distant metastasis, lateral pelvic node dissection and no available follow up data. Minimum required harvested lymph node number (MLN) was decided using maximal chi-square method. The patients were divided into N+ or N- groups. Univariate and multivariate analyses for oncologic outcomes were performed in each group. Subgroup analyses were performed according to whether a patient received preoperative chemoradiation therapy (pCRT) or not.

Results: The medical records of total 1825 patients were reviewed among who met the eligibility criteria were enrolled. Maximal chi-square method revealed 11 to be the minimum required harvested lymph node number. Univariate and multivariate analyses found LN≤11 to be an independent prognostic factor for both OS and DFS only in N- group (OS: HR=1.7, 95% CI=1.2-2.5, p=0.002; DFS: HR=1.7, 95% CI=1.3-2.3, p<0.001). But in N+ group LN≤11 failed to be a significant factor neither for OS or DFS. In the subgroup of the patients with pCRT and N-, LN≤11 continued to be a significant prognostic factor both for OS and DFS, which may attribute for stage migration effect. However, in the subgroup of the patients with N- without pCRT, LN≤11 was significant only for OS, but not for DFS, which may attribute to the fact that the same treatment strategy (postoperative chemoradiation) in both LN≤11 and LN>11 patients may offset the stage migration effect.

Conclusions: Our study demonstrates that retrieved lymph node number of eleven or less was associated with poorer prognosis in N- patients. This phenomenon was stronger in the patients who had pCRT. Stage migration effect may explain these findings.

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IS PATHOLOGIC NEAR-TOTAL REGRESSION AN APPROPRIATE INDICATOR OF A GOOD RESPONSE TO PREOPERATIVE CHEMORADIOTHERAPY BASED ON ONCOLOGIC OUTCOMES?

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Purpose: This study evaluated the oncologic outcomes of patients with rectal cancer who demonstrated pathologic near-total regression (NTR) after preoperative chemoradiotherapy (PCRT) and compared their outcomes with patients with total regression (TR).

Methods: We retrospectively analyzed the outcomes in 263 patients who received PCRT for advanced T3/4 or N+ rectal cancer followed by radical resection. Patients were diagnosed with TR (n = 132) or NTR (n = 131) according to the TRG. Recurrence-free survival (RFS) was evaluated and compared between groups. For evaluating the consistency between the result and previously published data, meta-analysis for summing up survival curve was performed using generalized linear mixed model.

Results: ypT status was heterogeneous in the NTR group as follows; 3 Tis (2.3%), 21 T1 (16%), 72 T2 (55%), and 35 T3 (26.7%). Metastatic lymph nodes were more frequently found in the NTR group (6.8% in TR vs 24.4% in NTR patients; p = 0.003). The cumulative recurrence rate was significantly higher in the NTR group (19.8% vs 6.1%; p = 0.003). The 5-year RFS was significantly lower in the NTR group (94% vs 77.8%; p = 0.001). Significant differences in the RFS rate were found in comparison with the published literature.

Conclusions: Based on differences in the oncologic outcomes between the TR and NTR groups, it might not be suitable to use NTR as an indicator of good response to PCRT. Therefore, consideration of NTR as an indicator of good response together with TR may not be appropriate.

Multivariate analysis of the factors associated with 5-year recurrence-free survival

Variable	Odds Ratio	95% CI	P
Tumor Regression Grade			0.001
TR	1		
NTR	4.32	1.83-10.21	
Sex			0.86
Male	1		
Female	1.07	0.53-2.15	
Adjuvant Chemotherapy			
No	1		0.98
Yes	0.97	0.13-7.4	
No. of harvested lymph nodes	1.01	0.96-1.04	0.94

TR; total regression, NTR; near total regression

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SAFETY AND ONCOLOGIC OUTCOMES OF TOTAL PROTECTOMY AND COLOANAL ANASTOMOSIS WITH OR WITHOUT RESECTION OF INTERNAL SPHINCTER FOR LOW RECTAL CANCER.

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Purpose: With development of surgical techniques and high prevalence of preoperative chemoradiation therapy, anal sphincter preserving surgery became popular for lower rectal cancer. However, there have been concerns of oncologic and functional safety in minimal invasive techniques for low rectal cancer. The aim of this study is to compare outcomes for patients who underwent total proctectomy with coloanal anastomosis with or without resection of internal sphincter for low rectal cancer between an open, a laparoscopic and a robot surgery.

Methods: Total 463 patients with low rectal cancer were evaluated retrospectively between Jan 2th, 2005 and Dec 31th, 2013 in the single institution. 252 Patients were underwent total protectomy and coloanal anastomosis (CAA) with or without resection of internal sphincter (ISR). 45 Patients were excluded from this analysis for the following reasons: stage IV, synchronous or distant metastasis. Total 207 patients were classified into an open surgery (OS) (n=81), a laparoscopic surgery (LS) (n=67) and a robotic surgery (RS) (n=59) and compared oncologic outcome between groups. The primary end point was 5-year overall survival and 5-year disease free survival rates.

Results: There is no difference among groups in preoperative characteristics except age, BMI and preoperative CEA level in 207 patients. Length of hospital stay, postoperative day of first flatus and day of first soft-diet intake are much shorter in LS and RS than OS group with statistical significance (P <0.05). Distal resection margin (DRM) and circumferential resection margin (CRM) show no difference in each group. The ratio of CRM positive was 6.2% in OS, 6.0% in LS and 3.4% in RS. Both early complication (within postoperative 30 days) and late complication (after postoperative 30days) were not different between groups. In terms of oncologic outcome, there is no difference in local and systemic recurrence. 5-year overall survival and disease free survival among groups show no statistical significance. Among these patients, 46 patients had total protectomy with CAA with ISR. The ratio of ISR was 28.4% in OS, 27.6% in LS and 27.6% in RS group. There is also no difference in preoperative, postoperative characteristics and oncologic outcome between an open surgery and a minimal invasive surgery group.

Conclusions: There is no difference of TNM stage, positive CRM rate, local and systemic recurrence including 5-year overall survival and disease free survival between three groups. To my knowledge, this is the first comparative analysis of oncologic outcome between an open, a laparoscopic and a robot surgery for total protectomy with CAA with or without ISR for very low lying rectal cancer. Based on these results, total proctectomy and CAA with or without ISR by MIS techniques seems to be safe and feasible in terms of oncologic outcome.

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WHAT IS THE OPTIMUM VESSEL LIGATION IN SPLENIC FLEXURE CANCER?

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Purpose: Adequate vessel ligation and treatment of splenic flexure cancer hasn't addressed well in the literature. It is an important aspect of the ongoing debate on the optimum level of vascular ligation in splenic flexure cancer surgery. This study aims to investigate the consideration of dividng left branch of middle colic artery in additional to left colic artery division in splenic flexure cancer in term of oncological outcome.

Methods: Throughout 2005 until 2012 records were reviewed and analyzed retrospectively. 170 patients diagnosed to have left colon cancer, which had operated, by left colectomy. 43 patients found to have splenic flexure cancer, elaborated and involved in this study. They grouped and compared based on the level of vessel ligation. Patient characteristics, perioperative clinical results, and long-term oncologic outcomes were compared between the two groups.

Results: Of the 43 patients enrolled, 33 (76.7%) were men and 10 (23.3 %) were women. 24 (55.8%) patients underwent left colic artery division (LCA) with the marginal branch of middle colic artery, while 19 (44.2%) patients operated by further division of left branch of middle colic artery (LMA) with LCA. There were no significant different in patients characteristics and tumor stage between both group. Stage 1 rated at 25% in LCA vs. 26.31% in LMC, stage 2 and 3 found 33.4%, 4.2% in LCA vs. 42.1%, 31.57% respectively (p=0.772). Both arms received resemble course of adjuvant chemotherapy (p= 0.183). Tumor size, lymphovascular invasion, tumor differentiations were likewise in both operations (p>0.005). In addition to the number of harvested lymph node were similar with no significant different value, rated at 19 ± 10 vs. 15 ±6.7 (p=0.171) respectively. Recurrence rate found relatively greater in LCA group compared to LMA but haven't reached statistical significant, 16.6% vs. 10.52% p=0.564 respectively. However, DFS analyzed at 79.1 month vs. 84.7 month and overall survival rated at 75.2 month vs. 79.1 month respectively, which haven't shown statistical differences between both groups (p>0.05).

Conclusions: In our study, the influence of further vessel ligation (LMA) hasn't shown direct impact on the patient's overall survival but has a potential to lower the risk of recurrence rate in splenic flexure cancer surgery. Which has prospective vision to consider division of LMC in the future to emphasize its true rule on the other cancer related mortality in splenic flexure cancer.

Pathological and Long term Outcome in both arms

Parameters	LCA (N= 24)	LMA (N= 19)	P Value
Tumor Size	5.4 +- 4	4.7 +- 2.1	0.469
Histology (WD)	4 (16.6%)	2 (10.52%)	0.637
Histology (MD)	19 (79.16%)	15 (62.5%)	
Histology (PD)	1 (4.16%)	2 (10.52%)	
LVI	6 (25%)	3 (15.78%)	0.461
Positive LN	1.6 +- 4	1.4 +- 2.7	0.882
Recurrence Rate	4 (16.6%)	2 (10.52%)	0.564
DFS	79.1 months	84.7 months	0.705
Overall Survival	75.2 months	79.1 months	0.889

LCA: left colic artery division, LMA: left branch of middle colic artery division, LVI: lymph-vascular invasion, LN: lymph node, DFS: disease free survival.

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TARGETED SCREENING FOR LYNCH SYNDROME: IS THE VETERAN POPULATION DIFFERENT?

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Purpose: Lynch syndrome (LS) is the most common cause of hereditary colorectal cancer (CRC), and carries high lifetime risks for CRC and other malignancies. Multiple organizations recommend screening for LS. Programs screening targeted high-risk CRC patients in the general population have demonstrated positive LS screening rates of 29% and incidence of LS of 3% among CRC patients, but little is known about LS incidence and screening in the Veteran population. We examined 4 Veterans Affairs Medical Centers in southern California following introduction of a targeted LS screening (TS) program. Under this program, eligibility for LS screening was a new diagnosis of CRC at age ≤ 60 years, a new CRC at age >60 years plus a personal or family history of LS-associated cancer, or a new diagnosis of endometrial cancer (EC).

Methods: Using the VA's Region 1 data warehouse, we developed a registry that identified all CRCs and ECs diagnosed during the first year of the TS program (09/01/14-08/31/15). The registry included demographic data, history of prior cancers, disease and treatment data, cancer family history, and LS screening and germline testing results. Tumors were screened by immunohistochemistry (IHC) of the four mismatch repair proteins or by molecular markers assessing microsatellite instability (MSI). Screening rates of those eligible and ineligible for screening were determined. Rates of positive screening results (IHC positive, MSI-high or MSI-low) and rates of LS diagnosis were compared to those found in the literature.

Results: We identified 179 new diagnoses of CRC and 4 of EC. Of the CRC patients, 98% were male, 26% were age 60 or younger, and most common races were white (58%), black (16%) and Hispanic (10%). Personal and family histories of LS-associated cancer were present in 7% and 11% of CRC patients, respectively. Screening practices and results for all patients are presented in the table below. The screening tests used were IHC (29%), MSI (3%), and both (69%). Among screened CRC patients, 17.1% had a positive result (95%CI 10.1-27.5%), which is significantly lower than the 29% described for similar targeted screening programs in the literature. All patients with positive screening tests underwent clinical genetics referral

and/or germline testing. No patients were diagnosed with LS during the study.

Conclusions: Our TS program resulted in high screening rates of high-risk Veterans with CRC and EC. The screened CRC patients had lower rates of positive screening results than those previously described. This may suggest an incidence of LS that differs from the 3% described in CRC patients in the general population, and may be due to the unique characteristics of the Veteran population. Further evaluation of this TS approach is indicated, including both the short-term budget impact and the long-term cost-effectiveness of a TS program within the Veteran population.

	Cases Identified	Cases Screened
CRC	179	76 (43%)
CRC, TS eligible	74	71 (96%)
CRC, TS ineligible	105	5 (5%)
EC	4	4 (100%)

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RECURRENCE RATES OF COLONIC ADENOCARCINOMA FOLLOWING ROBOTIC-ASSISTED SEGMENTAL RESECTION.

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Purpose: As the use of robotic-assisted surgery expands in the field of colorectal surgery, much data has been accrued demonstrating short-term safety and efficacy of the technique. However, there is a paucity of literature examining the oncologic outcomes of these procedures. We determined the overall and disease-free survival for patients who underwent robotic segmental colectomy for adenocarcinoma.

Methods: We conducted a retrospective review of 51 patients who underwent robotic-assisted colectomy at a single institution from 2010 to 2014. Surgeries included right, left and sigmoid colectomies. Indications were adenocarcinoma of the colon and lack of metastatic disease at the time of surgery. Pre-operative demographics, intra-operative data, and post-operative outcomes were examined. Student's t-test was used to analyze continuous variables; Fischer's exact test was used for categorical variables.

Results: There were no peri-operative mortalities, and three cases were converted to open procedures. The average follow-up time for the cohort was 41 months (+/-16 months). There was recurrence of disease in 8/51 patients (16%). The average time to recurrence was 15 months (+/-9 months). Death occurred in 3/43 disease-free patients (7%) and in 3/8 (38%) of the patients with recurrence, with an average post-operative span of 16 months (+/-11 months). Recurrence of disease was significantly associated with peri-neural invasion (p=0.025) and a higher number of positive lymph nodes (p=0.0002) than the disease-free group. Age, gender, body-mass index, tumor stage, tumor size, lympho-vascular invasion, estimated blood loss, length of hospital stay, peri-operative morbidity and treatment with chemotherapy were not significantly different between the two groups. The proximal, distal and radial margins were uninvolved in all 51 patients, with no significant difference in margin length between the groups.

Conclusions: To date, there remains minimal research concerning oncologic outcomes following robotic segmental colectomy. Our data demonstrates comparable recurrence rates of colonic adenocarcinoma after robotic-assisted resection when compared to current literature on laparoscopic and open surgery. Additional follow-up is needed to further evaluate the long-term outcomes of these patients.

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ADDITIONAL FLAP OPERATION IN BLADDER-PRESERVING SURGERY FOR LOCALLY ADVANCED RECTAL CANCER INVOLVING THE PROSTATE.

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Purpose: The standard surgery for local rectal cancer involving the prostate is total pelvic excision (TPE). Such cases often require double stomas: one for urinary diversion, such as an ileal conduit; and another for fecal diversion, such as a sigmoid colostomy. This procedure may compromise quality of life. Recent advances in sphincter-preserving operations (SPOs) including intersphincteric resection (ISR) and ultra-low anterior resection (U-LAR) for very low rectal cancer have allowed coloanal anastomosis (CAA) or coloanal canal anastomosis to be performed without adverse effects on outcome. En bloc radical prostatectomy is an option in selected patients who would otherwise need TPE for locally advanced rectal cancer involving the prostate. Bladder-preserving surgery with cystourethral anastomosis (CUA) do not need the urinary stoma. The patiensts with SPOs and bladder-preserving surgery with CUA has no stoma. Bladder-preserving surgery with CUA is sometimes possible, but leakage from the CUA is a serious problem. The aim of this study was to evaluate the efficacy of an additional flap operation for leakage from CUA.

Methods: The subjects were 39 patients who underwent bladder-preserving surgery for advanced rectal cancer involving the prostate from 2001 to 2015. 32 patients had CUA, 6 had cystoctomy, and one had neobladder. With the CUA group, five of the patients had an ileal flap operation, 2 had an omental flap operation, and 3 had an operation using both flaps. The ileal flap was formed from 5 cm of mucoresected ileum and faced the surrounding tissue of the CUA. The status of leakage from the CUA was evaluated**.**

Results: An anal sphincter-preserving operation (SPO) with CUA was performed in 22 patients and abdominoperineal resection (APR) with CUA was conducted in 11. The leakage rates from the CUA were 50.0% in the SPO group and 54.5% in the APR group. Of the 10 patients with additional flap operations, 7 (70.0%) had no leakage, whereas of the 23 patients who had no flap operation, 9 (39.1%) had no leakage. There were 4 cases (33.3%) with over a long duration of urinary catheterization in more than 30 weeks after surgery without flap leakage group, but there was no case with flap leakage gourp.

Conclusions: An additional flap operation may decrease leakage from a CUA and reduce the duration of urinary catheterization with leakage case.

Evaluate the efficacy of an additional flap operation for CUA

Ileal Flap (IF)	Leakage (n)	Duration of urethral catheter (mean, weeks, range)	More than 30 weeks with urethral catheter (n)
Without IF (n=23)	14 (60.7%)	31 (8-108)	4 (33.3%)
With IF (n=10)	3 (30.0%)	16 (8-20)	0 (0%)

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DIFFERENT PROGNOSTIC SIGNIFICANCE OF MUCINOUS AND SIGNET-RING CELL COMPONENTS IN COLORECTAL CANCER.

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Purpose: Objectives: To determine the prognostic significance of different component of mucin and signet-ring cells in colorectal cancer.

Methods: Methods: A total of 2413 consecutive colorectal patients underwent surgery for primary tumor between 2000 and 2012 were retrospectively studied.

Results: Results: All of the patients were divided as five groups by histological subtype: AC (adenocarcinoma without mucinous or signet-ring) in 1955 cases (81%), MAC (mucinous adenocarcinma, with >50% mucinous) in 232 cases (9.6%), PMAC (partial mucinous adenocarcinma, with <50% mucinous) in 166 cases (6.9%), SRCC (signet-ring cell carcinoma, with >50% signet-ring cell) in 34 cases (1.4%) and PSRCC (partial signet-ring cell carcinoma, with <50% signet-ring cell) in 26 cases (1.1%). MAC and PMAC

occurred more frequently in colon than AC (63.8% and 62.7% vs. 45.7%, *P* < 0.001). MAC, SRCC and PSRCC had more LVI, higher T N and TNM stages than AC (*P* < 0.05 for each). However, PMAC had similar LVI and tumor stages as AC (*P*>0.05). Five-year cancer specific survival was 69.7% for AC and 72.1% for PMAC (*P*>0.05 between two groups), which were significantly higher than39.2% for MAC, 29.9% for SRCC and 30.4% for PSRCC (*P* < 0.001 for each). However, there was no survival difference between any two of the three groups (MAC, SRCC and PSRCC, *P*>0.05 for each). In multivariable analysis, MAC (HR = 2.46, 95%CI=2.02–3.26, *P* < 0.001), SRCC (HR = 2.22, 95%CI=1.72–3.11, *P* < 0.001) and PSRCC (HR = 2.68, 95%CI=2.31–3.34, *P* < 0.001) were the independent prognostic factor associated with worse survival compared with AC, while PMAC was not (HR=1.2, 95%CI=1.0-1.4, *P*=0.077).

Conclusions: Conclusions: Mucinous adenocarcinoma patient with major (>50%) component of mucin had poor prognosiswhile those with minor(< 50%) mucin had similar survival as well adenocarcinoma. However, patients with the component of signet-ring cells, whether minor or major, had poor prognosis as mucinous adenocarcinoma.

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PREDICTORS OF RECLASSIFICATION OF VARIANTS OF UNKNOWN SIGNIFICANCE (VUS) AMONG GENES PREDISPOSING TO COLORECTAL CANCER.

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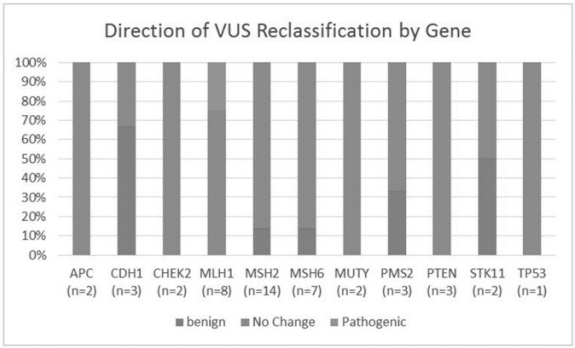
Purpose: Hereditary colorectal cancer syndromes account for 5% of the colorectal cancer burden. Identification of variants of unknown significance (VUS) is increasingly common in the era of next generation sequencing. VUS are not confirmed as either pathogenic or benign based on current data. This study aims to identify the factors that predispose to VUS reclassification towards pathogenic or benign mutations.

Methods: Patients with VUS genes showing relationship to colorectal cancer were selected from an institutional genetic registry. Their charts were reviewed for genes known to predispose to colorectal cancer as given by Myriad MyRisk clinical handbook: MLH2, MSH2, MSH6, PMS2, APC, MUTYH, STK11, CDH1, SMAD4, and PTEN. Charts were reviewed for reclassification of VUS to benign or pathogenic, time of initial gene discovery, and time of reclassification. Family history, gene size and available literature on gene function were used to predict reclassification.

Results: Forty-three patients were identified with VUS gene classification from 1990-2015. Average age at gene discovery was 50.3 (s.d.=13.8). Sixty-two percent of patients with VUS had prior diagnosis of cancer. Cancers were identified at an average age of 52 years. Median time between initial gene testing and reclassification was 38 months (s.d.=32; range: 4-111). Reclassification occurred in 20.9% of cases with 4.7% reclassified to pathogenic and 16.3% reclassified to benign (Figure 1). Logistic regression showed that positive Amsterdam criteria (OR 79, p=0.009) and the number of 2nd degree relatives with colorectal cancer prior to age 50 (OR 6.3, p=0.05) predicted reclassification to pathogenic. No patients with less than 3 family members having a cancer diagnosed before age 50 reclassified to pathogenic (OR 55, p 0.02). The sensitivity and specificity of having 3 or more family members with cancer before age 50 were 100% and 92%, respectively. The positive and negative predictive values of having 3 or more family members with cancer before age 50 were 40% and 100%, respectively. Size of gene, age at cancer diagnosis, time since gene identification, and number of scientific papers evaluating gene function did not predict reclassification.

Conclusions: With a median follow-up time of 38 months, 20.9% of VUS will reclassify. Pathogenic reclassification will occur in 4.7% of VUS patients. This study shows that family history and positive Amsterdam criteria predict reclassification of VUS to pathogenic. Family history may be helpful in predicting the likelihood of a colorectal related gene VUS updating to a pathogenic mutation.



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THE PROPENSITY OF POSTOPERATIVE CEA LEVEL ACCORDING TO THE RECURRENCE PATTERN AFTER RESECTION OF PRIMARY COLORECTAL CANCER.

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Purpose: Carcinoembryonic antien (CEA) is a glycoprotein, which is not only exist in normal mucosal cells but also elevated in adenocarcinoma especially colorectal cancer. Therefore, CEA level could be a surrogating marker for monitoring recurrent colorectal cancer. The aim of this study is to identify sensitivity of CEA level according to the recurrent organ for recurrent colorectal cancer.

Methods: Seven hundred-sixty five patients who diagnosed recurrent colorectal cancer and checked CEA level at the recurrent time were selected retrospectively from the Yonsei Colorectal Cancer Electronic Database between January 2001 and December 2010. Exclusion criteria included palliative surgery, pathologic stage IV, hereditary colorectal cancer, and double primary cancer. The group was divided into normal CEA level group (CEA≤5ng/ml) and abnormal CEA level group (CEA>5ng/ml) and analyzed.

Results: The local recurrence rate was 6.0 % (Colon: 4.8%, Rectum: 7.7%) and the systemic recurrence rate was 17.7% (Colon: 13.7%, Rectum: 23.0%) in this study. In patient and tumor characteristics, the tumor was located more often in rectum in normal CEA level group (60.2% vs 51.3%, P=0.015). In pathologic characteristics, in abnormal CEA level group, lymphovascular invasion (LVI) was more often (46.2% vs 37.4%, P=0.042) and both pathologic T stage and N stage were more advanced (pathologic T stage: P=0.017, Pathologic N stage: P=0.039). The sensitivity of CEA level according to the pathologic stage was 33.3% in stage 0, 30.6% in stage I, 39.3% in stage II, 42.3% in stage III, and 40.3% in total group. The sensitivity of CEA level was 45.2% in colon cancer and 36.5% in rectal cancer. The proportion of abnormal CEA level was over 50% in the more advanced metastatic status (synchronously more than 2 organ, peritoneal carcinomatosis). The proportion of abnormal CEA level in liver and lung were 47.9% and 25.3%, respectively.

Conclusions: The sensitivity of CEA level in the rectal cancer was lower than in the colon cancer. The sensitivity of CEA level was increased in the more advanced pathologic stage as well as the more advanced metastasis (combined metastasis, peritoneal carcinomatosis). The lung metastasis in rectal cancer was the most frequent in the metachronous metastasis, but the sensitivity of CEA level for the lung metastasis was relatively low.

P264

EDUCATIONAL BENEFIT FOR SURGICAL BEGINNER TO TRAIN SURGICAL DECISION USING FLUORESCENCE IMAGING SYSTEM WITH ICG DURING LAPAROSCOPIC COLORECTAL SURGERY.

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Purpose: This study is to evaluate the usability of fluorescence imaging system using intravenous indocyanine green (ICG) injection during laparoscopic colorectal surgery and whether fluorescence imaging system could have educational benefit for surgical beginner to train surgical decision.

Methods: Fluorescence imaging system, IMAGE1 SPIES™ (Karl Storz, Germany) was applied to colorectal cancer patients (n=21) from July to October, 2015. Dosage of ICG for intravenous injection was 0.2mg/kg. Times to enhance colonic artery and colonic wall were measured before colonic transection. Red color inversion (SPECTRA A mode) and Fluorescence image (ICG mode) were compared with laparoscopic standard image for decision of colonic perfusion and nerve identification. Surgical beginner group including medical students (n=6) and surgical residents (n=6) were asked five questions about colonic transection line, mesenteric vascular integrity and nerve identification on various image modes to find the most proper view for surgical decision.

Results: Mean time to enhance marginal artery and colonic wall was 24.5 (range, 4-45) and 46.9 (range, 20-77) seconds, respectively. Side effect of ICG injection was not happened. Anastomotic leak (n=1) was occurred on rectal cancer patient with sufficient colonic perfusion. Colonic necrosis (n=1) was followed after delayed arterial enhance and venous malfunction on sigmoid colon cancer patient. On experienced surgeon and surgical beginner group, changing rates of colonic transection line was 9.5 % and 54.2% (33.3-66.7%), respectively (p<0.01). Decisions of surgical beginners for transection line were dispersed with laparoscopic view, but it was converged to 83.3% with ICG with red inversion mode. Surgical beginners preferred ICG with red conversion mode for mesenteric vascular integrity and red conversion image (SPECTRA A mode) for identification superior hypogastric nerve.

Conclusions: Fluorescence imaging system with ICG might be safe and useful to evaluate colonic perfusion for decision of colonic transection and could have educational benefit for surgical beginners to train surgical decision.

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EFFECT OF A COLORECTAL CANCER PATIENT NAVIGATOR ON THE COMPLETENESS OF SURVEILLANCE AFTER COLORECTAL CANCER RESECTION.

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Purpose: Postoperative surveillance, including CT scan, carcinoembryonic antigen (CEA) testing and colonoscopy, is known to reduce mortality from colorectal cancer (CRC) recurrence. However, adherence to this surveillance is poor. Our aim was to determine the effect of a CRC patient navigator (CPN) on the completeness of CRC surveillance following resection.

Methods: At St. Paul's Hospital, data for all patients with CRC is maintained in the SPHCRC database. We identified all patients diagnosed with stage II or III CRC in the one year period before and one year after a CPN was introduced. Surveillance adherence, including completion of CEA testing, colonoscopy and CT imaging at appropriate intervals, was assessed for each patient over the 18 months following CRC resection. Patients were excluded if they declined surveillance. Pearson's chi-squared test was used to analyse differences in these outcomes.

Results: Between 2012 and 2014, 613 patients had surgical treatment for CRC at SPH. Of these, 102 eligible stage II-III patients were treated prior to the establishment of the CPN program and 73 patients in the year after the program start date were included. Overall, complete follow-up was significantly improved in the one year period after the CPN program was initiated (79% vs 63%, p=0.03). Surveillance with CT (97% vs 87%, p=0.04) was significantly improved, while there was a trend in improvement in colonoscopy (84% vs 76%, p=0.27) and CEA testing (89% vs 78%, p=0.10). Surveillance of Stage II (74% vs 50%, p=0.06) was significantly better, but Stage III patients were similarly followed (82% vs 67%, p=0.16). Rectal Cancer patients had a particularly dramatic improvement in surveillance (81% vs 59%, p=0.01).

Conclusions: In patients with stage II-III CRC, surveillance has been shown to improve outcomes and reduce morbidity and mortality. Utilizing a CPN program to ensure timely surveillance of patients following CRC resection improves the completeness of follow-up.

Table 1- Follow-up Surveillance of CRC patients After Resection

	Before Colorectal Patient Navigator	After Colorectal Patient Navigator	p-value
Overall Complete Follow-up	64/102 (63%)	58/73 (79%)	0.02746
CT within 18 months of Resection	89/102 (87%)	71/73 (97%)	0.03963
Colonoscopy within 18 months of Resection	77/102 (76%)	61/73 (84%)	0.2706
CEA testing (minimum of 2) within 18 months after Resection	80/102 (78%)	65/73 (89%)	0.1025
Complete follow-up of Stage II CRC within 18 months after resection	18/36 (50%)	26/35 (74%)	0.06247
Complete follow-up of Stage III CRC within 18 months after resection	44/66 (67%)	31/38 (82%)	0.1583
Complete follow-up of Males with CRC within 18 months after resection	41/68 (60%)	37/49 (76%)	0.1074
Complete follow-up of Females with CRC within 18 months after resection	22/34 (65%)	20/24 (83%)	0.2059
Complete follow-up of Colon Cancer patients within 18 months after resection	20/29 (69%)	11/16 (69%)	1
Complete follow-up of Rectal Cancer patients within 18 months after resection	43/73 (59%)	46/57 (81%)	0.01091

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A SINGLE INSTITUTION REVIEW OF ROBOTIC-ASSISTED RIGHT COLECTOMY: ONCOLOGIC RESULTS AND FOLLOW-UP.

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Purpose: Robotic-assisted colectomy has gained interest in recent years, many potential benefits and disadvantages of the procedure have been touted. We aim to assess the oncologic outcomes of robotic-assisted right colectomy, which remains an important component of the appraisal of this technique and its long-term utility.

Methods: A single institution retrospective review was completed from November 2009 to October 2015. Patients with adenocarcinoma of the right colon who underwent robotic-assisted resection were included. The only exclusion criterion was pre-operative evidence of metastatic disease to other organs.

Results: A total of 37 robotic-assisted right colectomies were completed; all patients underwent primary anastomosis. There were zero perioperative mortalities, and there was one conversion to open procedure. 20 males and 17 females were included. The mean age was 65.5 years (range 47-81). The overall mean operative time was 202.6 minutes. The mean lymph node retrieval was 24.24 nodes (range 9-49). On pathologic examination two patients had carcinoma in-situ, eight had T1 lesions, five had T2, fifteen had T3 and seven had T4 lesions. All specimens had negative margins. Data was obtained on 28 patients that had at least 12 months of follow-up, with a mean of 30 months (range 6-66 months). No patients with T1 or T2 lesions exhibited recurrence. Recurrence was found in two patients with T3 disease (at 2 and 10 months) and in two patients with T4 disease (at 13 and 32 months). Three out of four patients that exhibited recurrence were lymph node positive at the time of surgical resection.

Conclusions: Robotic-assisted right colectomy is a feasible option for adenocarcinoma of the right colon, with oncologic results appearing to be at least equivalent to comparable laparoscopic procedures. Long-term oncologic follow-up is necessary to provide further insight into the durability of this procedure.

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HIGH-GRADE ANAL DYSPLASIA: SKIP THE CLINIC AND PROCEED DIRECTLY TO THE OPERATING ROOM?

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Purpose: The development of high-resolution anoscopy (HRA) has advanced our ability to detect anal dysplasia. Historically, HRA is performed in a clinic setting and subsequent ablation is performed in the operating room with repeat HRA. However, patients cite discomfort from the procedure as a major deterrent to compliance with repeated anal cancer screening. This study determines the most effective venue for the performance of HRA—in a clinic setting versus the operating room.

Methods: Following institutional review board (IRB) approval, the correlation of anal pap smear and HRA performed in the operating room versus in the clinic setting was evaluated from 2013-2015. Data from the clinic setting was extracted from our institution's IRB-approved prospective HRA database.

Results: Forty-four patients underwent HRA (22 in the clinic setting, 22 in the operating room). The mean age was 52 years. Thirty patients (68.0%) were male. Seventy percent (31/44) of the patients were HIV (Human Immunodeficiency Virus)-positive and 10% (3/44) of the patients had CD4 counts less than 200. Thirty (68.1%) HRAs were positive for anal intraepithelial neoplasia (AIN) or cancer, distributed as follows: negative 14 (31.8%), low-grade 9 (20.4%), and high-grade 20 (35.4%), carcinoma 1(2.3%). There was a statistically significant difference in anal pap test to HRA correlation in the clinic setting [59.1% (13/22)] versus anal pap testing and HRA performed in the operating room [86.3% (19/22)] (p = 0.04). Those patients with a higher body mass index (28-30) had a lower anal pap test to HRA correlation (p = 0.03). More biopsies were obtained in the operating room than in the clinic setting (4 vs. 2, p <0.001). The majority of patients who underwent HRA in a clinic setting with subsequent HRA in the operating room stated that they preferred to have their HRAs performed in the operating room due to discomfort from the procedure.

Conclusions: Detection rates for anal dysplasia when performing HRA are significantly higher when performed in the operating room. To prevent discomfort in the clinic setting, patients with high-grade dysplasia on anal pap testing may benefit from proceeding directly to the operating room for concurrent HRA and ablation.

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PRIOR SURGICAL SCORE: AN ANALYSIS OF THE PROGNOSTIC SIGNIFICANCE OF AN INITIAL NON-DEFINITIVE SURGICAL INTERVENTION IN PATIENTS WITH PERITONEAL CARCINOMATOSIS OF A COLORECTAL ORIGIN UNDERGOING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY.

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Purpose: To analyze the prognostic significance of prior surgical score(PSS) in our cohort of patients undergoing cytoreductive surgery(CRS) and hyperthermic intraperitoneal chemoyherapy(HIPEC) for peritoneal carcinomatosis(PC) of a colorectal origin.

Methods: A retrospective analysis of a prospectively maintained database for all patients treated for PC of a colorectal origin from 1989-2012.Statistical analysis and PSS were calculated by the usual stastical methods.

Results: Of 407 patients in our study there were 210(51.6%) males and 197(48.4%) females. The mean age at presentation was 53.7 years. Grouped by prior surgical score:46(11.3%) had a PSS 0 vs. 25(6.1%),122(30.0%) and 145(35.6%) respectively who had PSS of 1, 2 and 3. Overall survival was 53.0%,3 and 5 year survival was 74% and 74% for group PSS 0 vs. 13% and 0%, 35% and 32%, 19% and 14% respectively for groups PSS 1,2 and 3. The median survival time for the various PSS groups were 23.8,20.6 and 18.0 months respectively for PSS-1,2,3. The median survival has not been reached for PSS 0 (p=0.000). The mean peritoneal carcinomatosis index (PCI) for PSS 0 was 20.13 vs. 23.8, 18.5 and 19.2 respectively for PSS 1,2 and3 (p=0.40). 87.2 % of the PSS 0 group had a completeness of cytoreduction (CC) score of 0/1 (no residual disease/tumour <0.25 cm) vs. 68%,68.1% and 48.6% respectively for PSS- 1,2 and 3 (p= 0.000). The mean number of organs resected for each group was 1.6 for PSS 0 vs. 3.5,3.0 and 1.6 respectively for PSS-1,2,3(p=0.000). Significant independent predictor of a shorter survival in multivariate analysis was a high CC status (p<0.000) and a high PSS (p=0.05).

Conclusions: The extent of a prior non-definitive surgical intervention may contribute to the poor prognosis associated with PC of a colorectal origin. Independent predictors for an improved overall survival include completeness of cytoreduction and low PSS.

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POSTOPERATIVE OUTCOMES OF HAND-SEWN VERSUS STAPLED COLOANAL ANASTOMOSIS FOLLOWING SPHINCTER-SAVING RESECTION FOR LOW RECTAL CANCER.

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Purpose: Coloanal anastomosis at rectal resection can be achieved with hand-sewn or stapled technique. The aim of this study was to review the differences in outcomes between these two techniques following sphincter-saving resection (SSR) for low rectal cancer.

Methods: A multicenter retrospective analysis of all patients who underwent SSR for low rectal cancer between 2003 and 2014 was performed. Patients with tumors located at 6 cm or less from the anal verge were included. Patients with terminal colostomy and abdominoperineal resection were excluded. Anastomotic leaks, stricture and the presence of permanent stoma on a 12-month minimal follow-up were evaluated. The indication for permanent stoma was also recorded.

Results: During the study period, 194 patients underwent SSR for low rectal cancer. Two patients died in the postoperative period from medical cause and were excluded from analysis. A hand-sewn coloanal anastomosis was performed in 101 patients while a stapled anastomosis was created in 91 patients and mean follow-up was 36.4 (± 30.9) months. Results are summarized in the Table. There was a trend toward more anastomotic complications (p= 0.06) after hand-sewn anastomosis and this was mainly associated with a higher risk for anastomotic stricture. There was no difference in the incidence of anastomotic leaks between the two groups. The rate and reason for permanent stoma was similar between the two groups in patients with ≥ 12 months follow-up. The tumors were closer to the anal verge in the hand-sewn group, however the mean distance between the tumor and the anal verge was similar in patient with anastomotic complications (4.2 ± 1.3 cm) compared to patients without anastomotic complications (4.4 ± 1.3 cm) (p=0.239).

Conclusions: Hand-sewn coloanal anastomosis following low rectal cancer resection may be associated with more anastomotic stricture than stapled anastomosis. The potential for higher complications with hand-sewn anastomoses should be considered when choosing a surgical approach to rectal cancer surgery.

Outcomes

	Stapled (n=91)	Hand-sewn (n=101)	P value
Anastomotic complications, n (%)	16 (17.5)	30 (29.7)	0.06
Stricture, n (%)	11 (12.1)	23 (22.8)	0.06
Leak, n (%)	10 (11)	14 (13.9)	0.66
Both, n (%)	5 (5.5)	7 (6.9)	0.77
Permanent Stoma with ≥ 12 months follow up, n (%)	14 (15.4)	20 (19.8)	0.33
Anastomotic complications	4 (4.4)	7 (6.9)	0.77
Local recurrence	7 (7.7)	9 (8.9)	0.8
Functional dysfunction	2 (2.2)	3 (3.0)	1
Other (C. Diff colitis, cecal perforation)	1 (1.1)	1 (1.0)	1
Distance from the Anal Verge (cm), mean (± SD)	4.9 ± 1	3.9 ± 1.4	< 0.001

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CLINICAL RESULTS OF LAPAROSCOPIC INTERSPHINCTERIC RESECTION FOR LOWER RECTAL CANCER COMPARING LAR.

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Purpose: Recently, intersphincteric resection (ISR) has become a popular procedure for sphincter saving resection for lower rectal cancer. However indication is still controversial and clinical results is unclear. The aim of this study is to assess clinical results of laparoscopic ISR to compare with low anterior resection (LAR).

Methods: Since 2007 to 2014, 216 curative laparoscopic resection was performed for lower rectal cancer including 67 ISR and 120 LAR. Mean age was 63.7 years old, there were 125 male and 63 females, 3 conversions to open resection. Preoperative chemoradiaion underwent for 4 patients to get surgical margin. Mean observing time was 1191 days.

Results: Pathological stages were I: 30, II: 8, III: 29 in ISR, and 0: 1, I: 56, II: 22, III: 41, respectively. Mean distal margin was 2.0 cm in ISR and 2.6cm in LAR. Operative time was 307 minutes in ISR and 267 minutes in LAR (P<0.01). Mean blood loss was 50g in ISR and 25g in LAR (P<0.01). Postoperative hospital stay was 9 days in ISR and 10 days in LAR. Postoperative complications of ISR vs LAR were; anastomotic leak 1.5% vs 9.2%, ileus 5.9% vs 10.8%, and wound infection 0% vs 0.8%. Five year OS and 3 year RFS were 96.1% and 80.4% in ISR and 95.3% and 85.7% in LAR (n.s.). Local recurrence rate was 8.8% and 3.3% (P=0.095). Local recurrences after ISR were observed 10% in stage I (3/30; lateral lymph node, pelvic plexus, anastomosis), 12.5% in stage II (1/8; presacral), and 6.9% in stage III (2/29; levator muscle).

Conclusions: Laparoscopic ISR for lower rectal cancer was longer operative time and greater blood loss, and no difference of OS and RFS comparing LAR. However relatively high local recurrence was observed.

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CLINICOPATHOLOGICAL FEATURES OF COLORECTAL CANCER AT THE EXTREMES OF AGE.

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Purpose: To determine the pathological features of patients with colorectal cancer (CRC) at the extremes of age and compare differences across the younger and older age groups.

Methods: Data was obtained from the CRC Registry for patients diagnosed during the 4-year period commencing January 1, 2011. Variables analyzed included clinical presentation, tumour site, stage, various histopathologic features and adequacy of nodal resection.

Results: Of 900 cases entered into our database, 59 were age 40 and under and 119 (67%) were age 80 and over. These patients formed the basis of this study. Common clinical presentations across both groups were bleeding per rectum (26% Vs 17), change in bowel habits (both 31%) and abdominal pain (16% Vs 14) P=0.556. Patient distribution revealed slightly more women (54%) with most tumours occurring in the rectum (27%) and the sigmoid colon (26%) and 72% of all tumours being moderately differentiated. Comparison across the ages revealed that most characteristics were similar including tumour distribution however younger patients had more signet ring histology while older patients were more likely to have perineural invasion (40% vs 16%; P <0.05) and other incidental pathologies (P <0.05). Older patients had a higher T- stage while significantly more nodes were examined for younger patients (P <0.05) however the number of positive nodes did not differ between the two extremes.

Conclusions: This review demonstrates that while there are some measurable differences in CRC in patients at the extremes of age however the majority were similar in their clinical symptoms, distribution, stage and in fact similar to historical screenable controls.

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OUTCOMES AND OPERATIVE TECHNIQUE OF NEEDLESCOPIC SURGERY FOR COLORECTAL CANCER IN 420 PATIENTS.

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Purpose: Laparoscopic colorectal surgery has been shown to result in reduction of postoperative pain and complications. Needlescopic surgery is minimally invasive technique that does not reduce the number of ports, maintaining the same level of quality as conventional laparoscopic surgery. Needlescopic surgery has performed in our institute since June 2011. Maximum port size is 5- or 12-mm. It is expected that needlescopic surgery reduces the postoperative pain. The aim of this study is to describe this technique, and to investigate its feasibility for colorectal cancer surgery.

Methods: A total of 420 patients with colorectal cancer from a single institution were included. All patients underwent curative surgery. Clinical characteristics and postoperative outcomes were observed retrospectively.

Results: Mean age was 64y. Ascending colon cancer was 94 cases. Transverse colon cancer was 21 cases. Descending colon cancer was 115 cases, and rectal cancer was 185 cases. Median operating time was 220 min. Median estimated blood loss was 15 ml. Median postoperative hospital stay was 10days. Mean body mass index was 23. There was 2cases which converted to open surgery. There was no mortality. There is significant difference in pain scale after surgery of abdominoperineal resection and intersphincteric resection (P=0.02). Incisions of 3mm port were not able to detect after 4weeks later of surgery.

Conclusions: Needlescopic surgery for colorectal disease was a technical and oncologically feasible technique.

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CHARACTERISTICS OF COLORECTAL CANCER INCIDENCE IN BEIJING AND COMPARISON WITH OTHER REGIONS IN THE WORLD.

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Purpose: There are significant international variations in the distribution of colorectal cancer . Rapid increase has been noted in China these years, but population-based epidemiologic studies about colorectal cancer are absent.

Methods: Colorectal cancer incidence rate of Beijing was from Beijing Cancer Registry (BCR).Representative cancer registries were selected to compare colorectal cancer incidence with Beijing, which included cancer registries at home (Shanghai, Jiashan, Hongkong) and abroad (New York, Oxford, Osaka, Mumbai, Kyadondo). Colorectal cancer incidence rates of these registries from 1998 to 2007 were obtained from IARC's "Cancer Incidence in Five Continents Plus" (CI5 plus) database.

Results: Characteristics of colorectal cancer incidence in Beijing Between 1998 to 2012, 43,990 patients with colorectal cancer were registered at Beijing Cancer Registry. Colorectal cancer incidence rate of Beijing was significantly increasing year by year. The annual percentage change (APC) of colorectal cancer was 7.7% and 1.8% from 1998 to 2005 and from 2005 to 2012 respectively, the incidence rate of rectal cancer and in male increased more significantly. **Comparison with other cities at home and abroad** The colorectal incidence of Beijing was lower than Shanghai, Jiashan, and Hongkong in China, but it was the only one that the incidence kept increasing rapidly. The colorectal cancer incidence rates in New York, Oxford and Osaka were higher than other cities, and Beijing had a medium level of colorectal cancer incidence. The incidence rates of colorectal cancer in India and Kyadondo remained low though they were increasing slowly. The colorectal cancer incidence of New York was decreasing these years, but in Beijing the incidence was increasing as we mentioned above.

Conclusions: Colorectal cancer incidence rate of Beijing was significantly increasing between 1998 and 2012, and the incidence was varied in different cancer types, sex, age groups, pathologic types and areas (urban/rural). Compared with other cities at home and abroad, Beijing had

a medium level of colorectal cancer incidence, but the incidence was increasing most significantly. There were obvious differences in cancer type, sex and age distribution between Beijing and other cities. The prevention, screening, and early diagnosis of colorectal cancer should be strengthened.

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SKELETAL MUSCLE LOSS DURING NEOADJUVANT THERAPY NEGATIVELY IMPACTS ON PROGNOSIS IN PATIENTS WITH LOCALLY ADVANCED LOW RECTAL CANCER.

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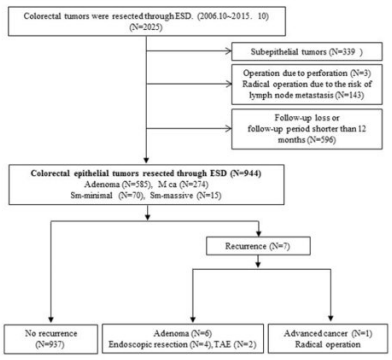
Purpose: Endoscopic Submucosal Dissection (ESD) is a very useful endoscopic technique, making it possible to perform an en bloc resection of a lesion regardless of its size. We already reported the early outcomes of colorectal ESD in 2013. The aim of this study is to report the long-term outcomes of our colorectal ESD experience. Rec) Lee EJ, Lee JB, Lee SH, Kim DS, Lee DH, Lee DS, Youk EG. Endoscopic submucosal dissection for colorectal tumors—1,000 colorectal ESD cases: one specialized institute's experiences. Surg Endosc. 2013;27:31-9.

Methods: Between October 2006 and October 2015, we performed ESD on 2,025 consecutive colorectal tumors in 1,951 patients. We analyzed 944 epithelial lesions removed through ESD methods and received follow-up colonoscopies. We evaluated the clinical outcomes and recurrence rate of these cases.

Results: The mean resected tumor size was 27.2±12.4 (5-145) mm. Our overall endoscopic en bloc resection rate was 97.4% and the en bloc R0 resection rate was 90.3%, respectively. Our perforation rate was 5.1% (48/944). Pathological examination showed adenocarcinoma in 38.0% of cases (359/944). During the median follow-up period of 32 (12-101) months, there were seven recurrences (0.7%). The local recurrence rate was higher in non-en bloc R0 resection group than in en bloc R0 resection group (3.4% vs. 0.5%, p=0.003). One patient developed an advanced cancer in the ESD site and underwent a radical surgery. Four cases received endoscopic resection and the remaining two cases received transanal excision.

Conclusions: Successful en bloc R0 resection through colorectal ESD can reduce tumor recurrence after endoscopic treatment and the resultant precise pathological assessment can reduce invasive surgical treatment.

Fig. 1. Flow chart showing a patient's clinical course after endoscopic submucosal dissection



ESD = endoscopic submucosal dissection; M ca =Adenocarcinoma confined to the mucosal layer; Sm-minimal = Minimal submucosal invasion: depth of invasion <1000 μm (flat or sessile type), <3000 μm (pedunculated type); Sm-massive = Massive submucosal invasion: depth of invasion ≥1000 μm (flat or sessile type), ≥3000 μm (pedunculated type); TAE = transanal excision

P275

COMPARISON OF LAPAROSCOPIC AND OPEN SURGERY FOR MARGIN POSITIVITY IN COLON CANCER: AN ASSESSMENT FROM NSQIP-PROCEDURE TARGETED COHORT.

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Purpose: Data on impact of surgical approach on the margin positivity in patients with colon cancer is limited. This study aims to compare perioperative and histopathological outcomes of patients undergoing laparoscopic and open colectomy for colon cancer using recently released procedure-targeted database in a case-matched design.

Methods: A review of 2012 colectomy-targeted American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) was conducted and patients were classified into two groups according to the surgical approach: Laparoscopic vs. Open. Groups were matched (1:1) based on local invasion depth (T stage), lymph node involvement (N stage), and presence of distant metastases (M stage). Patients who received neoadjuvant chemotherapy were excluded. Multivariate logistic regression analysis was used for group comparison.

Results: 990 cases were reviewed (495 patients in each group). Groups were comparable in terms of preoperative characteristics and demographics except age (p=0.012), gender (p=0.005), dyspnea (p=0.03), and preoperative weight loss (p=0.04). Operative time was significantly longer in the laparoscopic group [186 ±98 vs. 165 ±98 minutes, p<0.001]. Margin positivity was comparable between the groups (12.2% vs. 10.4%, p=0.38). Length of hospital stay was longer in the Open group [5 (2-91) days vs. 6 (1-64), p<0.001]. After adjustment for confounders, overall morbidity (28.5% vs. 45.5%, p<0.001), superficial surgical site infection (4% vs. 6.7%, p=0.02), urinary tract infection (1.8% vs. 4.6%, p=0.01), bleeding requiring transfusion (9.3% vs. 14.9%, p=0.007), postoperative ileus (11.7% vs. 17.4%, p=0.01), and reoperation (3% vs. 6.1%, p=0.02) rates were significantly higher in the Open group (Table).

Conclusions: Laparoscopic and open surgery achieves similar R0 resection rates in colon cancer. NSQIP targeted data demonstrate several short-term advantages of laparoscopic approach compared to open resection for colon cancer.

Results of risk adjusted analysis comparing laparoscopic and open surgery

Outcome	Multivariate MR or OR (95% CI)	P-value
Length of hospital stay	1.37 (1.28 - 1.47)	<0.001
Operative time	0.84 (0.79 - 0.90)	<0.001
Superficial Surgical Site Infection (SSI)	2.07 (1.11 - 3.82)	0.02
Deep SSI	2.47 (0.63 - 9.72)	0.19
Organ space SSI	1.06 (0.52 - 2.17)	0.86
Wound dehiscence	2.12 (0.37 - 12.03)	0.40
Pneumonia	1.52 (0.62 - 3.68)	0.35
Reintubation	1.42 (0.44 - 4.53)	0.55
Chronic renal insufficiency	0.68 (0.14 - 3.18)	0.63
Urinary tract infection	2.56 (1.13 - 5.78)	0.02
Bleeding requiring transfusion	1.74 (1.13 - 2.69)	0.01
Deep vein thrombosis	9.84 (1.22 - 78.99)	0.03
Sepsis	1.97 (0.86 - 4.53)	0.11
Septic shock	0.89 (0.18 - 4.25)	0.89
Anastomotic leak	1.77 (0.79 - 3.97)	0.16
Readmission	1.34 (0.85 - 2.12)	0.20
Ileus	1.63 (1.12 - 2.38)	0.01
Reoperation	2.03 (1.04 - 3.95)	0.03
Morbidity	2.16 (1.62 - 2.88)	<0.001
Readmission	1.34 (0.85 - 2.12)	0.20

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SKELETAL MUSCLE LOSS DURING NEOADJUVANT THERAPY NEGATIVELY IMPACTS ON PROGNOSIS IN PATIENTS WITH LOCALLY ADVANCED LOW RECTAL CANCER.

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Purpose: Sarcopenia has been recognized as a negative prognostic factor in several malignancies. Aim of the present study is to determine the

impact of sarcopenia and skeletal muscle loss (SML) during neoadjuvant chemoradiation (nCRT), on post operative complications and prognosis in patients with locally advanced low rectal cancer, submitted to nCRT and surgery

Methods: Patients with locally advanced rectal cancer (clinical stage T≥3 or N+) who underwent nCRT, surgical resection, and pre and post nCRT TC scan at our Institute, from January 2008 to March 2014, were studied. Total abdominal muscular area (TAMA) was measured by computed tomography before nCRT, and before surgery, at the level of the third lumbar vertebra by means of Slice-O-Matic V4.3 software (Tomovision, Montreal, Canada), Sarcopenia was defined with a cutoff point for the muscle index of 52 cm^2/m^2 for men and 42 cm^2/m^2 for women. The skeletal muscle change in cross sectional area in each patient was also compared before and after neoadjuvant treatment. Post operative morbidity, has been graded according to Clavien-Dindo (CD) classification, pathologic response to nCRT, and survival were compared in sarcopenic and non sarcopenic patients. The same items were compared in patients with and without SML after nCRT. Survival curves were compared by the Kaplan-Meier method, and the correlations between categorical variables were obtained with Pearson's χ^2 test.

Results: Fifty-two patients (34 males), median age 62 (range 32-79), met our inclusion criteria. Thirty-two patients were sarcopenic at baseline and 31 after nCRT. Sixteen patients had a SML $\geq$ 5% after nCRT and 19 $\geq$ 2%. No post operative mortality was observed. Thirty-two patients had postoperative complications as follow: CD1:3, CD2: 25, CD3: 3, CD4: 1. At pathological examination there were: 12 complete response, 14 stage I, 14 stage II, and 12 stage III tumors. Pre- and post treatment sarcopenia did not correlated with tumor response to nCRT. A higher number of N+ were found among patients with SML $\geq$ 2%. There was no correlation between sarcopenia and SML and postoperative complications. After a mean follow-up of 60 months (range20-93) all patients are alive. A skeletal muscle loss $\geq$5% significantly correlated with a shorter disease free survival both in the overall population (p=0.040) and in the subgroup of N0 patients (p= 0.015)

Conclusions: Skeletal muscle loss, but not sarcopenia "per se", after neoadjuvant chemo-radiotherapy in surgical treated rectal cancer patients, negatively impacts on disease-free survival. Patients with a SML $\geq$2 % had a tendency towards a worse response to RCT

P277

HIGH LEVEL OF SERUM CA19-9 CAN PREDICT THE POOR ONCOLOGIC OUTCOMES IN COLORECTAL CANCER PATIENTS.

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Purpose: We aim to verify the value of preoperative serum carbohydrate antigen 19-9 as a prognostic factor of primary colorectal cancer and recurrent colorectal cancer.

Methods: Serum CA19-9 was measured preoperatively in 4,794 patients who underwent curative resection for colorectal cancer. Serum CA19-9 was evaluated every 3 months for the first 2 postoperative years and every 6 months thereafter.

Results: Four hundred forty patients (9.2%) among 4,794 patients with colorectal cancer showed a high pre-CA 19-9 (CA 19-9 high: >37 ng/ml). High level of pre-CA 19-9 was significantly associated with high preoperative carcinoembryonic antigen level (CEA>5 ng/ml, P<0.001), size of tumor (P<0.001), right colon cancer (P<0.001), depth of invasion (P<0.001), lymph node metastasis (P<0.001), poor cell differentiation (P<0.001), distant metastasis (P<0.001). Cancer recurrence occurred 139 patients of 440 patients in high pre-CA 19-9 group and 667 patients of 4,354 patients in normal pre-CA 19-9 group (31.6% vs. 15.3%, P<0.001). The 5-year survival was less in patients with a high pre-CA 19-9 levels than normal pre-CA 19-9 group (5-years overall survival rate : 77.7% vs. 92.8%, P<0.001).

Conclusions: High serum CA 19-9 levels preoperatively and at follow up are poor prognostic factors for colorectal cancer.

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SURGICAL COMPLICATIONS FOR LOCAL ADVANCED RECTAL CANCER – COMPARISON OF TWO DIFFERENT PREOPERATIVE CHEMOTHERAPIES.

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Purpose: Preoperative chemoradiotherapy has improved local control of resectable rectal cancer. We discuss the effection of preoperative chemoradiotherapy(CRT) to surgical complications in this study.

Methods: between 2001 and 2014, consecutive patients with local advanced recal cancer within 10cm of the anal verge (clinical tumor category 3-4 or clinical node category 1-2) were divided into three groups. 587 patients received total mesorectal excision (TME) directly. 346 patients were treated with preoperative long term CRT (25*2Gy, capacitabine 825mg/m2, twice daily, day 1-33), TME followed 6-8 weeks later. 259 patients were treated with another pattern of preoperative short term radiotherapy (10*3Gy), TME followed 7-10 days later. According to Clavien-Dindo classification, surgical complications were evaluated for up to 30 days after discharged from hospital.

Results: Some 1192 patients were analyzed. There were no deaths caused by complications in 30 days. The most common complications were anastomotic leakage and perineal wound infection. Anastomotic leakage developed in 48 of 894 low anterior resections. 19 of them required surgical reintervention. Perineal wound complications developed in 50 of 303 abdominoperineal resections. The morbidity of perineal wound infection increased in patients who received long term CRT(p=0.002), but not in patients who received short term radiotherapy(p=0.626). More temporary diverting ileostomy preformed in patients who received preoperative CRT, especially in those with short term radiotherapy (p<0.001). there were no significant differences of anastomotic leakage in these three groups, but patients with long term CRT suffered from higher grade of this complication(needing surgical reintervention)(p=0.003).

Conclusions: The increase of surgical complications caused by preoperative chemoradiotherapy was acceptable. No significant differences were found in these three groups, except more perineal wound infection in long term CRT group. Our surgeons were prone to use temporary diverting ileostomy for patients who had received radiotherapy. Although there was no increase in morbidity of anastomotic leakage, more patients needed surgical reintervention if they had received preoperative long term CRT.

P279

PERIOPERATIVE AND SURVIVAL OUTCOMES FOR PATIENTS AGED 85 AND OVER UNDERGOING CURATIVE RESECTION FOR COLORECTAL CANCER.

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Purpose: A greater number of elderly patients with colorectal cancer are being offered curative surgery through improved peri-operative care. Appopriate patient selection through risk-stratification and pre-operative counselling can lead to excellent patient outcomes. This study investigated the outcomes of patients aged 85 and over who underwent resectional surgery for colorectal cancer.

Methods: A prospective analysis of patients from two regional units was carried out. Consecutive patients aged 85 and over who presented with colorectal cancer between 2003 and 2014 were included in the study. Patients who had metastatic disease on presentation were excluded. All surgery was considered curative and decided by the multidisciplinary team where possible. Data was captured on demographics, operation type, length of stay (LOS), complications, 30-day mortality, histopathological staging, and 1-year survival outcomes.

Results: A total of 266 patients were included with a median age of 87 (85-97). 160 (60%) patients underwent right hemicolectomy, 66 (26%) left hemicolectomy/anterior resection, 30 (8%) Hartmanns procedure, 19 (6%) had an undefined colectomy. Of these operations, 51% were performed laparoscopically. The median LOS was 8 days (0-64) although this was lower in the laparoscopic group - 6 days (3-32). There were 27 post-operative complications of which 19 were graded as Clavien Dindo 1-3. The 30-day mortality was 11%. The cancers were staged according to TNM 5th edition - 14 Stage 1, 37 Stage 2, 161 Stage 3, 62 Stage 4 and 1 polyp cancer. 1-year survival was 76.1%.

Conclusions: It is possible to perform safe and effective curative resection for colorectal cancer in patients aged 85 and over, however the peri-operative mortality remains high in this group. Over of half of these cases can be performed laparoscopically and these patients have better short-term outcomes. Optimal outcomes can only be achieved by a multidisciplinary peri-operative approach.

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COMPARISON OF CLINICOPATHOLOGICAL CHARACTERISTICS AND PROGNOSIS BETWEEN ≤5 YEARS AND >5 YEARS RECURRENCE AFTER CURATIVE SURGERY FOR COLORECTAL CANCER.

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Purpose: The purpose of this study was to evaluate characteristics and prognosis of recurrent colorectal cancer according to recurrence time. (≤5 years versus >5 years)

Methods: This study analyzed 4146 patients who were diagnosed with American Joint Committee on Cancer stage I to IV colorectal cancer and underwent curative surgery at the Samsung Medical Center in Korea between January 1995 and December 2005. Of them, 1056 patients showed recurrence after primary curative surgery for colorectal cancer. Recurrence occurred ≤5 years (n=983) or >5 years (n=73) after curative surgery.

Results: Among the 1056 patients who experienced recurrence, only 6.9% recurred >5 years after surgery. This group, males outnumbered females by a ratio of 2.5:1 and showed lower preoperative carcinoembryonic antigen levels, mild tumor depth invasion(T1 or T2), less lymph node metastasis, less lymphovascular invasion, less perineural invasion. Distant metastasis, especially lung metastasis, was most frequently observed in the late recurrence group. Compared with early recurrence(≤5 years), late recurrence(>5 years) showed good prognosis.

Conclusions: Late recurrence does exist. But with appropriate treatment, showed good prognosis.

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IS ROBOTIC SURGERY ASSOCIATED WITH IMPROVED SHORT-TERM OUTCOMES IN RECTAL CANCER PATIENTS UNDERGOING ABDOMINOPERINEAL RESECTIONS?

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Purpose: Robotic surgery is becoming a popular approach to minimally invasive colorectal surgery. The purpose of this study was to measure short-term outcomes after robotic abdominoperineal resections compared to the conventional open approach for selected patients.

Methods: Patients undergoing abdominoperineal resection (APR) for rectal adenocarcinoma from January 2009 to March 2015 at a single institution were identified using Current Procedural Terminology (CPT) codes. 239 patients were identified, 54 had robotic APR (R-APR) and 187 had open (O-APR). All R-APR were included. We excluded O-APR if patients had previous anterior resection, a major concurrent operation such as pelvic exenteration or hepatectomy, or required flap reconstruction. 52 patients remained in the O-APR group after exclusion. We recorded operative details, pathologic outcomes and 90 day complications according to Clavien-Dindo classification. Chi square, Fisher's exact test, T test and Wilcoxon rank sum test were used to compare groups with statistical significance set at 0.05.

Results: Patients in the R-APR group were younger (57 vs. 64.5 years, p=0.01) and had a trend towards higher median BMI (30 vs. 27, p=0.06), compared to O-APR. The proportion of patients receiving preoperative chemoradiation was similar in both groups (91 R-APR vs. 85%O-APR, p=0.4) but a greater proportion of R-APR patients received induction chemotherapy (65 vs. 25%, p<0.01). There were no significant differences among other patient characteristics such as gender, ASA score, and previous abdominopelvic surgery, or tumor characteristic such as stage, size, distance from the anal verge, or response to CRT. Conversion rate for the R-APR group was 3.7%. R-APR was associated with a longer median operative time (314 vs. 247 min, p<0.01), less blood loss (150 vs. 300 ml, p<0.01) and a shorter length of stay (6 vs. 8 days, p<0.01). Incidence of positive CRM was comparable (O-APR 9.6% vs. R-APR 3.7%, p=0.27). Complications in both cohorts are presented in Table 1. There was no difference in the proportion of patients with complications of grade 3 or higher, SSIs and perineal wound complications.

Conclusions: R-APR was associated with a shorter length of stay. The dataset was underpowered to detect an absolute difference in complication rate of less than 27%; however, the trend towards fewer complications justify examination in a larger cohort. We conclude this procedure has potential to improve surgical outcomes with future refinement.

Complications for Open APR vs. Robotic APR

Complications	Open APR (52)	Robotic APR (54)	p
Any Complication	36 (69%)	30 (56%)	0.15
Mean number of complications per patient	2.03	1.47	0.01
Grade III or higher	7 (13%)	4 (7.4%)	0.31
Surgical Site Infection rate	19 (37%)	14 (26%)	0.24
Perineal Wound Complication	22 (42%)	16 (30%)	0.17
Ileus/Small Bowel Obstruction	10 (19%)	7 (13%)	0.38
Readmission at 90 days	16 (31%)	11 (20%)	0.22

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THE IMPACT OF MECHANICAL BOWEL PREPARATION ON COLON CANCER RECURRENCE AND MORTALITY FOLLOWING RIGHT HEMICOLECTOMY.

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Purpose: A recent 10 year follow-up analysis of a Swedish multicenter randomized clinical trial on mechanical bowel preparation demonstrated significantly improved cancer-specific survival in patients who had received mechanical bowel preparation prior to a colonic resection for colon cancer compared to those who did not receive a preparation (1). The present study was conducted to assess the impact of mechanical bowel preparation on cancer recurrence, overall mortality and cancer-specific mortality in patients undergoing right hemicolectomy.

Methods: After institutional review board approval, the Quebec provincial cancer registry and patient medical records were retrospectively reviewed to identify all patients who underwent an elective right hemicolectomy for colon cancer at two tertiary care centers between 2006 and 2014. The primary outcomes were cancer recurrence, overall mortality and cancer-specific mortality. Secondary outcomes included anastomotic leak and wound infection. Patients with American Society of Anesthesiologists grade of 4 and above, stage IV colon cancer, mortality within 30 days of operation and synchronous colorectal cancer were excluded. Student's *t*-test, chi-square and Fisher exact tests were used to compare patient cancer and operative characteristics. Cox proportional hazard model was used to predict cancer recurrence, all-cause mortality and cancer-related mortality.

Results: Of 427 patients who met the inclusion criteria, 208 patients (48.7%) received a mechanical bowel preparation. The overall mean age was 73 [±10.5] years and 44.9% of patients were male. The mean follow-up was 3.3 years [±1.9]. On univariate analysis, the patients who received a mechanical bowel preparation had significantly longer follow-up (4.0 vs. 2.6 years, $p<0.0001$), fewer laparoscopic hemicolectomies (18.8% vs. 68.5%, $p<0.0001$), more transfusions (26.9% vs. 18.7%, $p=0.04$) and higher tumor grade (28.9% vs. 17.4% poorly differentiated, p=0.003). There was no significant difference in wound infection (6.3% vs. 4.6%, $p=0.44$) and anastomotic leak (0.5% vs. 1.8%, $p=0.37$) rates. On Cox regression, mechanical bowel preparation was not a significant predictor of time to recurrence [HR 0.85, 95% CI (0.49-1.48)], all-cause mortality [HR 2.06, 95% CI (0.47-4.48)] or cancer-specific mortality [HR 1.80, 95% CI (0.63-5.16)].

Conclusions: This study suggests that mechanical bowel preparation prior to elective right hemicolectomy for colon cancer does not impact long term oncologic outcomes. (1): A. Collin, B. Jung, E. Nilsson, L. Pahlman, J. Folkesson. Impact of mechanical bowel preparation on survival after colonic cancer resection. *Br J Surg* 2014; **101**: 1594-1600.

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THE ROLE OF THIRD DIMENSION IN RECTAL CANCER ASSESSMENT.

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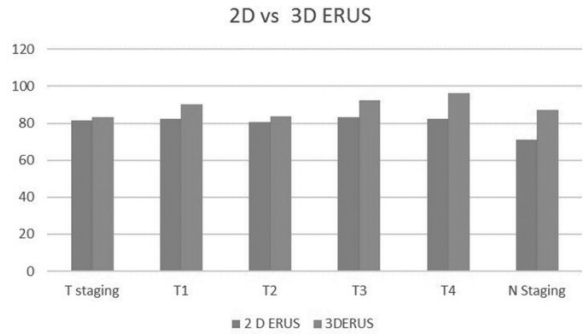
Purpose: Endorectal ultrasound is used for loco regional staging of rectal cancer for more than two decades. Traditionally, two dimensional endorectal ultrasound probes were used for tumor and nodal staging of rectal cancer. Three dimensional probes have been shown to improve the diagnostic capability of rectal cancer assessment. The aim of the study is to compare the diagnostic accuracy of both the techniques from the published data in the literature.

Methods: A systematic literature search was performed using PubMed, Embase and Cochrane databases for endorectal, trans rectal and endo anal ultrasound independently by two persons. This yielded 1405 abstracts including 204 reviews published between 1983 and 2014. These studies were reviewed for relevance to the purpose of the study. Studies comparing endorectal ultrasound staging with final histopathological staging and with a minimum of 20 patients were included. Studies were segregated based on the use of two or three dimensional ultrasound for tumor and nodal staging. Pooled statistical analysis was used to evaluate the diagnostic accuracy for loco regional staging.

Results: The literature search yielded 48 and 5 studies for tumor staging and 37 and 4 studies for nodal staging using two and three dimensional endorectal ultrasound techniques respectively. The final analysis included 12119 patients in the two dimensional endorectal ultrasound group and 629 patients in the three dimensional endorectal ultrasound group. Pooled analysis of all two dimensional ultrasound studies showed a T stage overall accuracy of 81.6±-8.1% and nodal staging accuracy of 71.0±9.7%. The individual staging accuracy of T1, T2, T3 and T4 stages were 82.4±8.3%, 80.5±17.4%, 83.41±13.8% and 82.26±21.2%. Pooled analysis of studies using three dimensional technique showed an overall T stage accuracy of 83.3±7.6% and T1 to T4 diagnostic accuracy of 90.2±6.9%, 83.6±10.7%, 92.4±3.4% and 96.3±2.2% respectively. The overall nodal staging accuracy using three dimensional ultrasound was 75.5±9.1% (Image 1)

Conclusions: Endorectal ultrasound for loco regional rectal cancer staging has acceptable diagnostic accuracy with both three and two dimensional ultrasound techniques. The results from three dimensional endorectal ultrasound group were more accurate than two dimensional ultrasound and the differene was more pronounced for nodal staging. A prospective multi-center trial comparing two dimensional, three dimensional and magnetic resonance imaging would clarify the best possible diagnostic modality for loco regional rectal cancer assessment.



Diagnostic accuracy of Tumor and Nodal staging with 2 Dimensional and 3 Dimensional ultrasound

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ACCURACY AND PREDICTIVE ABILITY OF PREOPERATIVE MRI FOR RECTAL ADENOCARCINOMA: ROOM FOR IMPROVEMENT.

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Purpose: MRI is the current gold standard for the pre-operative staging of most rectal cancers. The aim of this study was to assess the accuracy and predictive ability of MRI for T- and N-staging in rectal adenocarcinoma.

Methods: All patients diagnosed with rectal adenocarcinoma during 2012 and 2013 who subsequently underwent radical resection were identified from a provincial cancer registry. Preoperative MRI (PreOp) stage was compared with pathologic stage in patients receiving primary surgery or short course radiotherapy. Post-neoadjuvant long course chemoradiotherapy MRI (Post-LCRT) stage was compared with pathologic stage in patients receiving long course chemoradiotherapy (LCRT). Patients who had MRIs performed prior to LCRT but did not have post LCRT restaging MRI were excluded from analysis.

Results: Of 702 patients identified, 382 (54.4%) had a preoperative staging MRI; 134 (19.1%) had a preoperative MRI followed by short course radiotherapy or immediate surgery and 70 (10.0%) had a restaging MRI after completion of LCRT. PreOp T-stage was accurate in 66/133 patients (49.6% [95% CI 41.3 to 58.0]) and accurately differentiated $pT\geq3$ from $pT\leq2$ in 86/133 patients (64.7% [95% CI 56.2 to 72.3]). In this setting, 35.0% of $pT\geq3$ lesions were understaged and 35.6% of $pT\leq2$ lesions were overstaged by MRI. PreOp N-stage was accurate in 82/134 patients (61.2% [95% CI 52.7 to 69.0]). In this group, pN-stage was understaged in 23.9% and overstaged in 14.9% by MRI. Post-LCRT T-stage was accurate in 26/66 patients (39.4% [95% CI 28.5 to 51.5]), and Post-LCRT N-stage was accurate in 56/68 patients (82.4% [95% CI 71.6 to 89.6]).

Conclusions: The accuracy of MRI for T- and N-staging in rectal adenocarcinoma was poor. Further study is necessary to identify opportunities for quality improvement for this patient population.

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CLINICAL IMPACT OF STENT IN COLORECTAL CANCER OBSTRUCTION.

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Purpose: To analyze the clinical efficacy and long term oncologic outcome of self-expandable metallic stent (SEMS) in the bridge to surgery treatment strategy

Methods: Retrospective study was carried on a prospectively collected data. Total 322 CRC obstruction patients who underwent curative surgery between 2000 and 2013 at a single institution were included for the study. Cases with synchronous cancer, other cancer history, or missing data were excluded. Factors and outcomes were studied between the stent and non-

stent group. Chi-square test, Fisher's exact test was performed for association analysis. Kaplan-Meier method and Cox proportional hazard model were performed for survival analysis. The statistical analyses were performed with SPSS 18.0 (Statistical Package for Social Sciences, Chicago, IL)

Results: <<Results>> Comparing the stent and non-stent group, there were significant difference in location, type of surgery, and operation date. More stenting was performed for left colon cancer. (15.9% vs 77.63%, p<0.001) More open surgery was performed for the non-stent group. (76.2% vs 44.9, p<0.001) More stenting was performed after 2007. The technical success rate of SEMS insertion was 100%. SEMS complication rate was 4.1%. SEMS perforation rate was 3.4%. Regarding the clinical efficacy of stenting, significant difference was noted in the bowel preparation rate (86.1% vs 97.3%, p<0.001, emergency surgery rate, (19.2% vs 3.4%, p<0.001) and transfusion rate. (58.3% vs 46.3%, p=0.05) Yet, no significant difference was noted in stoma, leakage, and postop complication rate. In the survival analysis, stenting seemed to have a negative impact on disease free survival. (p=0.08) However, no significant difference was observed in overall survival. The cox proportional hazard model showed significancy in stenting, stoma creation, lymph node metastasis, and perineural invasion on survival.

Conclusions: The clinical efficacy of SEMS in relieving CRC obstruction was demonstrated; the technical success rate was high with acceptable complciation rates. By SEMS insertion, more patients benefited from better bowel preparation rates and less emergent surgery. On the other hand, stenting seemed to have a negative impact in the disease free survival analysis. Future prospective randomized studies are warranted, and additional studies optimizing oncologic outcome of stenting by utilizing adjunctive chemotherapy may be of interest.

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WHAT IS THE MOST COMMON SITE OF METASTASIS AFTER CURATIVE RESECTION WITH NEOADJUVANT RADIOTHERAPY FOR RECTAL CANCER: THE LIVER OR THE LUNGS?

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Purpose: To investigate the incidence, timing and predictive factors of metachronous hepatic and pulmonary metastases after curative resection with neoadjuvant radiotherapy.

Methods: A total of 382 consecutive patients with locally advanced rectal cancer who received curative resection with neoadjuvant radiotherapy from 2002 to 2011 were enrolled in this study.

Results: A total of 76 (19.9%) developed distant metastases. The 5-year disease-free survival for the entire cohort was 77.5%. The most common site of metastases was the lung (57.9%, n=44), followed by liver 38.2% (n=29), bone 18.4% (n=12), extra-regional lymph nodes 9.2% (n=7), peritoneum 7.9% (n=6), and brain 2.6% (n=2). Median interval from rectal surgery to identification of pulmonary metastases was much longer than that of hepatic metastases (20.2 months vs 10.1 months, p=0.022). In multivariate analysis, pulmonary recurrence was significantly associated with pathologic T stage (HR=3.820, 95% CI: 1.444-10.105; P=0.007), and pathologic N stage (HR=3.432, 95% CI: 1.681-7.006; P=0.001). As for liver metastases**,** only the pathologic T stage (HR = 3.659, 95% CI: 1.395-9.601; p = 0.008) retained its significance in logistic regression multivariate analysis.

Conclusions: In conclusion, Our study emphasizes that the lung was the most common site of recurrence in a cohort with rectal cancer who underwent neoadjuvant radiotherapy and curative surgery. As differences in patterns of pulmonary and hepatic metastases are observed, tailor-made and organ-targeted surveillance strategies leading to early detection of metastatic disease is strongly needed.

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CLINICAL SCORE FOR PREDICTING POSTOPERATIVE MORBIDITY AFTER RESECTION OF THE PRIMARY TUMOR IN PATIENTS WITH STAGE IV COLORECTAL CANCER.

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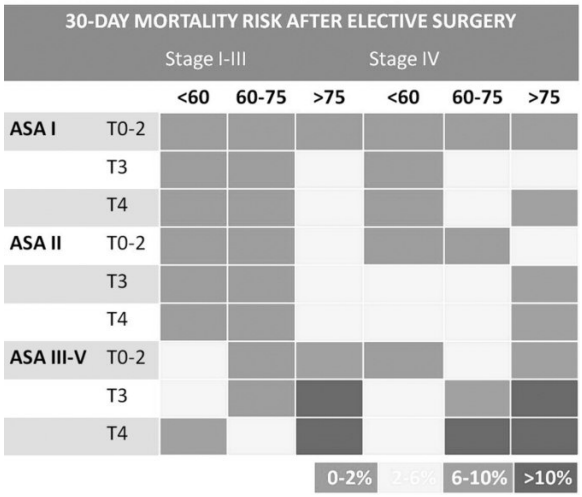
Purpose: There is no consensus about the benefit of a palliative resection of the primary tumour in stage IV colorectal cancer. An increased risk of postoperative mortality compared to stage I-III is often used as an argument against palliative resection in patients with an asymptomatic tumour. The aim of our study was to investigate if patients with stage IV colorectal cancer have an increased risk of postoperative morbidity and mortality after resection of the primary tumour.

Methods: Patients who underwent colorectal surgery for colorectal cancer between 2009 and 2013 were selected from the Dutch Surgical Colorectal Audit, a nation-wide surgical database. Differences in postoperative morbidity and mortality between stage I-III and stage IV were compared with the chi-squared test. We used a multivariable logistic regression to identify independent predictors of morbidity and mortality.

Results: Of a total of 43,827 patients, 37,985 patients (86.7%) had a stage I-III tumour and 5,842 patients (13.3%) had stage IV disease. There were no differences in the number or type of postoperative complications between the two groups. Postoperative mortality was higher in stage IV compared to stage I-III (6.4% versus 3.7%, p<0.001). Age (≥70 year versus <70 year: HR 2.20 [95%CI 1.65-2.92]), ASA classification (≥III versus I-II: HR 2.52 [95%CI 1.91-3.31]), Charlson comorbidity index (≥2 versus 0: HR 1.72 [95%CI 1.26-2.36]) en location of the primary tumour (rectum versus colon: HR 0.37 [95%CI 0.23-058]) all were strong predictors of postoperative mortality in patients with stage IV colorectal cancer (Figure 1).

Conclusions: Patients with stage IV colorectal cancer did not have an increased chance of postoperative complications after resection of the primary tumour. However, mortality within 30 days was higher in patients with stage IV disease. Important predictors of postoperative mortality were age, ASA score, comorbidity and location of the primary tumour.



P288

SURGICAL OUTCOME OF RECTAL CANCER IN HARTMANN PROCEDURE:A USEFUL WAY WITH CAUTION.

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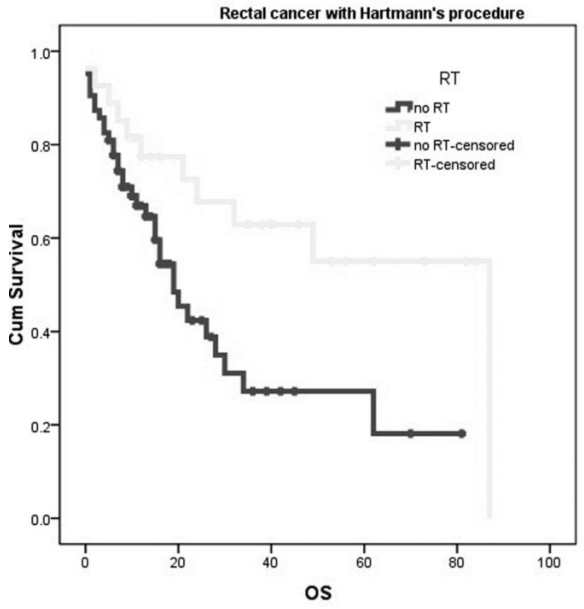
Purpose: Surgical treatment of rectal cancer is normally categorized into low anterior resection (LAR), abdominal-perineal resection (APR) and Hartmann's procedure, which is commonly conducted in the case of advanced disease or patients who couldn't tolerate radical surgery. The

comparison between LAR and APR revealed the potential survival benefit, however, the outcome of Hartmann's procedure is still lacking of evidence.

Methods: The clinical and pathological data of rectal cancer patients who underwent surgical treatment from Jan. 2007 to Mar. 2015 were collected retrospectively. The relationship between clinical features and survival was analyzed. Kaplan-Meier analysis was employed.

Results: Among 1261 rectal cancer patients, 90 (7.1%) patients underwent Hartmann's procedure. 27 (30%) patients received pre-operative chemo-radiation (P-CRT). Postoperative TNM staging demonstrated 4 (4.4%) stage 0 (p-CR), 9 (10%) stage I, 18 (20%) stage II, 24 (26.7%) stage III and 35 (38.9%) stage IV disease. The 3 year overall survival of Hartmann patients was significantly lower than that of LAR or survival of APR ($p<0.05$). Interestingly, Hartmann patients with P-CRT had markedly longer overall survival as well as lower rate of local recurrence, compared with patients without P-CRT ($p=0.012$ & $p=0.001$). Univariate analysis revealed that the OS was significantly correlated with TNM staging, ascites, CEA, P-CRT and other pathological features. Nevertheless, Hartmann patients suffered higher rates of post-operative complications compared with LAR and APR patients, especially with P-CRT, such as pelvic abscess and intestinal obstruction, etcs.

Conclusions: Minority of patients with rectal cancer underwent Hartmann's procedure due to potentially threatened resection margin, or poor physical condition against anastomosis. Comparatively, Hartmann patients had survival disadvantages in terms of higher perioperative morbidity, compared with LAR or APR patients. Pre-operative CRT might provide survival benefits in Hartmann patients due to local control.



P289

IMPACT OF NEOADJUVANT TREATMENT WITH IMATINIB IN THE TREATMENT OF RECTAL GIST.

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Purpose: Rectal Gastrointestinal stromal tumor (GIST) is a rare disease, 5% of total GIST of malignant rectal tumor. But the prognosis is the worst in rectum. As imatinib has been introduced as the neoadjuvant treatment, it has marked the beginning of a new era in the treatment of GIST. The aim of this study is to investigate the role of imatinib as the neoadjuvant treatment for rectal GIST.

Methods: A total of 36 patients with rectal GIST who underwent curative resection between January 1998 and December 2014 were included for the analysis. They were classified into neoadjuvant group (n=11) and non-neoadjuvant group (n=25), according to application of neoadjuvant therapy with imatinib. Clinicopathologic characteristics, postoperative morbidity, recurrent rate and overall survival between two groups were compared.

Results: In neoadjuvant group, tumor size was significantly decreased after imatinib treatment(7.7±3.8 vs. 4.8±2.9, p=0.011) There was also no significant difference in postoperative complication between the two groups. Comparing between two groups, it didn't show significant difference in tumor size (p=0.958) and mitotic count (p=0.486) Circumferential resection margin involvement was identified in one patient (1.9%) of neoadjuvant group, and in four patients (16.0%) of non-neoadjuvant group. There was no significant difference in disease free survival and overall survival (recurrence; 18.2% vs. 32.0%, p=0.688)

Conclusions: In the management of rectal GIST, neoadjuvant therapy with imatinib showed a role of conversion from unresectable tumor to resectable one, and offered the chance of curative resection, more than initially resectable tumor.

P290

INTRAOPERATIVE DECISION NOT TO GIVE INTRAOPERATIVE RADIATION: HOW DOES IT AFFECT OUTCOMES IN COLORECTAL CANCER?

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Purpose: We evaluated outcomes in patients with advanced colorectal cancer for whom intraoperative radiation therapy (IORT) was planned, but not delivered. Intraoperative decision making and outcomes were analyzed. We hypothesized that intraoperatively determined necessity for IORT would be associated with higher rates of R1 resection but similar recurrence rates.

Methods: Retrospective review of patients treated for colorectal cancer at an academic medical center between 2005-2014. Demographics, tumor stage, and resection margins were reviewed. Outcomes were compared for patients who did or did not receive IORT. Sensitivity and specificity of intraoperative judgment for deciphering patients who would not benefit from IORT was then calculated.

Results: Of 95 patients with Stage II-IV colorectal cancer, 79 (83%) patients underwent preoperative MRI to determine resectability and need for IORT. The remaining 17% underwent CT. All study patients were deemed IORT candidates based on imaging. 52 (55%) received IORT based on intraoperative findings. IORT patients were similar to controls in terms of age (62y vs. 56y; P=0.06) and disease stage; (Stage II 19% vs. 23%; P=0.6, Stage III 19% vs. 23%; P=0.6). Patients with Stage IV disease were less likely to receive IORT (10% vs. 37%; P=0.001). R0 resection rates were similar between groups (R0 67% vs. 61%; P=0.50), while patients undergoing an R1 resection were more likely to receive IORT (21% vs. 7%; P=0.05). Patients who underwent an R2 resection were less likely to receive IORT (12% vs. 33%; P=0.01). 6 of the 43 patients who did not undergo IORT because of presumed R0 resection had an R1 or R2 resection on final pathology. Clinical gestalt and frozen section analysis was 82% sensitive and 52% specific for determining R2 and R0 resection margins (those *not* helped by IORT). Complication rates were higher in IORT patients (75% vs. 51%; P=0.02). Locoregional recurrence (21% vs. 12%; P=0.2), metastatic recurrence (37% vs. 37%; P=0.5), and overall recurrence (44% vs. 44%; P=0.9) were similar. Subset analysis of R0 resection patients revealed similar rates of locoregional recurrence for non-IORT patients (17% vs. 8%; P=0.3). On multivariate regression controlling for TNM stage, tumor grade, and resection margin, IORT was not independently associated with recurrence rates (O.R. 1.3, 95% C.I. 0.5-3.9; P=0.6).

Conclusions: Intraoperative assessment appears to be a sensitive indicator of which patients with locally advanced rectal cancer may benefit from IORT. We identified higher complication rates and equivalent recur-

rence between those who did and did not receive IORT despite the relatively high prevalence of unresectable disease in non-IORT patients. These results support the appropriateness of utilizing clinical judgment for patient selection for IORT.

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SHORT-TERM RESULTS OF DOWN-TO-UP TME BY TAMIS FOLLOWING TRANSANAL INTERSPHINCTERIC DISSECTION FOR LOWER RECTAL CANCER LOCATED CLOSE TO THE ANUS.

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Purpose: The aim of this study was to clarify the short-term results and surgical tips of down-to-up TME by TAMIS following trans-anal intersphincteric dissection (TAMIS-ISR) for very low rectal cancer near the anus.

Methods: We experienced this procedure in twenty-seven lower rectal cancers locating within 5cm from the anal verge. In the first step of this procedures for tumors closed by the anus, transanal intersphincteric dissection per the anus was performed from 2cm distal side of the tumor till the level of upper edge of the anal canal that the pubo-rectal muscle was fully exposed. Then we start TAMIS procedures after placing Gelpoint path in the anal canal. Distal stump was closed to prevent cancer cell dissemination and irrigate the anal canal. Down-to-up TME was performed under pneumoperitoneum using conventional laparoscopic devices till the level of the peritoneal reflux. Next, we moved to the abdominal side and did conventional laparoscopic procedures to make entire resection of the specimen. All reconstructiosn were made by hand-sewn colo-anal anastomosis. Diverting ileostomy was created in all the patients.

Results: In this study, Clinical T1, T2 and T3 were 10, 10 and 7, respectively and mean length from the anus was 4.5cm. Laparoscopic pelvic sidewall dissection was performed in 10 cases. Median total operative time and median blood loss was 255min and 75ml in patients without pelvic sidewall dissection and 352 min and 79ml in patients with one. Median operating time in the part of TAMIS was 76 min in all the cases. No complications were found in TAMIS related procedures. Conversion was found in one. We had grade III or more postoperative leakages in 4 patients. R0 operation was achieved in all patients. Urinary dysfunction with residual urine of > 100ml at 5 POD was found in 4 patients, who would all recover in one month. As the greatest merit of TAMIS-ISR, we could get the clear exposure at the anterior side of the rectum which could not be seen in conventional laparoscopic TME. We could identify the recto-urethral muscle here and we could get to the prostate clearly after cutting the structure. Denonvillier's fascia could also be seen as next important structure. The seminal vesicle was exposed after cutting this fascia, and we could reach to the peritoneal reflux under TAMIS.

Conclusions: Down-to-up TME by TAMIS following trans-anal intersphincteric dissection could offer feasible procedures in any lower rectal cancer located close to the anus. We should learn specific surgical anatomies in performing TAMIS.

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ACHIEVING A COMPLETE PATHOLOGIC RESPONSE FOLLOWING NEOADJUVANT THERAPY IN RECTAL CANCER IMPROVES ONCOLOGIC OUTCOMES AND MORTALITY.

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Purpose: The objective of this study is to determine if achieving a complete pathologic response (pCR) after neoadjuvant chemoradiotherapy for rectal cancer leads to improved oncologic outcomes following radical resection. A secondary outcome is to determine if extending the time to resection affects the rate of pCR and subsequent oncologic outcomes.

Methods: Patients diagnosed with stage II and III rectal cancer from January 1, 2005 to December 31, 2013 in three major urban centers were identified. Those treated with curative intent neoadjuvant chemoradiotherapy and surgery were included. Demographic, clinical and pathologic data were collected via retrospective chart review. Rates of local recurrence, metastatic disease, and death were documented and compared using log rank tests.

Results: Seven hundred and eighteen patients fulfilled the inclusion criteria (483 males; mean age 60.7 [range 27-90] years). One hundred and nineteen patients (16.6%) had a pCR following neoadjuvant therapy. The mean follow up was 31.3 months (range 0.36-120.6 months). None of the patients who achieved a pCR had a local recurrence *vs* 26 (4.3%) of the non-pCR patients (p=0.004). Distant metastases developed significantly less frequently in the pCR group (5% *vs* 19%, p=0.0001). All-cause mortality also differed significantly between the pCR and non-pCR groups (8.4% *vs* 15.9%, p=0.015)**.** The median time from completion of neoadjuvant therapy and surgery was 8 weeks. pCR rates did not differ when the interval between completion of neoadjuvant chemoradiotherapy and surgery was greater than or less than the median (16.6% *vs* 13.7%, p=0.30). Local recurrence (7.1% *vs* 4.3%, p=0.09), distant metastases (13.6% vs 16.8%, p=0.43), and all-cause mortality (12.6% *vs* 11.5%, p=0.31) also did not differ when compared against the median time.

Conclusions: Achieving a pCR after neoadjuvant therapy in rectal cancer is associated with a decrease in the rate of local recurrence, distant metastases, and all-cause mortality after surgery. Intervals of greater than 8 weeks between the completion of neoadjuvant chemoradiotherapy and surgery do not appear to affect rate of pCR or subsequent oncologic outcomes.

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ONCOLOGIC OUTCOME AFTER COMPLETE MESOCOLIC EXCISION FOR STAGE I-III COLON CANCER: A SINGLE-CENTER 13-YEAR RETROSPECTIVE COHORT STUDY OF 3137 PATIENTS.

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Purpose: Complete mesocolic excision (CME) has been proposed to improve oncologic outcomes. The aim of this study was to review the long-term oncologic outcomes of the patients who received complete mesocolic excision for the treatment of stage I-III colon cancer

Methods: Between Jan 1, 2000 and Dec 31, 2012, all consecutive patients with adenocarcinoma arising from the colon were retrospectively retrieved for this cohort-based study from the Yonsei Colorectal Cancer Electronic Database. 3137 patients who underwent CME for the treatment of stage I-III colon cancer were eligible for the final analysis. CME was performed during the period of 2000-2005 (n = 844) and 2006-2012 (n = 2293). Our CME technique, on the basis of the same principle as original CME, but with a more tailored approach was our standard treatment for patients with colon cancer during the overall period

Results: Mean follow-up was 55.1 months (range 6.7 – 120.6). The most common location of the main tumor was in the left-sided colon [1648 (52.5%)], followed by right-sided colon [1179 (37.6%)] and transverse colon [310 (9.9%)]. 54 (6.4%) patient underwent minimally invasive surgery (MIS) during the period of 2000-2005 and 1640 (71.5%) patient underwent MIS during the period of 2006-2012. 152 (4.8%) patient had more than grade 2 complications during the overall period. According to time period, there was no significant difference between the two groups in terms of postoperative morbidity (2000-2005 vs. 2006-2012: 5.5% vs. 4.6%; p = 0.193). The mean number of resected lymph nodes was significantly different between the two groups (2000-2005 vs. 2006-2012: 27.3 ± 17.1 vs. 23.4 ± 14.6; p < 0.001). Adjuvant chemotherapy was given to 273 (85.6%) of the 319 patients with stage III disease during the period of 2000-2005 and 773 (92.1%) of the 839 patients during the period of 2006-2012 (p = 0.001). For all patients, 5-year overall survival (OS) rates, 5-year cancer-specific survival

(CSS) rates and 5-year disease-free survival (DFS) rates were 85.6%, 87.9% and 83.4%, respectively. 5-year OS, 5-year CSS and 5-year DFS rates in patient with stage III disease were 75.3%, 78.2% and 72.0%, respectively. According to time period, 5-year CSS rate was 86.0% for 2000-2005 and 88.9% for 2006-2012 (p = 0.020). In patient with stage III disease, 5-year CSS (2000-2005 vs. 2006-2012: 72.6% vs. 79.6%; p = 0.095) showed trend toward better outcome in the period of 2006-2012 than in the period of 2000-2005

Conclusions: Our result indicates that CME technique using MIS was successfully established for the treatment of colon cancer with similar postoperative complications and acceptable oncologic quality compared to open surgery. With the advance of adjuvant chemotherapy, this technique may contribute more benefit to improvement of oncologic outcome, especially in patients with stage III colon cancer.

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OUTCOMES ACCORDING TO BMI IN LAPAROSCOPIC COLORECTAL CANCER PATIENTS.

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Purpose: The purpose of this report was to compare the outcome of laparoscopic colorectal resection according to BMI.

Methods: All patients were performed laparoscopic colorectal resection from September 2006 to March 2015 at Korea University Anam Hospital. The data was collected prospectively and analyzed retrospectively. BMI may not correspond to the same degree of fatness in different populations. Therefore, BMI was classified as WHO Asia Pacific perspective for Asians (WHO IOTF 2003) in this study (Table). A total 2408 patients were included and classified into four groups; underweight (n=112, BMI <18.5), normal range (n=886, 18.5-22.9), pre-obese (n=655, 22.9-24.9), and obese (n=755, >25) group. Perioperative parameters and oncologic outcomes were analyzed in the four groups. Statistical analysis consisted of one way ANOVA (analysis of variance), Kruskal-Wallis test, and Kaplan-Meier curve analysis where appropriate, with significance set at P<0.05.

Results: There were no significant differences between the groups with respect to age, sex, adjuvant therapy, TNM staging, rate of diverting stoma, preoperative CEA, postoperative complications and length of postoperative hospital stay. The obese group had a longer operative duration (p=0.001), less number of harvested lymph nodes (p<0.001). On comparison of oncologic outcomes except stage IV, underweight group has poor outcome in both overall (p=0.007) and cancer specific survival (p=0.002). Underweight group had the lowest portion of national health insurance, whereas the group was the highest rate with medical care (p=0.012).

Conclusions: According to the BMI classification of WHO Asia Pacific perspective for Asians, there are significant differences in several variables such as ASA, operative time, the number of harvested lymph nodes and oncologic outcomes. Obese group has a longer operative duration, less number of harvested lymph node, whereas underweight group has the poorest outcome in overall and cancer specific survival than other three groups. It might be related with socioeconomic status, particularly with their insurance.

The World Health Organization (WHO) acknowledged that BMI may not correspond to the same degree of fatness in different populations. The following table is the WHO Asia Pacific perspective for Asians (WHO IOTF 2003)

Classification	BMI (kg/m²)	N (%)	Group
Underweight	< 18.5	112 (4.7)	0
Normal range	18.5 - 22.9	886 (36.8)	1
Overweight			
Pre-obese	23 - 24.9	655 (27.2)	2
Obese I	25 -29.9	698 (29.0)	3
Obese II	≥ 30	57 (2.4)	3

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SESSILE SERRATED POLYPOSIS SYNDROME: A WOLFPACK DRESSED AS SHEEP.

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Purpose: In 2006 we presented "Large hyperplastic polyps: wolves in sheep's clothing". These polyps have become known as sessile serrated adenomas/polyps (SSA/P) and their strong predilection to malignant change has been confirmed. Over the last 9 years we have noted that some patients have multiple SSA/Ps and are included in the broader term of Serrated Polyposis Syndrome. However, this dilutes the impression of clinical aggression that managing patients with multiple SSA/Ps conveys. We report a series of patients managed endoscopically to illustrate how dangerous this variant of the syndrome is.

Methods: Patients with > 5 cumulative SSA/Ps were accessed from a single surgeon's colonoscopy database. Patients were colonoscoped at intervals determined by the number, size and pathology of their polyps and these data were recorded prospectively. In general, polyps smaller than 5mm were not removed. End points included the number and size of polyps detected, the total number of polyps excised during colonoscopic surveillance and the incidence of colorectal malignancy within the cohort. Smoking and alcohol histories and personal and family histories of cancer were recorded.

Results: Twenty patients with > 5 SSA/Ps were identified, with a mean follow up of 6.4 years (range 0-24 years) and a mean number of surveillance colonoscopies of 4.6 per patient (range 1-8). Patient age at diagnosis ranged from 51 to 82 years. Ninety-two colonoscopies were performed during the study period, of which 3 had an inadequate bowel preparation; these patients were re-scoped with satisfactory preparation within 4 weeks. The average number of polyps per patient identified at the index colonoscopy was 14.2 (range 1-63) and this decreased to 5 (range 0-15) at the most recent colonoscopy. The mean number of polyps excised per patient was 29. The size of the largest detected polyp per examination became smaller over the course of follow-up: 25.8mm at index evaluation versus 14.1mm at most recent evaluation. High-grade dysplasia was found in 3 SSA/Ps and low-grade dysplasia in 4. Eighteen of 20 patients had adenomas, 10 of which were advanced. A total of 4 patients (20% of the cohort) were diagnosed with malignant polyps: 1 patient at the index colonoscopy, 1 patient at the 2nd annual surveillance and 2 patients at the 4th annual surveillance respectively. Three of these proceeded to resection due to inadequate polypectomy margins: no residual adenocarcinoma was identified in 2 of the specimens while the 3rd was a T2N0 lesion. There were no colonoscopic complications.

Conclusions: SSA/P polyposis is an aggressive syndrome of colorectal cancer predisposition. This is a problem as SSA/Ps are typically difficult to recognize endoscopically, there is a high incidence of adenomas and large interval SSA/Ps and cancer are features of follow-up. The potential role for prophylactic colectomy in this cohort of patients has yet to be fully examined.

Demographics and risk factors of SSA/P cohort

	N = 20	%
Mean age	66.4 years	
Gender	Male = 14, Female = 6	70 : 30
Family history colorectal cancer	5	25
Personal history cancer	Prostate = 3 Renal = 1 Colon = 1 Breast = 1 Thyroid = 1	15 5 5
Smokers / prior smokers	11	55
Alcohol intake	9	45

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LAPAROSCOPIC PROCTECTOMY OFFERS IMPROVED SHORT-TERM OUTCOMES IN OBESE RECTAL CANCER PATIENTS OVER TIME: RESULTS FROM ACS NSQIP.

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Purpose: Although many randomized studies have demonstrated non-inferiority to a laparoscopic approach to rectal cancer, there is a gap in the current literature regarding outcomes in obese patients. Our objective was to assess for a protective role of a laparoscopic approach to proctectomy in obese patients with rectal cancer.

Methods: Patients who underwent elective or emergent proctectomy for rectal cancer between 2005 and 2013 were identified from the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database. Cases were identified by ICD (rectal cancer) and CPT codes and stratified by laparoscopic or open approach (surgical approach). Primary outcome was the frequency of post-operative complications as a composite function. Secondary outcomes included need for reoperation, length of stay, and readmission. Variables were reviewed to ensure consistency of definitions between years. Multivariate regression techniques were used to identify predictors of the outcomes. Available confounding variables of the surgical approach were proposed a priori and ruled in using backwards selection techniques.

Results: 20,479 patients underwent proctectomy for rectal cancer; 5361 (26%) were laparoscopically undertaken. On univariate analyses, the overall rate of post-operative complication was 35% with an associated 7% reoperation rate. There was a lower overall rate of individual and composite complication rates in the laparoscopic group relative to the open group in patients of all BMI categories. On multivariate analysis, open proctectomy was associated with a 50% increase in postoperative complications relative to a laparoscopic approach (OR 1.52; 1.41-1.63). Increasing BMI categories were associated with increased rates of morbidity (OR 1.12; 1.1-1.15). Despite an increasing rate of complications observed in patients with higher BMI, the lower rates in the laparoscopic group remained constant with increasing BMI (p=0.88; **Figure 1**). Neither surgical approach nor BMI categories were predictive of any need for reoperation (p=0.69). A history of COPD or postoperative surgical site infection was most predictive of a need for reoperation (OR 1.5 and 1.67, respectively). For every 5-point increase in BMI category, there was an associated 13% increased length of stay. Furthermore, patients who underwent a laparoscopic approach had close to half the length of stay of open patients in this cohort (OR 0.52; 0.49-0.55). The benefit of laparoscopy over open proctectomy increased with increasing study year (p=0.003).

Conclusions: The benefits of a laparoscopic approach to a proctectomy in patients with rectal cancer continue to persist in obese patients. Despite the difficulty of a laparoscopic approach in this patient population, there are significant patient and hospital centered benefits in rates of post-operative morbidity and length of stay.

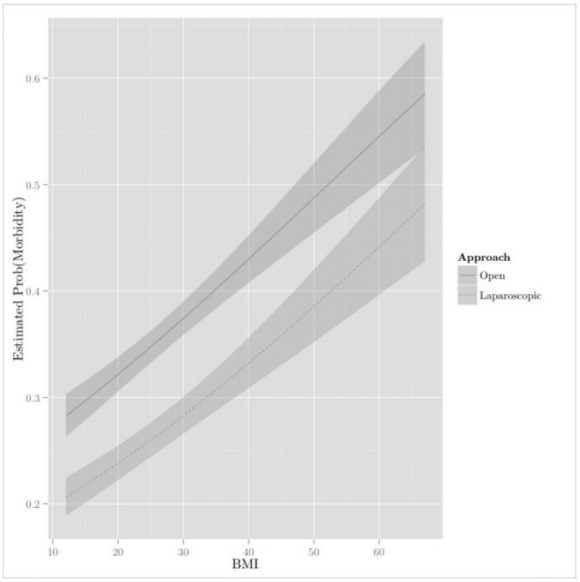

Figure 1. Differences in the rates of post-operative morbidity following a laparoscopic or open proctectomy in rectal cancer patients

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RECTAL CANCER SURGERY IN THE NATIONAL SURGICAL ADJUVANT BREAST AND BOWEL PROJECT PROTOCOL R-04: WHY DOES THE RECEIVED OPERATION SOMETIMES DIFFER FROM THE INTENDED OPERATION?

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Purpose: The decision to perform sphincter-sparing surgery (SSS) or abdominoperineal resection (APR) is usually made prior to surgery based on tumor location in the rectum, response to neoadjuvant therapy, current bowel/sphincter function, and patient (pt) preference. There are instances wherein the intended surgery differs from the received surgery – most commonly an APR is performed although the intended was SSS. The aim of the current study is to better understand the intraoperative reasons why a surgeon changes the intended rectal cancer surgery.

Methods: A retrospective review of operative and pathology reports of pts in the National Surgical Adjuvant Breast and Bowel Project (NSABP) R-04 protocol was completed. NSABP R-04, a randomized trial of four different neoadjuvant chemoradiation regimens for locally advanced (stage II-III) rectal cancer, accrued pts from July 2004 to August 2010. The surgeon was asked to determine the intended surgery (e.g., SSS versus APR) based on the preneoadjuvant therapy staging and physical exam. The surgery received was abstracted from the operative report. Inclusion criteria were pts for whom the intended surgery differed from the surgery received. Data collected included operative report data (primary reason for the change in decision making, intraoperative measurement of location of mass and distal margin), and pathology report data (tumor size, location of tumor, margin status, and results of frozen section).

Results: Ten percent of pts (N=86) had a change between the intended and received surgery; 85 (99%) underwent APR (intended SSS) and 1 (1%) underwent SSS (intended APR). The table describes overall cohort characteristics for the 85 pts receiving APR - 50 (59%) were due to a perceived issue with the distal margin; 15 (18%) were due to difficulty operating in the distal pelvis (e.g., narrow pelvis, bulky tumor, bulky prostate/uterus); 11(13%) were due to a technical issue with the anastomosis (e.g., inadequate length of conduit); and 9 (11%) were due to a radial margin concern.

Across these four groups, there was no difference in surgeon specialty, true distal margin (mean was 4.9cm for all pts undergoing APR), use of frozen section, presence of multiple specimens, or pathologic stage. There was a difference in tumor size between the groups with a radial margin concern vs. distal margin concern (mean size 4.4 cm, versus 2.8 cm, p value <0.05).

Conclusions: We identified multiple intraoperative findings that may impact a surgeon's decision to perform an APR rather than SSS. A mean true distal margin of 4.9cm suggests that APR is likely not necessary to obtain an adequate distal margin. More work is needed to evaluate and improve intra-operative decision making in rectal cancer surgery.

Surgeon and pathologic characteristics for patients undergoing APR (intended SSS)

Overall characteristics	n=85	Distal margin issue (n=50)	Unable to get below tumor (n=15)	Anastomotic issue (n=11)	Radial margin issue (n=9)
Specialist surgeon (%)*	62	66	69	30	66
Tumor size in greatest dimension (cm), mean +/- standard deviation	2.7 +/- 1.4	2.8 +/- 1.2	2.5 +/- 1.2	2.2 +/- 1.5	4.4 +/- 1.9***
True distal margin (cm), mean +/- standard deviation**	4.9 +/- 2.5	4.9 +/- 2.1	5.4 +/- 3.3	5.0 +/- 2.3	4.6 +/- 3.4
Frozen section sent (%)	19	18	6.7	27	33
Multiple specimens sent (%)	33	44	6.7	27	22
Overall pathologic stage (%)	-	-	-	-	-
0	24	32	13	27	0
1	24	20	20	27	44
2	16	14	27	0	33
3	35	34	40	45	22
*Defined as colorectal surgeon or surgical oncologist **True distal margin is defined as either distance from tumor to anal verge, or in cases of multiple specimens, the distal margin for the proximal specimen plus the total length of the distal specimen ***p <0.05 for t-test comparing radial margin group to distal margin group					
Support: NCI U10-CA180868, -180822, -189867; RSGPB-05-236-01-CPPB, Am Cancer Soc; Sanofi-Synthelabo Inc.; UCLA Jonsson Comprehensive Cancer Center; Conquer Cancer Foundation of the American Society of Clinical Oncology					

P298

TRENDS IN TREATMENT AND OUTCOMES FOR RECTAL ADENOCARCINOMA IN THE UNITED STATES: A POPULATION BASED STUDY FROM 1975-2012.

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Purpose: Colorectal cancer remains a leading cause of cancer death in the United States. The treatment of rectal cancer specifically has changed significantly over the course of the last 4 decades. The aim of our study was to describe changing patterns of treatment and outcome for rectal cancer in the US. We hypothesized that the use of radical surgery, organ preserving surgery, and multimodality therapy has increased with time, with improvement in outcomes.

Methods: Colorectal cancer remains a leading cause of cancer death in the United States. The treatment of rectal cancer specifically has changed significantly over the course of the last 4 decades. The aim of our study was to describe changing patterns of treatment and outcome for rectal cancer in the US. We hypothesized that the use of radical surgery, organ preserving surgery, and multimodality therapy has increased with time, with improvement in outcomes.

Results: The mean age of the population was 65.6 +/- 13.1 years, with a trend toward younger age during the last time period (64.1 +/- 0.1 years). 59% of patients were male. 78,450 (84.1%) of patients with Stage 1-3 disease underwent curative intent surgery. Radical surgery rates decreased from a peak of 92.9% (1981-1985) to 74.2% (2006-2012) with a corresponding increase in local excision (6.1% to 14.4%) and no surgery (1.1% to 11.4%) (all p<0.01). Sphincter preservation rates in surgical patients increased from 44.8% to 80.4% in the most recent time period (p<0.001). In stage 2-3 patients, radiotherapy use increased from a low of 17% (1975-1980) to 75.2% (2006-2012). In the subset of patients who underwent both radiotherapy and surgery, the sequence of treatment changed from largely postoperative (80.5% in 1981-1985) to largely preoperative (75.6% in 2006-2012). Overall cause-specific 5-year survival increased from 49% to 69%, respectively, from first to last time period (p<0.001). Stage and cause-specific 5-year survival increased from 83% to 89%, 64% to 80%, 41% to 72%, and 6% to 19% for stages 1,2,3 and 4, respectively (all p<0.001).

Conclusions: Over the course of the last 4 decades the treatment of rectal cancer has evolved significantly, with a lower rate of radical surgery, higher rate of organ and sphincter preserving surgery, and higher rate of preoperative radiotherapy. These changes, along with changes in systemic therapy, have been associated with significant improvements in cause-specific survival for all stages.

P299

ADJUVANT CHEMOTHERAPY IN HIGH-RISK STAGE II COLON CANCER.

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Purpose: Several national guidelines recommend that adjuvant chemotherapy be considered for stage II colon cancer in the setting of high-risk features. Despite these recommendations, this remains an area of controversy. We sought to understand the rate of administration and associated survival benefit with adjuvant chemotherapy in the setting of stage II colon cancer.

Methods: We conducted a retrospective cohort study of all patients treated for stage II colon cancer at a large referral center from 2009 to 2014. We created a composite variable for high-risk status, which included patients with < 12 lymph nodes, poorly differentiated histology, lympo-vascular invasion, perineural invasion, positive margins, bowel perforation or obstruction. We used multivariable analyses to determine factors associated with recommending or receiving adjuvant chemotherapy. A Cox proportional hazards model was used to determine 1, 3, and 5-year survival associated with receiving adjuvant chemotherapy.

Results: Of 571 patients with stage II colon cancer, 329 (58%) had high-risk features. Adjuvant chemotherapy was recommended for 58 (18%) patients with high-risk status and 34 (14%) without (p>0.2). Only 34 (10%) patients with high-risk status, and 16 (7%) patients without, received chemotherapy (p=0.120). Factors significantly associated with receiving chemotherapy included young age (p<0.001) and TNM Stage IIc (p= 0.01). High-risk status was not associated with recommending chemotherapy, although there was a trend for recommending chemotherapy with tumor perforation (p=0.056). Among high-risk patients who received adjuvant chemotherapy, overall survival was equivalent in the first year (p=0.08), improved at 3 years (p=0.029), and again equivalent at 5 years (p>0.2). When adjusted based on the Cox model, chemotherapy improved survival regardless of high-risk status (Figure).

Conclusions: The majority of stage II colon cancer patients with high-risk features do not receive adjuvant chemotherapy. Interestingly, adjuvant chemotherapy improved survival regardless of high-risk status. Adjuvant chemotherapy may benefit all stage II patients if clinically tolerated.

P300

FUNCTIONAL RESULTS AFTER LOW ANTERIOR RESECTION OF THE RECTUM FOR EARLY RECTAL CANCER.

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Purpose: Development of endoscopic resection techniques (ER), endoscopic mucosal resection (EMR) and endoscopic mucosal dissection (ESD) has lead to increased number of patients with rectal cancer solved by endoscopic approach. The ER is indicated for patients with well differentiated tumors m1-3 - sm1. There are cases, where ER is insufficient, risky, or pretreatment staging was not accurate. In these cases is indication for a surgical approach - for transanal endoscopic microsurgery (TEM), or resection of the rectum. The aim of the presentation was to evaluate functional outcomes in patients with early rectal cancer which underwent surgery of the rectum.

Methods: It was a prospective data collection with a retrospective analysis. Inclusion criteria were: - T1 tumors - Primary disease - Low Ante-

rior Resection - Local Excission Exclusion criteria were: - Neoadjuvant chemoradiotherapy - Recurrent disease - Diseminated disease

Results: In the period 1.1.2012 - 07.31.2015 was at the Surgical Clinic of the University Hospital in Hradec Králové performed 52 operations for early rectal cancer who met the above criteria. In that interval was performed 357 operations for rectal cancer, of which was 229 resections with anastomosis. Seven patients - 13.5% suffered after surgery for incontinence for flatus and faeces. 10 patients - 19.2% suffered for low anterior resection syndrome - LARS. In two patients - 3.8% has been reported erectile dysfunction. Postoperative complications were in seven patients - anastomotic leak occurred in 13.5% . 96% of the operations were performed by laparoscopic approach. Postoperative morbidity was 23.1%, no patient died after surgery. Locoregional recurrence or systemic relapse was not appeared among the group of patients.

Conclusions: An advantage of the surgery is higher radicality procedure with complete removal of regional lymph nodes, thereby reducing the risk of locoregional recurrence or system relapse to a minimum. On the other hand, another surgery carries a higher risk of postoperative complications, and considerable worsening of functional results.

P301

THE SYSTEMIC INFLAMMATORY RESPONSE IN MINIMALLY INVASIVE SURGERY COMPARING OUTCOMES BETWEEN LAPAROSCOPIC AND ROBOTIC SURGERY.

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Purpose: The aim of this paper is to determine the systemic inflammatory response of minimially invasive surgery, comparing laparoscopic to robotic colorecal surgery to determine whether there is any impact on clinical outcomes.

Methods: A prospective cohort study was conducted at our institution over a 10 month period between January and October 2015. Data was collected on all operative, clinical and oncological outcomes for all patients undergoing laparoscopic or robotic colorectal surgery. The systemic inflammatory response for all patients was determined by extracting the biochemical parameters at 24 hours post-operatively reflecting this, including haemoglobin (Hb), white cell count (WCC), c-reactive protein (CRP) and albumin (Alb). A propensity matched analysis was conducted, matching patients for ASA grade, disease pathology and operation undertaken. SPSS version 22 was used to analyse the data.

Results: A total of 76 patients were identified, with 37 (48.7%) of patients undergoing robotic colorectal surgery. The commonest indication for resection was malignancy, with 56.6% of all resections undertaken for this reason. There were no statisitically significant differences between the two with regards to operative parameters, including operating time. Tumour stage, nodal status and lymph node yield was similar in both groups. The RO resection rate was significantly higher in the robotic group compared to the laparoscopic group, 100% versus 96.4%, p=0.03. Postoperative systemic inflammatory response was similar in both groups. However, median length of stay was significantly shorter in the robotic group compared to the laparoscopic group, 3 days versus 5 days, p<0.01.

Conclusions: The systemic inflammatory response is preserved in the robotic group and is similar to that of patients undergoing laparoscopic surgery, however, the post-operative clinical outcomes between the two groups vary, with a significantly shorter length of stay in the robotic group. This suggests despite no differences in the systemic inflammatory response between the two groups, the response is potentially attenuated in the robotic group,however, this requires more work.

Comparison Of Outcomes Between Laparoscopic and Robotic

Variable	Laparoscopic n (%)	Robotic n (%)	P Value
ASA Grade I II II	1 (2.6) 25 (64.1) 13 (33.3)	2 (9.5) 22 (57.1) 7 (33.3)	0.48
Operation Hartmanns Anterior Resection Ventral Mesh Rectopexy Right Hemicolectomy ELAPE Left Hemicolectomy Subtotal Colectomy Sigmoid Colectomy	0 (0.0) 17 (43.6) 7 (17.9) 11 (28.2) 2 (5.1) 0 (0.0) 0 (0.0) 2 (5.1)	1 (2.7) 13 (35.1) 9 (24.3) 8 (21.6) 4 (10.8) 1 (2.7) 1 (2.7) 0 (0.0)	0.42
Disease Pathology Malignancy Adenoma Diverticular disease Inflammatory Bowel Disease Other	25 (64.1) 1 (2.6) 5 (12.8) 2 (5.1) 6 (15.4)	18 (48.6) 2 (5.4) 5 (13.5) 0 (0.0) 12 (15.8)	0.24
Median Operating Time (Mins)	224	218	0.91
T Stage Tis T1 T2 T3 T4	2 (8.0) 1 (4.0) 7 (28.0) 10 (40.0) 5 (20.0)	1 (5.6) 0 (0.0) 0 (0.0) 13 (72.2) 4 (22.2)	0.09
N Stage N0 N1 N2	12 (57.1) 3 (14.3) 6 (28.6)	10 (52.6) 5 (26.3) 4 (21.1)	0.61
Dukes Stage A B C1 C2	10 (25.6) 6 (15.4) 5 (12.8) 3 (7.7) 1 (2.6)	1 (2.7) 8 (21.6) 8 (21.6) 1 (2.7) 0 (0.0)	0.05
Margin Status R0 R1	27 (96.4) 1 (3.6)	16 (100.0) 0 (0.0)	0.03
Median Lymph Node Yield	19	20	0.26
Mean Day1 Post-Op WCC	11.2	11.9	0.15
Mean Day 1 Post-Op Hb	112	116	0.72
Mean Day 1 Post-Op CRP	88	108	0.52
Mean Day 1 Post-Op Albumin	37	33	0.30
Median Length of Stay (Days)	5	3	<0.01

P302

REDUCED-PORT ROBOTIC VERSUS MULTIPORT LAPAROSCOPIC ANTERIOR RESECTION FOR LEFT-SIDED COLON CANCER.

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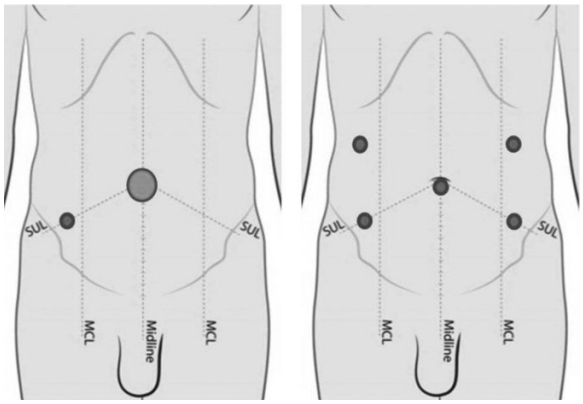
Purpose: Recently, the novel Da Vinci Single-Site® platform was especially designed to overcome the shortcomings of single-incision laparoscopic surgery. The Single-Site® port plus one conventional robotic port, a reduced port robotic surgery (RPRS) for left-sided colon cancer, can enable lymphovascular dissection using the Endowrist® instrumentation; this allows safe rectal transection through an additional port and maintains the cosmetic advantage of SILS. The aim of our study was to discuss the safety and feasibility of RPRS and compare clinicopathologic outcomes between RPRS and multi-port laparoscopic surgery (MPLS) for left-sided colon cancer.

Methods: The study group included 17 patients who underwent a RPRS and 26 patients who underwent a MPLS for left-sided colon cancer between August 2014 and August 2015.

Results: Demographic characteristics except age were similar between two groups (RPRS vs. MPLS, 61 vs. 71, p=0.011). The median operative time was significantly longer in the RPRS group than in the MPLS group (245 vs. 151 minutes, p<0.05). One patient (5.6%) required a conversion from RPRS to reduce-port laparoscopic surgery. There were no apparent differences in the time taken to return of normal bowel function, tolerance of diet, and length of hospital stay, but the RPRS group had a significantly smaller total incision length than MPLS group(RPRS: 51 mm vs. MPLS: 83 mm, P<0.001). The median proximal and distal resection margins between two groups was similar. The median number of harvested lymph nodes was similar in the two groups (RPRS: 18.7±7.9 vs. MPRS: 21.6±10.1, P=0.435). No significant differences were observed for postoperative pain, which was measured on the numeric rating scale on postoperative day 1,2,3. There were no significant differences in the rate of postoperative complications between the

groups (29.4% in the RPRS group and 16.7% in the MPLS group, P=0.439). There was no mortality within 30 days in two groups.

Conclusions: We demonstrated the feasibility and safety of RPRS for left-sided colon cancer. Although there was selection bias regarding age in this study, the clinicopathologic outcomes of RPRS were comparable to those of MPLS, with better cosmetic results.



Access port Setup for reduced-port robotic and multi-port laparoscopic surgery

P303

ONCOLOGIC OUTCOMES AFTER ROBOTIC-ASSISTED RESECTION OF RECTAL ADENOCARCINOMA.

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Purpose: The field of colorectal surgery has seen a large increase in the use of robotic-assisted surgery, especially for rectal resection where the advantages of robotics are evident. While the short-term safety and efficacy of this technique have been shown, there is minimal data investigating the oncologic outcomes of these procedures. We determined disease-free survival for patients who underwent robotic resection for rectal adenocarcinoma.

Methods: We conducted a retrospective review of 44 patients who underwent robotic-assisted rectal resection at a single institution from 2009 to 2014. Surgeries included low-anterior resections and abdomino-perineal resections. Indications were adenocarcinoma of the rectum and lack of metastatic disease at the time of surgery. Pre-operative demographics, intra-operative data, and post-operative outcomes were examined. Student's t-test was used to analyze continuous variables; Fischer's exact test was used for categorical variables.

Results: There were no peri-operative mortalities, and four cases were converted to open procedures. The average follow-up time for the cohort was 39 months (+/-19 months). There was recurrence of disease in 10/44 patients (23%); the average time to recurrence was 24 months (+/-12 months). Two patients had local recurrence, while distant recurrence occurred in the other eight. There was one death during the follow-up period, and it was related to disease recurrence. Disease recurrence was significantly associated with a higher T-score (TNM staging) (p=0.012), a higher number of positive lymph nodes (p=0.009) and the presence of lymphovascular invasion (p= 0.01) There was no significant difference in age, gender, body-mass index, tumor size, peri-neural invasion, estimated blood loss, length of hospital stay, peri-operative morbidity or treatment with chemo/radiation between the recurrence and disease-free groups. The proximal and distal margins were uninvolved in all 44 patients. The TME was complete in all 44 patients as well; however, one radial margin in each the recurrence and disease-free group was involved. There was no significant difference in any margin length between the two groups, nor was there a difference in tumor distance from the dentate line.

Conclusions: There is currently minimal literature regarding oncologic outcomes after robotic rectal resection. Our data demonstrates favorable oncologic technique and comparable recurrence rates of rectal adenocarcinoma after robotic-assisted resection when compared to current literature on laparoscopic and open surgery. Additional follow-up is needed to further evaluate the long-term outcomes of these patients.

P304

POSTOPERATIVE PROGNOSIS OF INGUINAL LYMPH NODE METASTASES FROM ADENOCARCINOMA OF THE RECTUM OR ANAL CANAL.

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Purpose: Management of inguinal lymph node (ILN) metastases from adenocarcinoma of the rectum or anal-canal is still not clearly defined, because the prognosis of patients with these metastases is poor. The aim of this prospective study is to analyze postoperative outcome in patients with inguinal lymph node metastases undergoing surgery.

Methods: From March 2005 to June 2015, we reviewed 14 patients who underwent operation with inguinal lymphadenectomy for adenocarcinoma of the rectum or anal-canal at our institution.

Results: The median age was 63 years (range, 45-79), and 8 were male and 6 was female. Unilateral ILN metastases were diagnosed in all patients. Among them, 8 patients had synchronous ILN metastases (Group A), 6 patients had metachronous ILN metastases (Group B). Two of 8 patients in Group A had extrapelvic metastatic disease at the same time (One patient had multiple liver metastases, one had lung metastasis.). In Group A, 6 patients, excluded one patient with lung metastasis and one patient undergoing trans-anal resection for T2 tumor, received preoperative treatment. Three patients with locally advanced tumor treated chemoradiotherapy (50.4Gy+5-fluorouracil), other 3 patients with aggressive regional lymph node metastases or multiple liver metastases treated initially chemotherapy (FOLFOX: 6 cycle) and followed chemoradiotherapy. Seven patients underwent abdominal perineal resection, one patient underwent total pelvic exenteration. There was no mortality. Postoperative complication occurred in 4 patients (surgical site infection). The median duration of postoperative hospital stay was 29 days (range, 18-65). All of 8 patients received adjuvant chemotherapy. Median follow up period was14 months, at this describe, 4 patients occurred recurrence (2; liver, 1; lung, 1; lymph node) and 2 of them dead. In Group B, excluded one patient with local recurrence, 5 patients did not receive preoperative treatment. Median follow up period was 48 months, 3 patients occurred recurrence (1; liver, 2; local recurrence of pelvic wall) and 2 of them dead. Four patient in Group A and 3 patients in Group B are no evidence of recurrence. Two patients among 4 in Group A were good responder of chemotherapy, other 2 patients had T2 tumor. Three patients in Group B were isolated ILN metastasis without other organ metastases.

Conclusions: The present study suggests that ILN metastasis is associated with higher recurrence. For patients with synchronous ILN metastasis, combination of aggressive adjuvant therapy and surgical resection might be effective for long-term survival. Patients with metachronous isolated ILN metastasis without distant metastases might be good prognosis after inguinal lymphadenectomy.

P305

CENTER VOLUME INFLUENCES ADHERENCE TO NATIONAL GUIDELINES FOR USE OF NEOADJUVANT CHEMORADIATION FOR RECTAL CANCER.

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Purpose: Neoadjuvant chemoradiation (CRT) has been demonstrated to reduce recurrence in locally advanced rectal cancer. National guidelines by both the National Comprehensive Cancer Network and the American

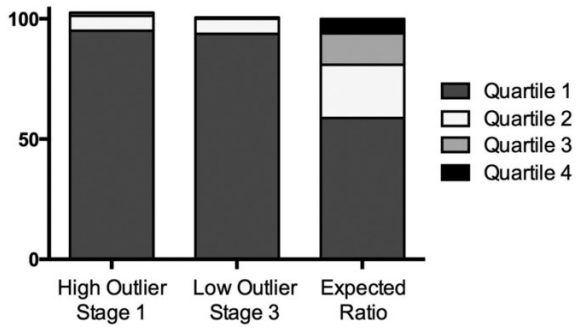
Society of Colon and Rectal Surgeons recommend neoadjuvant CRT in clinical stage 3 rectal cancer, while pre-operative therapy is not recommended in clinical stage 1 disease. We sought to determine variability in guideline adherence in stage 1 and 3 rectal cancer and investigate whether hospital volume correlated with the variability seen.

Methods: Patients with rectal cancer in the National Cancer Database from 2005-2010 undergoing low anterior resection or abdominoperineal resection for clinical stage 1 and 3 tumors were identified. Patients with rectosigmoid junction cancers and hospitals performing less than five resections per year were excluded. Hospitals were divided into quartiles based on yearly case volume. Logistic regressions were performed to identify patient and tumor characteristics predictive of neoadjuvant CRT in each stage. Hierarchical regression models were then used to calculate risk and reliability adjusted rates of CRT use for each hospital separately based on clinical stage. Results were calculated as stage specific hospital observed to expected (O/E) ratios for the use of CRT. Hospital outlier status was assigned using the top and bottom 10% of O/E ratios. The association between outlier status and hospital volume was then evaluated.

Results: A total of 23,501 patients were identified at 1,183 hospitals. For clinical stage 1 disease, neoadjuvant CRT was associated with younger age, male gender, lower comorbidities, higher tumor grade and tumors treated with APR. For stage 3, CRT was associated with younger, healthier patients with higher grade and lower tumors treated at high volume, academic medical centers. When controlling for patient and tumor characteristics, significant variability was seen in neoadjuvant therapy use across both stages. Across all hospitals, an average of 25% (range 9%-67%) of patients received neoadjuvant CRT for clinical stage 1 disease and 78% (range 16%-94%) of patients with clinical stage 3 tumors. Although 60% of hospitals were categorized as low volume, over 90% of the hospitals who were outliers (overutilizing CRT in stage 1, or underutilizing CRT in stage 3 tumors) were low volume hospitals (Figure 1).

Conclusions: There is significant hospital variability in adherence to national guidelines in the use of neoadjuvant radiation for clinical stage 1 and stage 3 rectal cancers. Particularly, there is an overtreatment of clinical stage 1 disease and under treatment of clinical stage 3 disease, which is influenced by hospital volume. This represents a clear area of focus for future national quality improvement efforts.

Figure 1. Distribution of Outliers in Neo-adjuvant Chemoradiation use based on Hospital Volume



P306

MRI REPORTS IN RECTAL CANCER LACK KEY ELEMENTS REQUIRED FOR TREATMENT PLANNING: A POPULATION-BASED STUDY.

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Purpose: Clinical practice guidelines for the assessment and treatment of rectal cancer suggest the use of MRI or endorectal ultrasound for local tumor staging prior to neoadjuvant or surgical therapy. The objective of this study was to determine the proportion of rectal cancer patients in one Canadian province receiving this imaging, and the completeness of these reports prior to the implementation of a synoptic reporting system.

Methods: Patients diagnosed with Stage I-IV rectal cancer between January 1, 2011 and December 31, 2013 were identified from a provincial database. A retrospective chart review identified MRIs performed prior to any neoadjuvant chemoradiation or operative intervention. The rate of MRI utilization was determined, and MRI reports were analyzed for completeness based on key clinical variables required for treatment planning.

Results: The proportion of patients undergoing an MRI after the diagnosis of rectal cancer increased in each year examined: 180 of 464 (38.7%) in 2011, 239 of 519 (46.3%) in 2012, and 236 of 445 (53%) in 2013 (p=0.0001). An explicit T stage was reported at an increasing rate, with 85 (48.3%), 107 (46.7%) and 138 (62.2%) of these MRI reports respectively (p=0.004), while the T stage was reported descriptively in 91 (51.7%), 116 (50.7%), and 79 (35.6%) (p=0.001). A description of mesorectal nodal status was provided in 99% in all years. The relationship of the tumor to the anterior peritoneal reflection was reported in 8 (4.5%), 13 (5.7%), and 13 (5.9%) of reports in 2011, 2012 and 2013 respectively (p=0.50); tumor height was reported explicitly in 72 (40.9%), 102 (44.5%), and 126 (56.8%) (p=0.001).

Conclusions: The proportion of patients receiving an MRI after the diagnosis of rectal cancer in this population based study increased over time. MRI reports for rectal cancer lacked many of the elements of reporting essential for treatment planning. Two of these essential reporting elements, explicit T stage and height of the tumor, increased over the study period.

P307

TRANSANAL ENDOSCOPIC MICROSURGERY IS USED FOR DIAGNOSIS, TREATMENT, AND PALLIATION DEPENDING ON FINAL RECTAL TUMOR PATHOLOGY.

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Purpose: The evaluation and treatment of early (Stage I adenocarcinoma) and indolent rectal malignancies (neuroendocrine, GIST) can be complex due to diagnostic discrepancies and patient preferences for treatment. Transanal endoscopic microsurgery (TEM) is often used in these types of tumors due to the possibility of curative resection with less invasive surgery as well as to provide a total histologic specimen for diagnosis and staging. The purpose of this study was two-fold: to analyze how TEM was utilized in the treatment of early and indolent rectal neoplasms, and to determine the course of treatment after TEM provided final pathologic diagnosis.

Methods: All patients that underwent TEM with final pathologic diagnosis of malignancy between July 2007 and July 2015 were identified. Patients were stratified into groups based on final pathology: T1 or T2 adenocarcinoma, carcinoid tumor, or GIST. Retrospective chart review gathered data including preoperative evaluation, pathology results, and any postoperative treatment.

Results: There were fifty-seven patients with rectal malignancies treated with TEM. Of thirty-one patients with T1 adenocarcinoma on final pathology, twenty-six (83.9%) were considered cured and received no additional treatment. All nine patients with carcinoid tumor on preoperative biopsy had carcinoid or no residual tumor on final pathology and received no additional treatment. All fourteen patients with T2 adenocarcinoma on final pathology were recommended additional treatment, but only eight (57.1%) proceeded with further treatment. The six T2 patients that did not pursue additional treatment had prohibitive comorbidities (n=3) or refused the possibility of a stoma (n=3). Of fifty-seven patients with rectal malignancy, only twenty-three (40.3%) had complete correlation with preoperative biopsy, imaging, and final pathology following TEM.

Conclusions: There can be considerable diagnostic and staging discrepancies in rectal tumors, and TEM can provide definitive pathologic diagnosis. Final pathology and/or staging changed after TEM in the majority of cases. TEM can be curative in favorable T1 adenocarcinoma and carcinoid

tumors, but it becomes a diagnostic tool or palliative treatment in more advanced malignancy. We concluded from this study that TEM should be considered a diagnostic tool and the final pathology from the TEM specimen should dictate if further treatment is warranted.

	Final Pathology	Preop Biopsy Consistent with Final Pathology	Preop Imaging Consistent With Final Pathology	Had Additional Treatment After TEM
T1 adenocarcinoma	31	19	12	5
T2 adenocarcinoma	14	8	6	8
Carcinoid	9	9	NA	0
GIST	3	1	NA	1

P308

IMPACT OF TOTAL LYMPH NODE RETRIEVAL ON RECURRENCE AND DISEASE-FREE SURVIVAL OF NODE NEGATIVE COLON CANCER PATIENTS.

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Purpose: Historically has been established that a number of 12 lymph nodes is necessary for staging purposes and that there is no benefit in extending the lymphadenectomy in colon cancer over that objective. However, after the description of Complete Mesocolic Excision and it's better oncologic results, recently this has been challenged, with growing evidence that a higher number of lymph nodes harvested may result in better survival. Our objective is to determine the presence of an association between the number of lymph nodes harvested and oncologic outcomes (disease-free survival, recurrence, overall survival), in node negative patients.

Methods: We studied a sample of 215 patients with node negative colon cancer submitted to surgery between 2006 and 2010, after excluding all node positive patients, those that presented with metastatic disease and patients that were submitted to total colectomy. We evaluated the number of lymph nodes harvested, T staging, limphovascular and perineural invasion, tumour differentiation, mucinous component, surgical margins and measured recurrences, disease-free survival and overall survival.

Results: Mean age of patients was 70,4 years (SD 11,7). Majority of patients were male (124). Regarding T staging, 4,7% were T1, 19,5% were T2, 63,3% were T3 and 12,6% were T4. 16,3% of patients were submitted to emergent surgery and the remaining elective surgery. Mean number of lymph nodes retrieved was 11,79. 15,8% of patients had disease recurrence, with a mean time-to-recurrence of 25,53 months (SD 13,9) of which 14 had local recurrence, 15 had distant metastases and 5 patients had both of them. Disease-free survival was 49,53 months, at a maximum of 60 months. Mean number of lymph nodes retrieved in patients that survived without recurrence was 11,65 lymph nodes, against 11,88 in patients that developed recurrence (p value of 0,877). Regarding local recurrence, the number of lymph nodes retrieved was 11,61 in patients that did not recurred and 12,42 with local recurrence (p higher than 0,05). Regarding distant metastases, the number of lymph nodes retrieved was 11,8 in patients that survived without recurrence and 11,1 in patients that recurred (p higher than 0,05).

Conclusions: In our population, increasing the number of lymph nodes retrieved did not improve oncologic outcomes measured in terms of recurrence and disease free-survival.

P309

BODY IMAGE AND COSMESIS IN PATIENTS AFTER LAPAROSCOPIC COLORECTAL SURGERY: DOES THE INCISION MATTER?

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Purpose: With the increasing use of laparoscopic colorectal surgery, optimal incision for specimen retrieval remains controversial. Our aim was to compare cosmetic and body image outcomes of Pfannenstiel incisions (Group P) versus alternative incisions (Group A) for specimen retrieval in patients undergoing elective laparoscopic colorectal surgery.

Methods: Patients between July 2013 and June 2015 were identified. All were sent a web-based survey containing questions that integrated the validated Patient Scar Assessment Questionnaire (PSAQ: 41 questions) and Photo-Series Questionnaire (PSQ: 6 questions). Hand-assist laparoscopic (HAL) surgery was defined by the introduction of the hand into the peritoneal cavity through a Gelport®. Laparoscopy was defined as completion of the procedure without hand assist including both intra and extracorporeal stapling methods. Patients with documented wound complications in the immediate post-operative period, creation of permanent end stoma and dermatologic conditions predisposing to scar disfigurement were excluded. Fisher's exact and Wilcoxon tests were used to compare categorical and continuous data, respectively.

Results: Of the 318 study patients identified, 112 submitted responses to both the PSAQ and PSQ (response rate 35%). There were 54 (48%) Group P patients and 58 (52%) Group A patients (periumbilical (n=19), lower midline (n=10) or right upper quadrant transverse incision (n=29)). Study groups were comparable in demographics, clinical comorbidities, preoperative medical therapy, indication for surgery, method of closure using absorbable suture or staples, and postoperative complications at 3 months and 1 year postoperatively. However, HAL was more commonly performed in Group P patients (n=25; 46%) versus Group A patients (n=15; 26%) (p=0.03). There was no difference between study groups in all PSAQ domains except for the severity of incisional numbness when present (Group P (n=12; 22%) vs Group A (n=2; 3%); p=0.008). There was no difference between study groups in all PSQ domains except that after comparing patients' own incisions to photographs of various alternative incisions, 35 (60%) Group A patients would choose an alternative incision compared to only 11 (20%) Group P patients (p< 0.0001).

Conclusions: Although more commonly associated with severe postoperative numbness, using a Pfannenstiel incision as opposed to other incisions as the specimen extraction site is cosmetically preferred in patients undergoing laparoscopic colorectal surgery.

P310

THE MORBIDITY OF A WOUND: A PATIENT CENTERED ASSESSMENT.

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Purpose: A significant portion of colorectal surgery patients have minor wound disturbances, yet very few of these patients meet the CDC definition for surgical site infection (SSI). We sought to investigate the natural history of these minor wound disturbances with a specific focus on the patient experience. We hypothesize that concern for SSI is a frequent contributor to healthcare consumption in the postoperative period.

Methods: A 24-month prospective observational study was undertaken at an academic institution. Patients undergoing elective colorectal surgery by two board-certified colorectal surgeons were consented, enrolled and prospectively followed by a clinical research coordinator for 90 days. The wounds were serially photographed and clinically characterized beginning in the hospital and at subsequent follow-up visits. The primary outcome was patient concern for a wound disturbance defined as an unscheduled phone call, home health evaluation, emergency room, surgery clinic or primary care (PCP) visit specific to the surgical wound. Three attending surgeons reviewed blinded clinical data and serial photographs independently to determine the presence of an incisional SSI; SSI diagnosis required agreement from 2 of 3 surgeons.

Results: One hundred ninety-two patients were consented and 171 patients were included in the final analysis. Of these, 31 (18%) sought evaluation from a health care provider for concerns related to their wound including 46 phone calls to the surgical team, 6 emergency room visits, 7 PCP visits, 10 home health visits, and 22 surgical clinic visits. Wound ery-

thema and drainage were the most common sources of patient concern. Patients with and without concern for SSI were similar for race, sex, and comorbidities. Mean BMI was higher in patients with concern for wound disturbances (34 versus 28 kg/m^2, p<0.0001). Additionally, patients within an enhanced recovery protocol had fewer wound concerns than those in a traditional care pathway, 12% (12/99) compared to 27% (19/72, p=0.02). Ultimately, 8% (14/171) were diagnosed with an SSI by study criteria while only 2% (4 patients) were captured as having an SSI by the institutional National Surgical Quality Improvement Program (NSQIP) database (p<0.0001).

Conclusions: Patient concern about their surgical incision is common following colorectal surgery. We found less than half of these concerns were associated with a diagnosis of SSI. However, current standards of care including in-person evaluation of wound concerns leads to frequent utilization of healthcare resources in the postoperative period. This incongruency presents an opportunity for alternative strategies such as a mobile health app to provide secure electronic communication with the surgical team employing patient-generated wound photography. Use of such technology has the potential to reassure patients, maximizing patient-centered care and preventing unnecessary consumption of healthcare resources.

P311

DOES LAPAROSCOPY MAKE COLORECTAL REOPERATION SAFER?

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Purpose: Unplanned return to the operating room is a feared and often devastating event after colorectal resection. Laparoscopic colorectal resection is increasing in popularity and utilization due to improved postoperative outcomes. We aimed to assess the effect of an index laparoscopic colorectal resection on the outcomes of patients requiring unplanned reoperation.

Methods: The 2012-2013 American College of Surgeons-National Surgical Quality Improvement Project (ACS-NSQIP) database was used to identify patients who underwent colorectal resection. Patients requiring an unplanned reoperation within 30 days were identified and multivariate regression analysis was used to compare outcomes of reoperation between open and laparoscopic resections.

Results: A sample of 84,193 patients who underwent colorectal resection was identified. A total of 4,795 (5.7%) patients required unplanned reoperation with a rate of 7.7% amongst patients with an open index colorectal resection (OS) as opposed to a rate of 4.3% amongst those with a laparoscopic index colorectal resection (LS). Reoperation after OS occurred later compared to after LS (10±7.58 vs. 9±9.93 days respectively). The most common indication for unplanned reoperation after both OS (13.5%) and LS (20.8%) was obstruction. Patients undergoing OS had almost a two-fold higher incidence of wound disruption requiring reoperation compared to LS (12.7% vs. 6.7% respectively). The most common interventions during reoperation for both OS and LS were open exploration, resection and diversion (~50%). Patients who underwent LS were much more likely to undergo a laparoscopic reoperation (12.5%) compared to those that underwent OS (0.9%). Multivariate regression analysis revealed that patients requiring unplanned reoperation after OS had a significantly increased in-hospital mortality (AOR=2.86, 95%CI: 1.10-7.45, P<0.05), overall morbidity (AOR=2.75, 95%CI: 1.73-4.38, P<0.05), prolonged hospitalization > 30 days (AOR=3.50, 95%CI: 1.10-7.45, P<0.05), risk of septic shock (AOR=2.41, 95%CI: 1.32-4.42, P<0.05) and risk of surgical site infection (AOR=1.97, 95%CI: 1.32-2.94, P<0.05).

Conclusions: Unplanned reoperation after colorectal resection was less common in patients who underwent a laparoscopic resection compared to open. Furthermore, patients who required reoperation after LS were more likely to receive a laparoscopic reoperation and had significantly lower postoperative mortality and morbidity. These findings suggest that having a laparoscopic colorectal resection has a favorable effect on complications and outcomes when unplanned reoperation is required.

Table comparing adjusted outcomes in patients requiring reoperation after open vs. laparoscopic colorectal resection

Outcome	Reoperation After Open colorectal resection (n = 3115)	Reoperation After laparoscopic colorectal resection (n = 1680)	Adjusted Odds Ratio	95% Confidence Interval	P-value
In Hospital Mortality	13.3%	4.1%	2.86	1.10-7.45	<0.05
Overall Morbidity	84.4%	72.5%	2.75	1.73-4.38	<0.05
Serious Morbidity	79%	64.8%	2.56	1.65-3.69	<0.05
Hospitalization>30 days	24.2%	11.3%	3.50	1.91-6.42	<0.05
Any SSI	54.7%	51.3%	1.97	1.32-2.94	<0.05
Pneumonia	16.2%	6.9%	2.17	1.07-4.37	<0.05
Unplanned Intubation	15.5%	8.1%	3.39	1.58-7.26	<0.05
Ventilator Dependency	29.1%	11.1%	2.13	1.19-3.82	<0.05
Septic Shock	24.7%	12.3%	2.41	1.32-4.42	<0.05

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ENHANCED RECOVARY AFTER SURGERY (ERAS) IN SAUDI ARABIA: KING FAISAL SPECIALIST HOSPITAL AND RESEARCH CENTER JEDDAH.

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Purpose: The senior author (ALK) practiced ERAS in Scotland for a decade. He introduced the ERAS in King Fiasl Specialist Hospital and Research Center (Jeddah) (KFSHRC-J); Saudi Arabia. This review looked into patients who underwent surgery and manged with ERAS protocol. The aim of this audit is to review dematography of the patients, thier surgical outcome, length of stay in the hospital, morbidity and mortality and re-admission rate in a sample of Saudi society.

Methods: This is a prospective audit of one surgical unit expirence in (ERAS) in patients undergoing major laparoscopic and open colorectal and none colorectal surgery. Data collected over 2 years time.

Results: A total number of cases carried out was 109. ERAS protocol was followed in all pateints. Eighty eight patients underwent colorectal surgery while 21 had other surgical procedure. Thirty nine cases underwent laparoscopic colorectal preocedure and thirty nine had an open surgery. Ten cases were converted from laparoscopic to open procedure. The median post operative stay was 5 days. With maximum stay was 30 days and minimum stay one day. The reasons for delayed discharge were surgical complications in 15 patients, medical complications in 8 patients and social reasons were the cause in 11 patients. The overall morbidity was 28%, the overall mortaility was 0.9%, the readmission rate was 2.8% and the re-operative rate was 1.8%.

Conclusions: Following ERAS protocol will enhance early discharge. Delay usually is related to the medical status of the patients. The greater ASA score the more delay occured.

P313

UNPLANNED REOPERATION AFTER COLORECTAL RESECTION: WHEN AND WHY WE GO BACK.

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Purpose: Unplanned return to the operating room is a feared and often devastating event after colorectal resection. We aimed to assess the risk factors, indications and interventions related to reoperation after colorectal resection in a population based sample.

Methods: The 2012-2013 American College of Surgeons-National Surgical Quality Improvement Project (ACS-NSQIP) databases were used to identify patients who underwent 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: A sample of 84,193 patients who underwent colorectal resection were identified. A total of 4,795 (5.7%) patients underwent unplanned reoperation occurring a mean 10±8 days from the index procedure. Patients who required unplanned reoperation were more likely to be initially emergent cases, have an ASA class $\geq$ 3, be diabetic, have preoperative weight loss and be on chronic steroids (P<0.05 for all). Multivariate regression analysis revealed that patients requiring unplanned reoperation had a significantly increased risk of in-hospital mortality (AOR=2.39, 95%CI: 1.68-2.24, p<0.05), overall morbidity (AOR=10.31, 8.32-12.78, p<0.05), wound disruption (AOR=22.65, 95%CI: 15.97-32.12, p<0.05), intra-abdominal abscess (AOR=13.28, 10.46-16.85, P<0.05) and septic shock (AOR=9.37, 95% CI: 6.95-12.63, p<0.05). The most common indications for unplanned reoperation were obstruction (16.4%), followed by infection (13.9%) and wound disruption (9.8%). The most common interventions during reoperation were open exploration, resection and diversion (~50%). A minority of patients (~5%) received a laparoscopic intervention as part of their reoperation.

Conclusions: Unplanned reoperation after colorectal surgery is rare but potentially devastating event with a significant increase in mortality and morbidity. The most common indications for reoperation were obstruction and infection. The majority of reoperations were open with only a minority of reoperations utilizing a laparoscopic technique (~5%).

Most common indications and procedures in patients requiring unplanned reoperation after colorectal resection

Rank	Indication	% Of all Indications	Procedure	% Of all procedures
1	Obstruction	16.4	Open exploration and lysis of adhesions	23.3
2	Infection	13.9	Open resection	18.1
3	Wound disruption	9.8	Ostomy creation and revision	8.1
4	Hemorrhage	6.5	Laparoscopic exploration and lysis of adhesions	3.7
5	Perforation	3.9	Open drainage of intra-abdominal abscess	3.2
6	Ostomy Complications	2.6	Laparoscopic resection	1.3

P314

THE OUTCOME OF ROBOTIC RESECTION FOR RECTAL CANCER.

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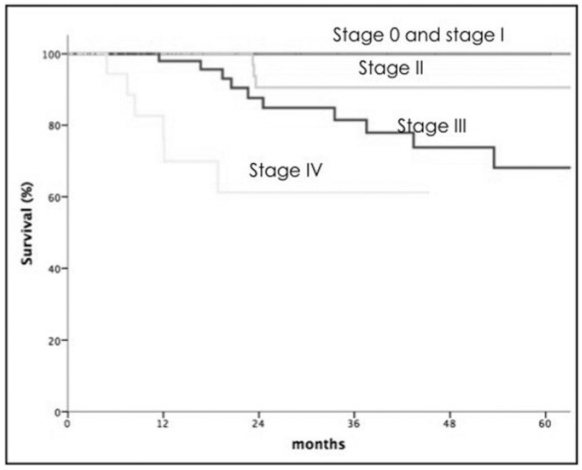
Purpose: Robotic resection for rectal cancer has been sbown to be safe and associated with a low conversion rate. However, there are few data on the long term oncologic outcome on patients after robotic rectal resection. This study aimed to evaluate both the short-term results as well the survival and local recurrence of patients after robotic surgery for rectal cancer.

Methods: From 2008 to 2015, all the patients who underwent robotic resection for rectal cancer were included. The data on the demographics, operating details and the postoperatve results were collected prospectively. The local recurrence rate and the suvival of the patients were analysed using Kaplan Meier method.

Results: During the study period, 228 patients (66.7% men) underwent robotic assisted rectal resection. The median age was 65 years (range: 34-90). The median level of the tumor was 7 cm from the anal verge. Neoadjuvant radiation was given to 40.1% of patients and previous abdominal surgery was present in 18.9%. The type of operation included abdominoperineal resection (n=14), anterior resection (n=211) and Hartmann operation (n=3). The median docking time was 6 min and the median console time was 101 min. The median blood loss was 100 ml and the median operating time was 257 min. Synchronous resection was performed in 13 patients, which included 3 exenterations. The median distal margin was 3 cm and the median lymph node harvested was 14. Positive circumferential margin occurred in 3.5%. The complication rate was 18.9% and the median hospital stay was 6 days. With the median follow up of months, the 5 year local recurrence rate was 6.6% and the cancer specific survival is shown in Figure 1.

Conclusions: Rootic surgery for rectal cancer is associated with a low conversion rate. The postoperative outcomes are favorable. The local recurrence rate and survival are similar to laparoscopic surgery.



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ANALYSIS OF RISK FACTORS FOR POSTOPERATIVE COMPLICATIONS IN PATIENTS WHO UNDERWENT CLOSURE OF ILEOSTOMY AFTER COLORECTAL CANCER RESECTION.

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Purpose: To identify the risk factors associated with postoperative complications after ileostomy closure.

Methods: We performed a retrospective analysis of patients who had undergone an elective ileostomy closure between June 2009 and June 2015 at a single institution. All patients had their protective loop ileostomy created at the time of a previous colorectal cancer resection. All complications were recorded and classified according to the Clavien-Dindo Classification. Characteristics related to demographics, patients comorbidities, type of previous colorectal resection, use of adjuvant treatment, complications of the previous colorectal resection, period of time between previous colorectal surgery and ileostomy closure, and technical aspects of the ileostomy closure procedure were reviewed (Table 1). Risk factors for paralytic's ileus and severe complications were also analyzed. Statistical univariate and multivariate analysis were performed, setting a P value of 0.05 for significance.

Results: A total of 294 patients were included. Postoperative complications developed in 79 (29.6%) patients, including 39 (13.3%) ileus, 35 (11.9%) diarrhea, 25 (8.5%) wound infections and 24 (8.2%) clinical complications. 65 (24.8%) patients had complications were classified as no severe (Clavien ≤ 2) and 14 (4.8%) as severe complications (Clavien ≥ 3). 30-day postoperative mortality was 1.7% (5 patients). Mean length of postoperative hospital stay was significantly longer in patients with complications than in patients without them (13 versus 5.4 days, p<0,001). On univariate analysis, old age, serious complications on the colorectal cancer resection, and hand-sewn anastomosis were associated with higher rate of complications (Table 1). On multivariate analysis, old age, complications on the colorectal cancer resection, readmission within 30 days after the colorectal cancer resection, and the need for midline laparotomy at the time of ileostomy closure, were independent risk factors for overall complication . Most of the complications were managed with conservative therapy, but 10 (3.4%) patients needed reoperation (3 right colon perforation, 6 anastomotic dehiscence and 1 anastomotic stricture). Old age, ECOG ≥ 1, readmission due dehydration, and longer duration of surgery were independent risk factors for severe complications (Clavien ≥ 3). Risk factors for paralytic's ileus included old age, diabetes, high output of the ileostomy, need for midline laparotomy at the time of ileostomy closure and hand-sewn anastomosis.

Conclusions: Ileostomy closure had an acceptable rate of postoperative complications and most of them were not severe (Clavien ≤ 2).

Results of univarate analysis overall complication

Variable	Complication		OR (IC)	Total	p
	NO	YES		(N = 294)	
	N=215 (%)	N=79 (%)			
Age (years)					0,008
mean (SD)	59,7 (11,6)	63,8 (11)	1,034 (1,01-1,06)	60,8 (11,6)	
median	61 (20; 85)	65 (32; 86)		62 (20; 86)	
Complication (colorectal cancer resection)					0,002
No	146 (79,3)	38 (20,7)	1,00	184	
Yes	69 (62,7)	41 (37,3)	2,283 (1,35-3,86)	110	
Clavien ≥ 3 (colorectal cancer resection)					0,049
No	199 (74,8)	67 (25,2)	1,00	266	
Yes	16 (57,1)	12 (42,9)	2,228 (1,0-4,95)	28	
30-day readmission (colorectal cancer resection)					0,003
No	207 (75,3)	68 (24,7)	1,00	275	
Yes	8 (42,1)	11 (57,9)	4,186 (1,62-10,83)	19	
Ileostomy closure technique					0,039
Stapled	203 (73,6)	73 (26,4)	1,00	276	
Handsewn	12 (66,7)	6 (33,3)	2,915 (1,06-8,06)	18	
Hospital length stay (days)					<0,001
mean (SD)	5,4 (1,4)	13 (11,2)	1,81 (1,53-2,14)	7,4 (6,8)	
median	5 (3; 10)	10 (4; 65)		5 (3; 65)	

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BETTER IN THAN OUT - URINARY RETENTION AFTER ILEOSTOMY TAKEDOWN IN MEN IS COMMON AND CAN BE AVOIDED BY KEEPING URINARY CATHETER AFTER SURGERY.

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Purpose: Urinary retention (UR) is a common event following pelvic surgery, increasing risk of UTI and prolonging hospital stay. The rate of urinary retention after ileostomy takedown following pelvic surgery are presumed to be minimal but have not been reported. Tamsulosin is an alpha blocker that works by relaxing bladder neck muscles and is used to treat benign prostatic hypertrophy and UR. We aim to investigate the rates of urinary retention after ileostomy takedown and potential benefits of preemptive tamsulosin use on rates of UR in men

Methods: This a retrospective review of all men undergoing ileostomy takedown following pelvic surgery for cancer and inflammatory bowel disease (IBD) at a single institution from 2008 to 2015. Patients prescribed baseline alpha blockade and those with a need for prolonged urinary monitoring were excluded. Rates of post-operative UR as well as other complications were reviewed. Urinary retention was defined as need to place urinary catheter. Patients given 0.4 mg of tamsulosin 3 days prior and for at least 3 days after surgery starting in 2012 (tamsulosin study group) were compared to patients receiving expectant post-operative management (control group)

Results: 84 patients were included in the study with mean age of 48 (±14.6). 21 patients (25%) developed urinary retention following ileostomy takedown. Patients who developed retention had similar operative times (53 vs. 60 minutes, p=0.135) and intravenous fluid given in the operating room (1029 vs.1133 cc, p=0.358) compared to non retention group. Both groups also had similar comorbidity profile including rates of IBD and cancer. Not placing the urinary catheter at all, or removing it at the end of the case (67 men, 80%) did not have any effect on urinary retention. However, in 14(20%) of patients who kept catheter after surgery (mean 8 hours, range 6-48 hours), there were no episodes of retention after catheter was removed (p=0.002). 25 (30%) of men recieved perioperative tamsulosin (tamsulosin study group). Peri operative use of tamsulosin did not results in lower rates of urinary retention (33 vs. 29%, p=0.784). There were no urinary tract infection in the whole cohort and urinary retention resolved in all patients before discharged

Conclusions: Urinary retention after ileostomy takedown in men following pelvic surgery is very common. Avoiding urinary catheter placement, early catheter removal or addition to peri operative tamsulosin does not seem to have effect on urinary retention rate in this cohort. However, keeping urinary catheter in place for at least 8 hours seem to be protective against urinary retention following catheter removal

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EXTENDED PROPHYLAXIS WITH LOW-DOSE RIVAROXABAN TO REDUCE POSTOPERATIVE VENOUS THROMBOEMBOLISM IN SELECTED COLON AND RECTAL SURGERY PATIENTS.

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Purpose: The use of extended postoperative venous thromboembolism prophylaxis is increasingly being recognized following colorectal surgery for malignancy and inflammatory bowel disease. The use of low-dose rivaroxaban, an oral factor Xa inhibitor, has not been studied in this certain situation, but has potential advantages over other forms of prophylaxis.

Methods: Starting in May 2014 all patients who underwent major surgery for colorectal cancer or inflammatory bowel disease were discharged on 10mg of rivaroxaban until 30 days after surgery. Patients deemed to be high risk for outpatient anticoagulation were excluded. Retrospective analysis of the medical record was then undertaken to confirm any clinical suspicion of venous thromboembolism. Data from the Michigan Surgical Quality Collaborative (MSQC) and National Surgical Quality Improvement Program (NSQIP) were also used to compare rates before and after implementation.

Results: Over the course of 16 months, 306 patients were discharged on anticoagulation, 277 of which were discharged on only rivaroxaban. Among this cohort the mean age was 55.2 +/-17.9, mean BMI was 26.8 kg/m^2 +/-6.4, mean operative time was 193 minutes +/-103 and median length of stay was 5.8 days (range 2-31). The majority of cases did not involve pelvic dissection (26%) and were for malignancy (66%). No patients were lost to follow-up and no cases of venous thromboembolism were reported. Minor bleeding was reported in 6.4% and major bleeding in 1.8%, leading to premature stoppage in 7.9% (n=22). There were no cases of reoperation due to bleeding. Observed to expected odds ratios via NSQIP dropped from 1.56 and 1.29 in 2012 and 2013 respectively to 0.87 in 2014. Data from MSQC also suggested a trend toward improvement in rates of venous thromboembolism (figure 1).

Conclusions: Although there were no observed thromboembolic events in the patient cohort that used extended prophylaxis with rivaroxaban, larger multi-institutional studies will be required to confirm the finding that rivaroxaban reduces postoperative venous thromboembolism in selected colorectal patients.

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THE UTILITY OF 3D ENDORECTAL ULTRASOUND IN STAGING RECTAL CANCER: A SINGLE-PRACTICE PROSPECTIVE.

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Purpose: The development of the Consortium for Optimizing the Treatment of Rectal Cancer (OSTRiCh) in 2011 has highlighted the need to standardize the practices in which rectal cancer is diagnosed, staged, and surgically and medically treated. MRI is recommended as a standard practice in staging rectal cancer, helping to determine the next most appropriate treatment pathway, i.e surgery versus neoadjuvant treatment. However, 3D endorectal ultrasound has emerged as a useful diagnostic modality in staging rectal cancer. It can be used to locally stage patients, and to re-stage them after neoadjuvant chemoradiation.

Methods: In an effort to understand how this modality is used and contributes to our practice of six attending colorectal-trained surgeons, patients who had undergone staging with 3D endorectal ultrasound for were identified. Patients who had anal squamous cell carcinoma were eliminated and focus was placed on patients with biopsy-proven rectal adenocarcinoma.

Results: Of the twenty-eight patients identified with rectal adenocarcinoma who had undergone 3D ultrasound, in twenty-four patients it was

used in the initial staging process. In four patients, it was used to re-stage after neoadjuvant chemoradiation, and in 50% it matched the final pathologic diagnosis for T and N stage. 7 patients had an MRI and 3D endorectal ultrasound as part of their initial diagnostic staging, and 4 (57%) of those patients had concordant findings on both modalities. Seven patients did not pursue neoadjuvant chemoradiation because stage I disease was diagnosed on their 3D endorectal ultrasound. None of these patients were upstaged once final pathology was revealed, but one did undergo a total mesorectal excision after the transanal endoscopic specimen revealed poor features (angiolymphatic invasion, etc).

Conclusions: As more entities join the Consortium for Optimizing the Treatment of Rectal Cancer (OSTRiCh), and their recommendations and practices become the standards recognized for managing rectal cancer, we must understand how to align our methodology in that direction. This brief, small review of the use of 3D endorectal ultrasound in our practice requires further analysis and more data to make full recommendations as to its usefulness in evaluating rectal cancer. We need to build a standardized method of diagnosing localized rectal cancer extension.

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A MULTI-INSTITUTIONAL STUDY OF LONG-TERM PATIENT-REPORTED OUTCOMES AFTER PROCTECTOMY VS. PROCTOCOLECTOMY FOR RECTAL CANCER IN PATIENTS WITH LYNCH SYNDROME.

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Purpose: Lynch Syndrome (LS) is the most common hereditary colorectal cancer (CRC) syndrome. When patients present with rectal cancer as their index cancer, patients and surgeons must decide whether proctectomy (P) alone or proctocolectomy (PC) will be performed. Existing literature has elucidated the relative risks of metachronous colon cancer after P vs. PC, but no study has explored long-term patient-reported outcomes. We aimed to fulfill this gap in knowledge to better inform surgical decision-making in this special population.

Methods: A multi-institutional study was conducted after identifying LS patients who had undergone surgical treatment for rectal cancer. LS was defined by either a pathogenic germline mutation in DNA mismatch repair (MMR) genes or a MMR-deficient tumor without evidence of hypermethylation or BRAF mutation. Thirty-nine patients meeting inclusion criteria responded to a cross-sectional survey. Functional outcomes were measured by the validated MSKCC Bowel Function Instrument; quality of life (QOL), by the validated EORTC QLQ-C30 (generic) and QLQ-CR29 (disease-specific) instruments; and health utility, by the validated EQ-5D instrument. Clinical data were retrospectively retrieved from medical records and collated with survey responses. All data were de-identified and pooled from contributing institutions. Outcomes after P vs. PC were compared using the Wilcoxon rank sum test.

Results: Among 39 respondents (Male: 19, 49%), The median age at rectal cancer diagnosis was 42 (interquartile range IQR: 36-54), and at survey was 58 (IQR: 50-75) years. At the time of the survey, 24 (61.5%) had undergone P, and 15 (38.5%), PC. An ostomy was present in 21 patients (54%). No difference was detected in EORTC global and domain QOL scores, or in specific symptom scores among P vs. PC patients, except PC patients reported more dry mouth (p=0.047) and sore skin (p=0.025). The stoma vs. no stoma analysis showed lower sexual interest scores in female patients without a stoma (n=4, p=0.024) and worse stool frequency scores in patients without a stoma (p=.001). After excluding patients with a stoma, P vs. PC patients did not differ in global function or in frequency, dietary, urgency/soliage subscale scores. Finally, the reported overall health index score did not differ.

Conclusions: Patients with LS who had undergone resection for rectal cancer had generally adapted well to their treatments (P vs. PC as well as stoma vs. non-stoma) in the long term. In this special population, competing priorities such as long-term risks for metachronous colon cancer and syndromic extra-colonic cancers must be balanced by the day-to-day impact on functional outcomes and QOL when the extent of surgical resection is being considered. These priorities must be sought for in each individual patient.

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THE IMPACT OF SURGEON VOLUME ON POSTOPERATIVE COLORECTAL SURGERY OUTCOME.

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Purpose: Colorectal surgeries pose a considerable risk for mortality, readmissions, and complications. Postoperative outcome is associated with a number of factors related to the surgeon, hospital, and patient. Surgeon volume and hospital volume have been reported to be associated with the outcome of colorectal surgeries. In this study, we seek to analyze the relationship between colorectal surgery outcome and annual surgeon volume to 1) help patients make an informed choice on where to seek care from 2) contribute to the ongoing policy debate on setting minimum volume standards for hospitals and procedures 3) advocate re-engineering of surgical systems to find an alternative solution to low volume procedures.

Methods: This study was conducted using retrospective data from Geisinger Health System (GHS), a large tertiary care medical center in rural Pennsylvania. Surgeon volume data was extracted from electronic health records from of GHS and associated risk adjusted outcome data was extracted from QualityAdvisor™ database. Risk adjusted outcomes were measured using Observed to Expected ratio (O/E Ratio) for 30-day mortality, 30-day readmissions, complications, and postoperative length of stay (LOS). Each surgeon was classified as a high or low volume based on an annual case volume threshold of 37 surgeries. Outcomes for 1) elective, 2) emergent, 3) all (elective and emergent together) colorectal surgeries were compared between high and low volume surgeon groups.

Results: We included a total of 2, 629 adult patients who had a colorectal surgery between 2006 and 2014 at GHS; 1,077 patients who did not have a risk adjusted O/E ratio were removed. The high volume surgeon group performed 54.9 surgeries on average per year compared to 5.74 of the low volume surgeon group. Also, the high volume surgeon group had operated on a significantly older (p=0.0281) and more chronically ill (p=0.0017) patient population. Sixty six percent of the emergent surgeries were performed by the low volume surgeon group and 71% of the patients who had an ASA score 4 or more were operated on by the low volume surgeon group. The postoperative complications were significantly higher in the low volume surgeon group (elective p=0.0017, emergent p<0.0001, all p<0.0001). The postoperative LOS was significantly higher in the low volume surgeon group (elective p<0.0001, emergent p=0.0012, all p<0.0001).

Conclusions: Surgeon volume outcome analysis should be performed considering the elective and emergent status of a surgery to obtain meaningful results. Postoperative complications and LOS outcomes are significantly better when high volume surgeons perform the surgery. However, there is no significant difference in mortality or readmission outcomes in relation to surgeon volume. We recommend studying the causal relationships to understand the factors contributing to complications and longer LOS when surgeries are performed by low volume surgeons.

P321

OBESE PATIENTS WITH HYPOALBUMINEMIA ARE AT INCREASED RISK FOR MORBIDITY AND MORTALITY IN ELECTIVE COLORECTAL SURGERY.

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Purpose: To determine if elective colorectal surgery patients with low albumin, high Body Mass Index (BMI), or both are at higher risk for post-operative morbidity and mortality.

Methods: Patients undergoing elective colorectal surgery from a single institution were evaluated using the National Surgical Quality Improvement Program (NSQIP). Patients were stratified into either high albumin (>3 g/dL) or low albumin (<3 g/dL) and high BMI (>25) or normal BMI (<25) and then combined into one of four groups (high albumin/high BMI, high albumin/low BMI, low albumin/low BMI, and low albumin/high BMI). Univariate analysis was used to assess the relative contribution of albumin and BMI independently and combined on surgical morbidity and mortality. Multivariate analyses were used to identify independent risk factors including surgical site infection, pneumonia, prolonged intubation, DVT/PE, CVA, MI, acute kidney injury (AKI), blood transfusions, sepsis, and cardiac arrest.

Results: There were 1431 patient analyzed, of which 170 patients (12%) had low albumin and 919 (64%) patients had a high BMI. There were 103 (7.2%) patients had low albumin and high BMI. Low albumin and high BMI were each independently associated with higher rates of complications ($p< 0.001$). Patients with both low albumin and high BMI were at much higher risk for post-operative mortality (OR: 16.1, CI: 8.1-23.6, $p<0.02$) and morbidity (OR: 5.2, CI: 3.0-9.1, $p<0.01$) compared to all other groups. When controlling for other factors, low albumin conferred a higher overall risk for post-operative morbidity (OR: 11.3, CI: 5.2-17.9, $p<0.04$) and mortality (OR: 1.3, CI: 0.7-2.9, $p<0.01$) when compared to BMI. Sub-group analysis of independent morbidities showed an increased rate of complications with deep space infections, pneumonia, prolonged intubation/ventilator dependence, AKI, blood transfusion, post-operative DVT, and post-operative sepsis in patients with high BMI and low albumin ($p<0.02$).

Conclusions: Obese patients with hypoalbuminemia are a distinct population with statistically higher rates of post-operative complications and mortality. Low albumin is a greater risk factor for post-operative morbidity and mortality than high BMI.

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IS THERE A NEED FOR EXTENDED POSTOPERATIVE VENOUS THROMBOEMBOLISM PROPHYLAXIS IN SURGERY FOR DIVERTICULITIS: A COMPARISON OF INCIDENT OF POSTOPERATIVE VENOUS THROMBOEMBOLISM EVENTS IN SURGERY FOR DIVERTICULITIS VERSUS COLORECTAL CANCER.

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Purpose: To compare the postoperative venous thromboembolism (VTE) rate in patients undergoing surgery for diverticulitis versus colorectal cancer. The National Comprehensive Cancer Network recommends patients who undergo surgery for colorectal cancer receive up to 4-weeks of post-operative, out-of-hospital VTE prophylaxis. We observed a trend towards increased VTE in our patients after surgery for diverticulitis. We would like to determine if the risk for VTE is a pattern nationally and if it is comparable to patients undergoing surgery for colorectal cancer.

Methods: The study is a retrospective review of patients undergoing major abdominal and pelvic surgery for diverticulitis versus colorectal cancer. Data were obtained from the National Surgical Quality Improvement Program years 2005-2010. The primary outcome was 30-day postoperative VTE (including deep vein thrombosis and pulmonary embolism) rate using univariate testing and logistic regression controlling for age, body mass index, American Society of Anesthesiologists Classification, work relative value units, if the surgery were emergent, pelvic versus abdominal surgery, laparoscopic versus open surgery, and preoperative hematocrit, corticosteroid use, bleeding disorder, sepsis, and functional status.

Results: A total of 61,422 patient were identified with diverticulitis (18,275) and colorectal cancer (43,147). The 30-day postoperative rate of VTE was higher in patients with colorectal cancer than patients with diverticulitis (2.0% v. 1.6%, p-value= 0.0002). When controlling for the above fifteen significant covariates, the odds ratio for VTE in patients undergoing surgery for diverticulitis versus colorectal cancer was 0.80 with a p-value of 0.006.

Conclusions: Patients with diverticulitis had a significantly reduced odds of VTE complication following surgery; however; the unadjusted risk of postoperative VTE is still relatively high in patients undergoing surgery for diverticulitis. Additional studies are warranted to determine if patients undergoing surgery for diverticulitis would benefit from a 4-week period of postoperative, out-of-hospital VTE prophylaxis.

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IS COLONIC J-POUCH RECONSTRUCTION FOLLOWING LOW ANTERIOR RESECTION AS SAFE AS STRAIGHT ANASTOMOSIS?

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Purpose: Low rectal tumors are often treated with sphincter preserving resection and coloanal anastomosis. Two commonly employed reconstructive techniques are the traditional straight coloanal anastomosis (SCAA) and colonic j-pouch anal anastomosis (CJPAA). While the CJPAA may offer advantages in regards to functional outcome, the anastomosis requires additional technical steps. The purpose of this study was to compare the short-term morbidity and mortality of coloanal anastomosis utilizing a SCAA vs. CJPAA for reconstruction after low anterior resection.

Methods: We identified patients who underwent proctectomy for rectal neoplasia followed by SCAA (CPT 45112) and CJPAA (45119) in the 2008-2013 ACS NSQIP database. Preoperative patient demographics, intraoperative data, and postoperative complications were compared. Univariate analysis was performed to evaluate 30-day mortality, postoperative complications, and length of stay (LOS). Multivariate analysis was used to assess the impact of the reconstruction technique on postoperative complications.

Results: A power analysis was performed for equality testing with a total of 1366 patients needed to provide an 80% power. A total of 1471 patients were included, 708 in the SCAA group and 763 in the CJPAA group. Preoperative characteristics including age, BMI, ASA, OR time, and wound classification were similar between groups. There was no difference in the thirty-day mortality (0.8%). Univariate analysis demonstrated that major complications were higher in the SCAA group compared to the CJPAA group (20% vs. 14%, P=.001)(Table 1). In addition, LOS was longer in the SCAA group vs. CJPAA group (8.8 days vs. 8.1 days, p=0.001), as well as deep incisional surgical site infections (3.3% vs. 1.4%, p=0.03) and the need for reoperation (7.8% vs. 5.1%, P=0.03). After adjusting for covariates, major complications were equally as likely in both groups (OR 0.68, 95% CI 0.46-1.00).

Conclusions: An anastomosis utilizing a CJPAA resulted in a shorter length of stay. However, postoperative complications were not increased following CJPAA when compared to straight anastomosis, in spite of the increased technical steps involved in CJPAA reconstruction.

Table 1. Postoperative outcomes following SCAA vs. CJPAA

	SCAA (%)	CJPAA (%)	P-value
Mortality (30 day)	0.8	0.8	0.5
Superficial SSI	9.5	11.2	0.29
Post-op transfusion	12.1	9.7	0.15
Major complication	20.1	13.8	0.001
Deep incisional SSI	3.3	1.4	0.03
Organ space SSI	8.2	6.4	0.22
Wound dehiscence	2.3	1.1	0.1
Sepsis	5.9	4.5	24
Septic shock	2.0	0.8	0.08
Cardiac arrest	0.4	0.1	0.5
Post MI	0.7	0.8	0.99
Reintubation	1.8	1.2	0.41
PE	12.1	9.7	0.15
ARF	0.9	0.7	0.9
Return to OR	7.8	5.1	0.03
Minor complication	15.4	17.0	0.29
DVT	1.7	1.1	0.39
UTI	3.8	5.4	0.19
Pneumonia	2.1	0.8	0.08
LOS	8.8 days	8.1 days	0.001

Statistical significance p<0.05

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WHERE DOES A COLORECTAL SURGEON'S REVENUE COME FROM?

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Purpose: A colorectal surgeon performs a wide variety of procedures, including endoscopy, minor ano-rectal cases, and major abdominal procedures. The time and technical skills required to perform these procedures also varies widely. The contribution margin (CM) is the hospital revenue generated by a surgical case minus all the hospitalization variable labor and supply costs. One would assume a direct correlation between CM and the length of time and complexity of a case. However, literature and data specific to the revenue and OR time of different procedure types for a colorectal surgeon is limited. The purpose of this study was to analyze the mean CM for each type of colorectal procedure as a function of time spent by a colorectal surgeon.

Methods: The billing reports and operative times for procedures of a single colorectal surgeon between October 2014 to October 2015 at our institution were retrospectively analyzed. Procedures were subdivided as endoscopy, minor ano-rectal and major abdominal procedures. Major operative procedures were further analyzed to compare open, laparoscopic, and robotic surgeries. The mean contribution margin (mCM) was calculated for each of these categories. We calculated the mean operating room (mOR) times – wheels-in to wheels-out – as well as the mean case times (mCT)– from incision-to-close. Mean CM per hour of operating room time was also calculated.

Results: In total 441 cases were performed. They were broken down into 159 endoscopic, 140 ano-rectal, and 142 major cases. The mean case time was 9 minutes shorter for endoscopy procedures compared to ano-rectal cases (16 min vs 25 min, respectively), with major abdominal operations having mean case time of 201 min. Amongst the major cases, there were 22 laparoscopic, 40 open, and 80 robotic cases, with mean case times of 193 min, 246 min, and 270 min, respectively. The mCM for endoscopy and ano-rectal, and major abdominal cases were $889.57, $3221.34, and $8100.53 respectively. Within major cases, the mCMs were laparoscopic: $10,978.11, open: $5,699.02, and robotic: $8,509.95. mCM per hour of operating room time for each procedure type was: endoscopy $1906.49/hour, ano-rectal $3452.45/hour, laparoscopic $2538.08/hour, open $1086.71/hour, and robotic $1490.36/hour.

Conclusions: Our findings show that per hour of operative time, ano-rectal procedures yield the highest mCM compared to endoscopy or any major abdominal surgeries. Among major abdominal cases, the laparoscopic cases on average take less time than robotic cases and yield the highest mCM per hour. This may be partly accounted for by the high cost of robotic cases. One can infer that contribution margin correlates directly with surgeon reimbursement. Knowing the average contribution margin for each type of procedure may influence how a colorectal surgeon decides to tailor his or her practice.

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IMPLEMENTATION OF ROUTINE CAPNOGRAPHY IN THE IMMEDIATE POSTOPERATIVE PERIOD: TRIALS AND TRIBULATIONS.

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Purpose: Capnography monitoring (measuring end-tidal carbon dioxide [ETCO2]) has been recommended as the standard of care in postoperative safety monitoring following opioid administration and neuraxial anesthesia. However, there are no universally accepted guidelines to direct current monitoring practices. We sought to implement routine ETCO2 monitoring in the immediate postoperative period in patients undergoing colorectal surgery within an enhanced recovery protocol while aiming to establish functional, yet practical, monitoring parameters for use.

Methods: A prospective cohort analysis was undertaken to evaluate the efficacy of postoperative capnography monitoring in patients undergoing colorectal surgery at an academic institution. At the time of implementation, monitor parameters were based on institutional recommendations and factory default settings. Devices were monitored using call-bell capability that tied into an overhead alarm system. Alarm data were analyzed to ensure alarm settings were appropriate. Patient satisfaction was monitored to determine the effects of this additional safety monitoring on the patient experience.

Results: In the first 3 months following the implementation of ETCO2 monitoring, 42 consecutive patients were placed on capnography monitors in the first 24 hours after neuraxial opioid administration. During this time, over 23,000 alarms were registered (average 42 alarms per patient in 24-hour period – range 14-2279) leading to significant disturbance in patient satisfaction and sleep interruption. This required five separate adjustments of the institutional settings. Parameter settings and changes are noted in Table 1. Changes were made based on the number of nuisance alarms reported, clinical insignificance of the alarms reported due to monitor sensitivity, and decreased patient and staff satisfaction. Comparing the patients experiencing alarms before and after parameter adjustments, patient alarms for ETCO2 low limits decreased slightly from 86% to 83% (p=0.79) but remain excessively high; alarms for Respiratory Rate (RR) high limits decreased significantly from 69% to 14% (p=0.0001) and RR low limits increased slightly from 79% to 83% (p=0.62). During this same time period, there were no reported cases of respiratory depression requiring intervention.

Conclusions: We have clear knowledge that capnography is the earliest indicator of respiratory depression and can provide an added mechanism for increased patient safety monitoring. However, device factory settings are highly sensitive and can cause patient and staff dissatisfaction as well as alarm fatigue, deferring attention from true alarms. Evidence-based guidelines are needed for alarm parameter settings related to end-tidal CO2 monitoring to ensure both safety and avoidance of alarm fatigue.

Table 1: Covidien Capnostream20 capnography monitor parameter settings

	Units	Default Settings	Initial settings	Current settings
ETCO2 high	mmHg	60	60	60
ETCO2 low	mmHg	15	30	10
RR high	bpm	30	30	30
RR low	bpm	5	8	6
No breath	secs	30	20	30
SpO2 low	%	85	87	87
Pulse high	bpm	140	150	150
Pulse low	bpm	50	50	50

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COLORECTAL SURGERY IN THE ELDERLY. DOES THE EXTREME AGE DETERMINE THE ODDS RATIO OF COMPLICATIONS?

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Purpose: The human aging is an ongoing process, expressing a functional worsening, subjective or objective. There is not a specific age for the beginning of the old age but it is about 65 years old. Greater and greater there is more old people that could need an operation. These population can present atypical symptoms, worse response to complications and more serious. Before to consider colorectal surgery in the elderly we have to assess the need of surgery, the quality of life, the ethical guidelines, the risk/benefit estimation and the expected survival. The aim of the study is to assess if age, Charlson Comorbidity Index and ASA Classification determine the odds ratio of global, surgical and medical complications, anastomotic leakages and reoperations in colorectal elective surgery.

Methods: A clinical series reviewing the period 2004-2013 (10 years) in which we performed 643 elective colectomies. We selected groups and subgroups according to age: Group 1: < 75 years (Subgroup 1.1: < 65 years; Subgroup 1.2: 65-75 years); Group 2: > 75 years (Subgroup 2.1: 75-85 years; Subgroup 2.2: > 85 years). Age, Charlson Comorbidity Index and ASA Classification were included as predictor variables in the multivariate analysis.

Results: The odds ratio of global complications in patients between 75 and 85 years compared with patients under 75 years is 1.89. However in patients over 85 years compared with patients under 75 years is 1.143. This odds ratio increases 1.317 times per each increased grade of ASA. The odds ratio of surgical complications in patients between 75 and 85 years compared with patients under 75 years is 2. However in patients over 85 years compared with patients under 75 years is 1.494. This odds ratio increases 1.315 times per each increased grade of ASA. The odds ratio of medical complications increases 1.736 times per each increased grade of ASA. The odds ratio of anastomotic leakages increases 1.596 times per each increased grade of ASA. The odds ratio of reoperations in patients between 75 and 85 years compared with patients under 75 years is 2.367. However in patients over 85 years compared with patients under 75 years is 1.385.

Conclusions: The risk of global and surgical complications is determined by age and ASA Classification. The risk of medical complications and anastomotic leakages is just determined by ASA Classification. The risk of reoperations is just determined by the age of the patient. Thus, in patients over 85 years, those who have achieved a successful aging and with a right selection of surgery candidates, we did not show a major percentage of global and surgical complications, neither reoperations compared with patients under 75 years. Despite that patients over 75 years have a higher Charlson Comorbidity Index, we did not demonstrate any statistical significant relationship between postoperative complications and this scale.

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EFFECTIVENESS OF ADDING TRANSVERSE ABDOMINUS PLANE (TAP) CATHETERS TO PATIENT-CONTROLLED ANALGESIA (PCA) IN LAPAROSCOPIC COLON RESECTIONS: A RETROSPECTIVE CHART REVIEW.

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Purpose: The control of postoperative pain has become a major issue in surgery awareness and it is considered an important measurement of patient satisfaction. Improvements in pain relief, including stopping pain before it starts is of great benefit to the surgical patient. When pain is aggressively addressed, patients respond by recovering faster. The use of opioids remains the mainstay to minimize postoperative pain. In patients undergoing abdominal procedures, adequate pain control remains an issue. Within colorectal surgery, a shift from conventional laparotomy incision to laparoscopic approach has reduced postoperative pain. It is known that innervation to the antero-lateral abdomen is provided by sensory nerves T7-L1, ilioinguinal and iliohypogastric nerves, which travel through the transverse abdominis muscle plane (TAP). Local anesthetic block of these nerves (TAP block) has been described and has shown to be effective for immediate postoperative pain control after laparoscopic surgery. In addition to pain control, Early Recovery After Surgery (ERAS) pathways in colorectal surgery reliably reduce length of hospital stay. There is no consensus on the optimal analgesia for patients undergoing laparoscopic colorectal surgery within ERAS. Post-operative analgesia may result in longer lengths of stay in the hospital, usually due to narcotic-induced ileus. Our initial hypothesis is that opioid sparing is the most important component of ERAS protocol and that TAP catheters allow patients to achieve that goal.

Methods: Medical records of all the patients undergoing laparoscopic colorectal resections at Stamford Hospital between January 2011 and December 2014 were searched and examined. Inclusion criteria are age 18-100 years and non-emergent primary laparoscopic colorectal resections. Exclusion criteria are opioid dependence, lap converted to open procedures, and emergent or revision surgery.

Results: Records indicate that in this sampling population, there were 50 patients that received TAP catheters and 15 patients that did not. The mean age in the TAP group was 60.5 and 63 in the non-TAP group, which was not statistically significant. Overall, the patients in the TAP catheter group tended to pass flatus earlier (2.9 days vs 3.1 days), and were also found to pass stool (3.7 days vs 4.5 days) and be discharged earlier (5.1 days vs 6.5 days) than the non-TAP catheter group. The results of the latter were statistically significant.

Conclusions: Ongoing data collection is currently being done on all these patients. However, early results of this retrospective pilot study does demonstrate that the addition of a TAP catheter block to a PCA post-operatively in laparoscopic colectomy patients leads to less use of overall narcotic consumption, earlier passage of flatus and stool, and shorter length of stay.

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EXPLORING PATIENTS' AND CAREGIVERS' EXPERIENCES WITH A NEW STOMA AND IDENTIFYING OPPORTUNITIES FOR IMPROVEMENT.

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Purpose: Patient engagement is defined as a meaningful involvement of patients, caregivers, clinicians and other health care providers throughout the research process in order to influence research to be more patient centered, useful and trustworthy and ultimately lead to greater use and uptake of results by patients and the broader health care community. As part of a large, pan Canadian quality improvement project for rectal cancer, patients with rectal cancer and their family members as well as enterostomal nurses from participating centers were invited to participate in a one day, in-person collaborative workshop to obtain their perspectives on the current and ideal experience with a new stoma following rectal cancer surgery.

Methods: Thirty patients previously treated for rectal cancer and their family members as well as enterostomal nurses from 8 high volume rectal cancer centers across Canada were invited to attend a 1 day in person collaborative workshop. During the workshop the patients and family members were asked to reflect on their experience of having a new stoma and provide their best and worst experiences leading up to surgery, during and immediately after surgery and following discharge from hospital. Using a nominal group consensus process, the participants then prioritized all of the experiences to describe the ideal experience of having a new stoma. Through a storyboarding exercise, the participants then made suggestions about how to assist future patients achieve the ideal "stoma" experience.

Results: The major themes identified by the workshop participants were: i) lack of access to ET nurses or ET expertise throughout all phases of the experience, ii) feelings of abandonment at discharge with new stoma and at discharge following stoma closure, iii) feelings of isolation and stig-

mata associated with having a stoma, iv) key role of a caregiver/partner and v) underestimation of the effect of new stoma and reversal of stoma on lifestyle. Suggestions for improvement included a i) buddy systems or online ostomy matching program, ii) pre-ostomy education group classes and iii) increased public awareness about stomas through commercials and/or celebrity spokesperson and iv) a patient checklist for each phase of the new stoma process.

Conclusions: By engaging patients, family members and enterostomal nurses in a collaborative workshop, several major themes were identified that represent opportunities to improve care for patients with new stomas and several actionable and unique strategies were suggested in order to accomplish this.

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LOCAL PARASTOMAL HERNIA REPAIR WITH BIOLOGICAL MESH – SAFE BUT WITH HIGH RECURRENCE RATES.

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Purpose: Local parastomal hernia repair using biological mesh is widely performed to treat parastomal hernias. With the introduction of biological mesh, different techniques have emerged. The goal of this study was to evaluate the efficacy, morbidity, and safety of local parastomal hernia repair using biological mesh.

Methods: A retrospective analysis of a prospectively maintained database was performed from July 2006 to July 2015. All patients who had undergone local repair at the original stoma site were included in the study. Non-local (laparoscopy or midline) procedures were excluded. The type of repair, incision, and overall final placement of the biological material for repair were analyzed. Time to recurrence was also measured as an independent variable. Three board certified colorectal surgeons performed all the operations.

Results: Within the established time frame, 41 local repairs were done using biological mesh. The mesh used was of human origin in 7 (17%), bovine in 8 (19%), and porcine in 26 (63%). Variable types of local incisions used in the local repair included: a "lollipop" incision (circumferential around the stoma with a radial incision made in one direction to better facilitate exposure) in 23 (56%) cases and a traditional circumferential incision was used in 18 (44%). The majority of the repairs (88%) were elective, while only 12% were performed in an emergent setting. With regards to biologic mesh placement, underlay was used in 13 (31%) cases, overlay in 4 (9%) cases, and both an underlay and overlay (sandwich technique) in 24 (58%) cases. The mean follow up time was 2.26 years with a recurrence of 34% (14 patients). Recurrence was similar based on type of incision; each group contained 7 patients each with a recurrence. Underlay repair had a recurrence in 7 patients and sandwich technique had a recurrence in 6 patients (P = 0.705) and onlay repair had 1 recurrence. There were no immediate complications or readmissions related to the local mesh repair however one patient (2%) was admitted for mesh infection within 30 days of the repair and needed mesh removal. There were no mortalities noted in the population.

Conclusions: These findings shown here demonstrate that parastomal hernia repairs are plagued by high recurrence rate (34%), while although undesired, is consistent with the incidence of recurrence published in the current literature. Our findings further reveal that incision type (circular or lollipop) and mesh placement technique (underlay, overlay or sandwich) are irrelevant to the rates of recurrence. Sandwich technique seems to have less recurrence compared to underlay or overlay but the difference is not statistically significant. Local parastomal hernia repairs with biological mesh are safe, but have high hernia recurrence rates.

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RISK FACTORS FOR EMERGENCY DEPARTMENT VISITS AND READMISSIONS AFTER NONEMERGENT COLORECTAL SURGERY FOR BENIGN AND MALIGNANT DISEASE.

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Purpose: Emergency Department visits and readmissions after colorectal surgery are common (8-30%) and costly to patient outcomes and hospital resources. There is a need for large database analyses with power to better assist in defining the risk factors for ED visits and readmissions in an effort to decrease the incidence. The purpose of this study was to determine risk factors for Emergency Department visits and readmissions for patients undergoing non-emergent colorectal surgery.

Methods: This is a retrospective analysis of Emergency Department visits and 30-day readmissions using the protocol-driven, externally audited Michigan Surgical Quality Collaborative database from July 1, 2012 to April 30, 2015.

Results: A total of 8,470 patients comprised the study group: 3,493 (41.2%) open, 4,239 (50.1%) laparoscopic, and 738 (8.7%) robotic. Predictors of 30-day ED visits were African-American race [OR: 1.34 (1.09, 1.66)], tobacco use [OR 1.23 (1.02, 1.47], and ASA 3-4 Class [1.32 (1.11, 1.58)]. Those ≥ age 45 [OR 0.51 (0.39, 0.68)] and those who had laparoscopic [0.81 (0.68, 0.97] or robotic approaches [0.71 (0.52, 0.98] were less likely to have ED visits. Predictors for 30-day readmissions were tobacco use [1.28 (1.08, 1.52)], ASA Class 3-4 [OR 1.44 (1.22, 1.71)], steroid use [OR 1.36 (1.02, 1.82)], and longer operative times [OR 1.001 (1.001, 1.002)]. Those who had the laparoscopic approach [OR 0.72 (0.60, 0.85)] or the diagnosis of diverticulitis [OR 0.74 (0.61, 0.90)] were less likely to be readmitted after discharge. All risk factors for readmissions remained significant on subgroup analysis of abdominal and pelvic operations except for tobacco and steroid use, which were specific to colectomies.

Conclusions: In this large regional database analysis, there are several identifiable predictors for Emergency Department visits after discharge and readmissions after non-emergent colorectal surgery. Attention should be directed to those risk factors that are modifiable in an effort to decrease the need for readmissions. Further study of the etiology of readmissions should be done in an effort to proactively identify those non-septic etiologies that may be managed as outpatients.

Risk Factors for Emergency Department Visits and Readmissions After Colorectal Surgery

Risk Factor	ED Visits Odds Ratio (CI)	Readmissions Odds Ratio (CI)
Age 45-64	0.59 (0.46, 0.76)*	1.13 (0.85, 1.51)
Age ≥ 65	0.51 (0.39, 0.68)*	1.15 (0.85, 1.56)
African-American Race	1.34 (1.09, 1.66)*	1.16 (0.95, 1.42)
Tobacco Use	1.23 (1.02, 1.47)*	1.28 (1.08, 1.52)*
ASA Class 3/4	1.32 (1.11, 1.58)*	1.45 (1.22, 1.71)*
Steroid Use	1.33 (0.97, 1.82)	1.36 (1.02, 1.82)*
Laparoscopic Approach	0.81 (0.68, 0.97)*	0.71 (0.60, 0.85)*
Robotic Approach	0.71 (0.52, 0.98)*	0.95 (0.72, 1.23)
Diverticular Disease	1.11 (0.91, 1.35)	0.74 (0.61, 0.90)*

*significant values

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IMPORTANCE OF LAPAROSCOPIC VOLUME AND TYPE OF TRAINING ON CONVERSION DURING ELECTIVE LAPAROSCOPIC COLORECTAL SURGERY.

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Purpose: This study aimed to determine if laparoscopic volume and type of training influences rates of conversion during elective laparoscopic colorectal surgery.

Methods: After IRB approval, retrospective review of a prospectively maintained IRB-approved database was performed for all patients who

underwent elective colorectal resection by any of 6 colorectal surgeons between 2009-2014. All analyses, confounding variables, and outcomes were proposed *a priori*. Surgeons were designated as laparoscopic- or open-trained based on individual education in laparoscopic colorectal surgery during residency. Surgeons were further classified as low- or high-volume laparoscopic based on performing <100 or >100 laparoscopic procedures, respectively, for the study period. Operative technique was laparoscopic, open, or converted.[w1] Conversion rates were compared among 3 groups: Group A: low laparoscopic volume, laparoscopic trained; Group B: low laparoscopic, volume, open trained; Group C: high laparoscopic volume, open trained. Categorical variables were compared among groups using Pearson chi^2 test and continuous variables were compared between groups using Wilcoxon rank-sum test. Using logistic regression for binary outcomes and proportional odds logistic regression for ordinal outcomes, multiple comparisons between the 3 groups were made for variables demonstrating overall significance. Significance was determined at $p<0.05$.

Results: 573 patients were included [mean age 56 (±17) years; 44% male]. Overall conversion rate was 13% (75% preemptive, 25% reactive). Group B had a significantly higher conversion rate than Group C (2.6% vs 14.3%, OR 4.4;p=0.01), but there was no significant difference between Groups A (17.9% vs 14.3%, OR 1.3;p=0.85) and B (42.6% vs. 17.9%, OR 1.3;p =0.11). Patients who underwent conversion from laparoscopy tended to be significantly older (p<0.001), have lower rates of proctectomy (p = 0.007), higher rates of anastomoses (p<0.001), and higher BMI (p<0.001). After adjusting for proctectomy, anastomosis, BMI, use of a hand-assist port, and operative time, there is no significant evidence that training type is associated with conversion (OR = 3.86, 95% CI 0.54-29.14;p=0.15). Compared to patients undergoing successful laparoscopic operations, patients in whom conversion was undertaken had significantly higher rates of postoperative ileus (OR 3.17, p<0.001), increased length of stay (OR 2.16, p=0.002), time to flatus (OR 3.21, p <0.001) and time to solid intake (OR 2.45, p <0.001).

Conclusions: Patients who underwent conversion experienced increased morbidity. Comparing surgeon- and patient-related factors between laparoscopic and converted, type of surgeon training is not associated with conversion. Rather, high laparoscopic volume surgeons, regardless of type of training, convert less frequently than do low laparoscopic volume laparoscopic surgeons.

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BMI IS NOT ASSOCIATED WITH RISK OF ANASTOMOTIC LEAK FOLLOWING ELECTIVE COLORECTAL RESECTION.

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Purpose: Anastomotic leak is a serious complication after colorectal surgery and is associated with significant morbidity and mortality. Body mass index (BMI) has been shown to increase the risk of several post-operative complications. The purpose of this study was to determine whether BMI is an independent predictor of anastomotic leak following elective colorectal resection.

Methods: We identified all patients who underwent elective colorectal resection in both the American College of Surgeons National Surgery Quality Improvement Program (ACS NSQIP) Participant Use Data File (PUF) and the Procedure Targeted PUF for Colectomy for the years 2012 to 2013. Patients were grouped into three BMI categories: Underweight (BMI<18.5), Normal/Overweight (BMI 18.5-29.9), and Obese (BMI≥30). Univariate analyses were used to compare the demographics/co-morbidities and operative characteristics of these groups, and adjusted odds ratios (OR) and 95% confidence intervals (CI) were calculated using multivariable logistic regression.

Results: 19,372 patients underwent elective colorectal resections from 2012 to 2013. 9,337 (48.2%) were male. 532 (2.8%) were Underweight, 12,234 (63.2%) were Normal/Overweight, and 6,606 (34.1%) were Obese. A total of 608 patients (3.2%) developed anastomotic leak in the 30-day postoperative period. Overweight patients were most likely to have hypertension and diabetes and to have operative times longer than 180 minutes. Underweight patients were most likely to be smokers, to be taking steroids, to have disseminated cancer, and to have a stoma created at the time of surgery. On multivariate analysis, neither Underweight (p=0.08) nor Obese (p=0.66) BMI was associated with an increased risk of anastomotic leak compared to Normal/Overweight BMI. Factors that were associated with anastomotic leak were male gender (OR 1.44, 95% CI 1.16-1.78), race designated as "other" (OR 1.62, 95% CI 1.16-2.24), diabetes (OR 1.37, 95% CI 1.03-1.83), smoking (OR 1.55, 95% CI 1.20-2.01), ASA Class 3 (OR 1.44, 95% CI 1.14-1.82), contaminated wound class (OR 1.39, 95% CI 1.03-1.88), a combined oral antibiotic/mechanical bowel preparation (OR 0.55, 95% CI 0.41-0.74), a laparoscopic approach (OR 0.62, 95% CI 0.50-0.78), and operative time greater than 180 minutes (OR 1.25, 95% CI 1.00-1.56).

Conclusions: BMI is not associated with the development of anastomotic leak following elective colorectal resection.

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COMPETENCY IN PERFORMING COLONOSCOPY: AN ASSESSMENT OF COLONOSCOPY SKILLS ACQUIRED DURING A COLON AND RECTAL SURGERY RESIDENCY.

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Purpose: The ability to skillfully perform a colonoscopy is integral to most colon and rectal surgical practices. General surgical residents are taught basic endoscopic skills of varying quality. Colon and rectal surgery residents must perform a minimum of 140 colonoscopies with 30 being therapeutic in nature. There is no assessment of the quality of their colonoscopy skills other than by direct observation. Case numbers may be a poor surogate for competence. Under the guidance of the Program Directors Association of colon and retal surgery residencies, an assessment of the colon and rectal surgical resident both at the beginning and end of residency was felt to be necessary in order reveal any significant deficits in the current education program, and potentially start a discussion about other means of evaluating competency in performing colonoscopy.

Methods: A total of ten programs comprising eighteen residents participated in the entire study. The residents were tested on twenty consecutive colonoscopies at the start of the residency and an additional twenty at the end of their residency. They were graded on their ability to reach the cecum without any staff involvement, the time it took them to intubate the cecum, and their success independently removing polyps. Patients who had had a prior colon resection were excluded.

Results: At the beginning of the colon and rectal surgery residency the residents were able to intubate the cecum independently 63.06% of the time (standard deviation +/- 21.63%), took 13.09 minutes to reach the cecum (standard deviation +/- 4.79 min), and independently removed a polyp 62.83% of the time (standard deviation +/- 29.32%). At the conclusion of the residency the residents were able to get to the cecum 91.94% of the time (standard deviation +/- 9.26%), took 8.96 minutes (standard deviation +/- 3.34 min) and independently removed polyps 95.60% of the time (standard deviation +/- 5.99%). The improvements in all three parameter had p values of 0.0012 or better. In addition, the narrowing of the standard deviation at the end of residency suggests that there was less variability in the skills of the residents entering practice.

Conclusions: The colon and rectal surgery residents improved significantly in all parameters during their residency. In addition, the residencies appear to be producing a more uniform product across the country. This suggests that the current standards of teaching colonosocpy to colon and rectal surgery residents are effective and adequate.

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PATIENTS WITH RESTORATIVE PROCTOCOLECTOMY EXPERIENCE HIGHER RATES OF POSTOPERATIVE ILEUS AND READMISSION AFTER DIVERTING ILEOSTOMY CLOSURE.

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Purpose: Restorative proctocolectomy is a complex procedure associated with higher complication rates than other colorectal procedures. Frequently, diverting stomas are performed to decrease potential morbidity resulting from this procedure, but reversal of these stomas may also be accompanied by complications. Our hypothesis is that ileostomy closures after ileal-pouch anal anastomosis (IPAA) are associated with higher rate of postoperative complications compared to those after other colorectal procedures.

Methods: A prospectively maintained database by the Division of Colon and Rectal Surgery was queried for diverting loop ileostomy reversals over a 3-year period (2013-2015). Demographic, disease-related, and hospitalization-related variables were abstracted for this retrospective cohort analysis. Patients were stratified by presence of prior IPAA. Outcomes including complications (including surgical site infection, urinary tract infection, urinary retention, and ileus [defined as need for nasogastric decompression and/or radiographic evidence of ileus]), length of stay, and 30-day readmission were compared using chi-square and Student's *t* tests. Readmission within 30 days was modeled using logistic regression.

Results: A total of 164 patients undergoing ileostomy reversal were identified (33 in IPAA group, 131 in non-IPAA group). IPAA patients were more likely to be younger (42.0 vs. 53.3 years, p<0.001) and male (78.8% vs. 52.2%, p=0.007), but were similar with regard to race, smoking status, and ASA classification. IPAA patients had significantly higher rates of postoperative complications (Table 1), which was primarily attributable to increased rates of postoperative ileus/bowel obstruction (48.5% vs. 15.3%, p<0.001). No significant difference in length of stay was noted during index admission between cohorts. With regard to 30-day readmissions, however, significantly higher rates were noted in the IPAA population compared to all others (27.3% vs. 9.9%, p=0.009). Multivariate analysis revealed that the presence of IPAA increased the odds of 30-day readmission by over 5 times (odds ratio [OR] 5.6, 95% confidence interval [CI] 1.8 to 17.9, p=0.003). Gender, but not age, also resulted in significantly higher odds of readmission (OR 3.6 for females, 95% CI 1.3 to 10.3, p=0.017).

Conclusions: Patients with prior IPAA appear to experience higher rates of postoperative ileus after diverting loop ileostomy closure, as well as higher 30-day readmission rates, compared to patients undergoing stoma closure after other colorectal procedures. Thus, patients undergoing ileostomy closure after IPAA should be informed about the increased morbidity of this procedure.

Postoperative Outcomes of IPAA and non-IPAA Patients

Variable	IPAA (N=33)	Non-IPAA (N=131)	p-value
Any Complications	66.7%	46.6%	0.039
Ileus/Bowel Obstruction	48.5%	15.3%	<0.001
Surgical Site Infection	21.2%	15.3%	0.410
Urinary Tract Infection	6.1%	4.6%	0.724
Urinary Retention	18.2%	12.2%	0.369
Length of Stay (days)	5.2	4.8	0.667
30-Day Readmission Rate	27.3%	9.9%	0.009

IPAA=Ileal-Pouch Anal Anastomosis

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HIV AND COLON POLYPS - MORE THAN JUST AVERAGE RISK?

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Purpose: Because of the improved life-expectancy in patients with the human immunodeficiency virus (HIV) since widespread use of combination retroviral therapy, the incidence of non-AIDS defining cancer has become a major problem. The effect of HIV infection on colorectal neoplasia has not been well reported. The aim of this study was to examine the impact of HIV status and markers of active disease on adenoma detection rate.

Methods: A retrospective review was undertaken of a prospectively-maintained database of HIV(+) patients undergoing either screening or diagnostic colonoscopy at a single academic center from January 2013 to January 2015. The influence of immunosuppression parameters on neoplasia was additionally examined.

Results: Fifty patients underwent 60 colonoscopies, of whom 64% were male, average age, 51.6 years. Indications included: Screening 38%, Surveillance 8%, Diarrhea 23%, and Bleeding 23%. Overall, twenty-two (37%) colonoscopies were positive for polyps with the majority occurring on the left side of the colon (82%). The overall adenoma detection rate was 26%, with a 6% prevalence of advanced adenomas. No malignancies were detected. Subset analysis revealed neoplasia in 43% of the screening colonoscopies. No immunosuppression indicators were found to be significant predictors of neoplasia (Table).

Conclusions: In this study HIV infection was not identified as a risk factor for colorectal neoplasia. Specifically, both the overall adenoma and the advanced adenoma detection rates were comparable to nationally reported averages . Furthermore, markers of immunosuppression did not correlate with neoplastic findings. Nearly twenty percent of lesions were proximal to the splenic flexure, and would have been missed by flexible sigmoidoscopy. Larger studies are needed to determine whether current screening guidelines are applicable to HIV patients as well as investigate access to care compared to the HIV-negative population.

Impact of immunosuppression on neoplasia

	Neoplasia	No neoplasia
Documented period of viremia	55%	66% NS
Duration of viremia	11 months	12 months NS
CD4/CD8 ratio	0.6	0.4 NS
CD4/CD8 ratio nadir	0.3	0.2 NS

NS = not significant

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MANAGEMENT OF ANASTOMOTIC LEAKAGE AFTER LAPAROSCOPIC COLORECTAL SURGERY.

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Purpose: The aim of this study was to compare the management of complications between laparoscopic surgery and laparotomy for colorectal resection.

Methods: We retrospectively reviewed 1390 and 1956 patients who, respectively, underwent laparoscopic surgery and laparotomy for colorectal disease between May 2010 and July 2015.

Results: The mean age and sex distributions were similar between the 2 groups. In laparoscopic surgery group, there were 338, 112, 506, and 434 patients who underwent right hemicolectomy, left hemicolectomy, high anterior resection, and lower anterior resection, respectively. 46 patients had anastomotic leakage after laparoscopic surgery. The leakage rates were 1.48%, 1.79%, 1.38%, and 7.37%, respectively. The methods for the management of anastomotic leakage are shown in *Table 1*. The mean durations of hospital stay for postoperative anastomotic leakage were 23.35 days in the laparoscopic surgery group and 29 days in the laparotomy group. In the laparoscopic surgery group, the morality rate was 0 and there was no laparoscopy-related death. Only 4 patients received abdominal re-explo-

ration by laparotomy and the hospital stays were 38, 115, 31, and 29 days, respectively.

Conclusions: Laparoscopy is an ideal method for the management of postoperative anastomotic leakage after laparoscopic surgery. Advantages of laparoscopic surgery include early recovery of bowel function, shorter length of hospital stay, lower medical cost and prevention of unnecessary laparotomy even amidst complication.

Table 1. The methods for management of anastomotic leakage

Laparoscopic surgery group (n=46)	RH (n=5)	LH (n=2)	HAR (n=7)	LAR (n=32)
NPO + Nutrition + Antibiotics	2	2	2	4
CT-guided drainage	1	0	1	3
Laparotomy	2	0	1	1
T-loop colostomy + Distal wash out	0	0	1	13
T-loop colostomy + Distal wash out + Abdominal lavage by laparoscopy	0	0	2	7

RH= right hemicolectomy; LH= left hemicolectomy; HAR= high anterior resection; LAR= lower anterior resection; NPO= non per os

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USE OF LAPAROSCOPY IN COLORECTAL REOPERATIVE SURGERY.

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Purpose: Laparoscopic colorectal surgery has gained acceptance around the world. It is well known that this type of surgery is not exempt of complications and some patients will require reoperative surgery. The aim of this study is to evaluate the feasibility of relaparoscopic intervention performed to manage postoperative complications of colorectal laparoscopic surgery.

Methods: A series of 1400 patients who underwent laparoscopic colorectal surgery was analyzed from a prospective database (june 2000 - august 2015). Patients were divided in two groups according to the approach performed in the reoperative surgery: laparoscopy (Group 1) or laparotomy (Group 2). Demographic data, hospital stay, type of complication, number of reoperations, morbidity and mortality were analyzed. Data were statistically analyzed with Students t test and chi square test.

Results: A total of 111 (%) patients required a reoperative surgery . 73 (65,8%) of them were included in G1. No differences between both groups were identified in demographic data (age, gender, BMI, ASA, prior surgeries, comorbidities). According to the initial approach, conversion (G1: 11%, G2:23%, p:0,09) and increased duration of the surgery (G1: 175 vs. G2: 239 min, p: 0,0005) were more frequent in G2. The most common findings at reoperative surgery were: anastomotic leakage 72/111 [G1: 56/73 (78%), G2: 16/38 (42%), p: 0,001)], parietal complications 11/111 [(G1: 3/73 (4%) G2: 8/38 21%, p: 0,006)] and bowel perforation [(G1: 3/73 (4%) G2: 5/38 (13%), p: 0,08). Interval time between surgeries (4,85 vs. 6,37 days, p: 0,012) and number of reoperations (1,09 vs. 1,26; p: 0,03) were lower in G1. The length of hospital stay was lower in G1 (10,4 vs. 13,5 days, p: 0,057).

Conclusions: Laparoscopic approach is safe and feasible for postoperative colorectal complications, particularly to manage anastomotic leakage. Benefits of miniinvasive surgery could be mantained with this approach and hospital stay is decreased.

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SINGLE SURGEON EXPERIENCE: 300 CASES OF ROBOTIC RECTAL CANCER SURGERY.

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Purpose: With the rescent progression of minimally invasive techniques for colorectal cancer, robotic surgery is now being worldwidely spreading. Additionally upon several advantages of minimal invasive surgery such as better cosmesis, less operative pain, quicker recovery, robotic surgery shows better surgical view and ergonomic positioning. Therefore, as Severance hospital is one of the leading hospital in Asia, especially in robotic surgery, we would like to share single surgeon's experience of 300 cases rectal cancer robotic surgery.

Methods: From March 2008 to August 2015, total 300 cases of rectal neoplasm patients underwent robotic surgery in Severance hospital by single surgeon (NK Kim). Since the year of 2013, all robotic surgery was performed by Da Vinci Si.

Results: Patient's characteristics are shown as median age 55 years (29-88) with 193 (64.3%) male and 107 (35.7%) female distribution. Mean body mass index was 23.28±3.13 kg/m2. Proportion of stage 0 and I was 48% of all surgeries, however, we should consider that 147 cases (49%) have undergone preoperative concurrent chemoradiotherapy before surgery. Most of cases were low anterior resection (71%, 213 cases) followed by ultra low anterior resection with coloanal anastomosis (23%, 69 cases) and abdominoperineal resection (6%, 18 cases). Middle rectal cancer (AV 6-10cm) took place half of surgeries (50%, 150 cases) followed by low rectal cancer (AV<6cm, 103 cases) and upper rectal cancer (AV≥10cm, 47 cases). Over 96% of tumor was pathologically confirmed as adenocarcinoma and there were 5 mucinous adenocarcinoma, 1 neuroendocrine tumor, 2 GIST, and 1 carvernous hemangioma. Mean distal margin, proximal margin and circumferential resection margin was 2.4cm ± 2.2cm, 13.4cm± 5.1cm, and 0.9cm ± 0.7cm each. 21 cases (7%) of anastomosis leakage were seen and 10 cases (3.3%) needed transfusion during operation. There were 2 cases of conversion during surgery. Total 43 cases (14.3%) have shown recurrence and among them only 5 cases were local recur cases.

Conclusions: Robotic surgery is known as feasible and safe, shown as with low local recurrence rate. However, even performed with well skilled surgeon, open conversion or local recurrence could be occur. Thus, careful consideration of surgical indication is needed.

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CREATING A PREDICTIVE MODEL FOR OUTCOMES IN COLORECTAL SURGERY TO ENHANCE SURGICAL DECISION-MAKING AND IMPROVE INFORMED CONSENT.

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Purpose: Accurately predicting surgical outcomes enhances surgical decision making. Using the National Surgical Quality Improvement Program (NSQIP) database, the American College of Surgeons has developed a surgical risk calculator that requires Boolean clinical variables including steroid use for chronic conditions, ascites, hypertension requiring medications, dyspnea, acute renal failure, and history of severe COPD. These may not be readily available in most electronic medical records (EMR). In this study, we seek to develop a colorectal surgical risk predictive model based on hospital, provider, and patient variables (clinical and nonclinical) that are readily available to surgeons. Our purpose is to 1) support surgeons to have an improved communication with patients on the potential outcome of a surgery 2) support clinical decision making by identifying high risk patients for mortality, readmission, and complications and 3) enhance informed consent for patients.

Methods: We developed a surgical risk predictive model from a retrospective dataset of 2,415 unique patient encounters of patients who underwent colorectal surgeries between 2006-2014 at a single tertiary care center. We included 117 variables to predict the risk of 30-day mortality, 30-day readmission and postoperative complications. Naïve bayes, random forest, gradient boosting, and logistic regression were used to predict each outcome. The best models with the highest area under the ROC curve (AUC) were chosen to predict each outcome. We used 75% of the total dataset to train models and 25% for testing.

Results: The best model for 30-day mortality is a gradient boosting model with an AUC of 0.85 with a slightly lower discrimination power than the ACS model (AUC of 0.91). Discharge disposition and type of procedure were the top predictors. The best model for 30-day readmission is a random forest model with an AUC of 0.77. Discharge disposition and whether the patient had a prior colorectal surgery within 30 days were the top predictors. The ACS risk calculator does not provide a risk score for readmissions. The best model for complications is a gradient boosting model with an AUC of 0.90 which has a better discrimination power than the ACS risk calculator (AUC of 0.68). Discharge disposition and total length of stay were the top predictors.

Conclusions: We have shown that creating a model to predict postoperative outcomes of patients undergoing colorectal surgery is feasible. This can be done with strong discrimination power to enhance surgical decision making using data readily available in typical EMR systems. Unlike the ACS universal risk calculator, the models presented above will need to be validated prospectively.

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RISK FACTORS ASSOCIATED WITH SURGICAL SITE INFECTION IN COLORECTAL SURGERY.

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Purpose: Surgical site infections (SSI) are the most common complication after colorectal resection. SSI results in the increased morbidity, mortality, prolonged hospital length of stay, and increased healthcare costs The purpose of this study was to identify risk factors for SSI after colorectal surgery.

Methods: A total 3025 patients who underwent colorectal resections between January 2010 and December 2011 were included. An univariable and multivariable analyses for risk factors of SSI were performed

Results: The overall rate of SSI was 9.95%: superficial SSI 3.87%, deep SSI 1.15%, and organ space SSI 4.92%. In multivariated analysis, independent risk factors for SSI were identified to current smoker(P=0.046), combined operation(p=0.002), open surgery(vs laparoscopic surgery, P=0.001), perioperative transfusion(p=0.002), type of colorectal resection(colon and rectum, P=0.001). And we made novel scoring system for predicting SSI by combining the above factors which were assigned as one point. Enrolled patients were categorized as low(0~1), intermediate(2~3), and high risk group(4~5) and there were significant differences between the above risk groups.

Conclusions: By considering to know these risk factors and strategies to prevent, treat or reduce these risk factors, We may be able to improve the SSI rates following colorectal surgery If we can identify these risk factors and special monitoring high risk patients, We may be able to improve the SSI rates following colorectal surgery

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ELECTIVE COLECTOMY FOR DIVERTICULITIS IN TRANSPLANT PATIENTS: IS IT WORTH THE RISK?

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Purpose: Because of the high morbidity and mortality with perforated diverticulitis in transplant recipients compared to the general population, early colectomy for diverticulitis in this population has been suggested. However, the outcomes of elective colectomy are not well defined. The aim of this study was to determine the morbidity and mortality for transplant patients undergoing elective colectomy for diverticulitis and determine the impact of recurrent diverticulitis on postoperative complications.

Methods: We identified solid and liquid organ transplant recipients that underwent elective colectomy for sigmoid diverticulitis between 2000-2015 at a single tertiary care institution. Patient and procedure variables, postoperative complications, postoperative length of stay, anastomotic leak, reoperation, and 30-day readmission and mortality were identified through retrospective chart review. Complication rates were compared between patients with 1 episode of diverticulitis prior to surgery *versus* 2 or more using the Fisher exact test.

Results: 27 transplant recipients (median age 61 [40-81] years) underwent elective surgery for diverticulitis. Ten patients (37%) had one prior episode of diverticulitis and 16 (60%) had 2 or more episodes (median 4 [range, 2-10]). Primary anastomosis was performed in 25 cases (93%), with proximal diversion in 9 cases (33%). Eleven cases (41%) were performed laparoscopically. Length of hospital stay was 9.3±6 days. The overall complication rate for elective colectomy was 52% (superficial SSI [15%], pneumonia [11%], need for hemodialysis [7%], intra-abdominal abscess [7%], respiratory failure [4%], cardiac arrhythmia [4%]). No anastomotic leaks occurred and no reoperations were required. Five patients (18%) required hospital readmission and no deaths occurred within 30 days. Complications differed based on type of transplant (kidney [21%], lung [60%], and liver [85%], p<0.01*)*. Postoperative complications were not significantly different between patients with 1 previous episode of diverticulitis *versus* those with multiple episodes (45% *vs.* 31%, *p*=0.74*),* or impacted by preoperative percutaneous drainage of diverticular abscess (*p* = 0.91).

Conclusions: Most transplant recipients who underwent elective colectomy for diverticulitis did so after multiple recurrences with a high postoperative complication rate and no mortality. There was no significant difference in postoperative complications for patients undergoing surgery after their initial attack of diverticulitis compared to those with multiple episodes prior to surgery. Elective colectomy in transplant recipients should be considered after an initial diverticulitis attack to avoid future recurrences but may not impact postoperative complications.

Table 1: Transplant Patients Who Underwent Elective Colectomy For Diverticulitis (n=27)

	n	%
Female	15	56
Age, mean years±SD	58±5.7	
Kidney transplant	13	48
Liver transplant	7	26
Lung transplant	5	18
Heart transplant	1	4
Stem cell transplant	1	4
BMI, mean±SD	27.3±5.7	
Albumin, mean g/dL±SD	3.6±0.7	
Preoperative prednisone use	21	78
Preoperative tacrolimus use	15	56
Preoperative cyclosporine use	10	37
Active smoker	3	11
ASA 2	2	7
ASA 3	25	93
History of preoperative abscess	12	44
Preoperative stricture	3	11
Colovesical fistula	8	30
Preoperative percutaneous drainage	7	26
Perioperative stress dose steroids	20	74

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LOCATION IS EVERYTHING: THE ROLE FOR SPLENIC FLEXURE MOBILIZATION IN DIVERTICULITIS.

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Purpose: A uniform consensus on the surgical approach for diverticulitis is constantly evolving. Routine splenic flexure mobilization (SFM) has been previously recommended to ensure an adequate length for a tension free anastomosis and to minimize the risks of an anastomotic leak. We hypothesized that routine SFM does not affect outcomes and should be individualized to surgical anatomy. In addition, we sought to compare patient demographics and radiographic findings that may be associated with performing this technique.

Methods: All patients who underwent elective colectomy with primary anastomosis at a tertiary care center from 2007-2015 for left-sided diverticulitis were identified from the National Surgical Quality Improvement Program (NSQIP). Operative records were reviewed to identify cases where SFM was performed. Computed tomography scans were reviewed to determine primary disease location (sigmoid or descending colon). Patient demographics, co-morbidities, and perioperative characteristics were compared; and 30-day risk-adjusted outcomes were assessed.

Results: We identified 208 sigmoid/left colectomy patients, with a median age of 57 years old (interquartile range: 49-64). Operative approach was more often laparoscopic (laparoscopic=71%; open=29%) with a conversion rate of 9.6%. SFM was performed in 54% of patients (n=113). Demographics and co-morbidities were similar between groups stratified by SFM. Laparoscopic approach was associated with SFM (60% vs. 40%; p=0.01) and SFM was more likely to be performed in proximal disease (descending 83% versus sigmoid 40%; p<0.01). Mean operative time was significantly greater in the SFM group compared to no mobilization (232 vs. 184 minutes; p<0.01). Median time to discharge and 30-day postoperative outcomes were not significantly different. After risk adjustment, SFM was associated with an increased rate of a minor postoperative morbidity (Odds ratio (OR): 2.8; 95% confidence interval (CI): 1.0-7.8; p=0.05). SFM was not associated with organ space infection (p=0.94). On adjusted analysis, a laparoscopic approach (OR: 2.4; p=0.02) and disease in the descending colon (OR: 7.4; p<0.01) were associated with an increased odds of performing SFM. The remainder of risk factors did not reach statistical significance (**Table 1**).

Conclusions: SFM was identified in only half of the colectomies performed for diverticulitis and our results demonstrate the safety of selective SFM. This technique was associated with a longer operative time, and correlates with an increased rate of minor complications. Although the NSQIP database does not specifically identify the incidence of an anastomotic leak, an equivalent risk of organ space infections between groups acts as a surrogate marker in support of our hypothesis. These findings suggest that SFM should be individualized based on anatomy, disease extent, and ability to create a tension free anastomosis.

Table 1. Results of multivariable logistic regression analysis for predictors of splenic flexure mobilization

Variables	*OR*	*95% CI*	*P-value*
Female gender	1.7	(0.7-3.3)	0.12
Age:			
<65	Reference		
≥65	1.4	(0.7-3.1)	0.35
Body mass index (kg/m^2):			
Normal weight	Reference		0.43
Obese	1.7	(0.7-4.0)	
Overweight	1.2	(0.5-2.8)	
Diabetes	1.7	(0.5-5.4)	0.36
Dyspnea	1.6	(0.4-6.8)	0.52
Smoker	0.9	(0.4-2.1)	0.87
Hypertension	0.8	(0.4-1.6)	0.56
Colorectal fellowship trained surgeon	1.1	(0.4-3.2)	0.80
Laparoscopic approach	2.4	(1.1-5.0)	***0.02***
Disease location:			
Sigmoid colon	Reference		
Descending colon	7.4	(3.4-16)	***<0.01***

OR, odds ratio; *CI*, confidence interval

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METABOLIC SYNDROME AS A RISK FOR ANASTOMOTIC LEAK BEYOND OBESITY ALONE.

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Purpose: There has been conflicting evidence regarding the role of obesity as a risk factor for anastomotic leak following colorectal resection. Furthermore, the metabolic syndrome (MS), defined as central obesity accompanied by dyslipidemia, hypertension, and glucose intolerance, is associated with an inflammatory state and increases risk for several disease processes beyond that which can be explained by obesity alone, but has not been studied in relation to anastomotic leak. The purpose of this project was to define the relationship between obesity and anastomotic leak, and additionally to evaluate the excess risk for leak in the setting of MS.

Methods: The NSQIP targeted colectomy database from 2012-2014 was queried for patients undergoing colectomy with anastomosis. Patients were divided into groups based on BMI (normal: 18.5-24.5, overweight: 25-29.9, class I obesity: 30-34.9, and class II obesity: 35+) and presence of components of MS: obesity, hypertension, diabetes, or presence of all three comorbidities. Univariate analysis was performed using chi-squared tests to compare leak rates between these groups. Multiple logistic regression controlling for preoperative and operative variables was then used to evaluate the role of MS as an independent predictor for leak.

Results: A total of 53,185 subjects were identified for inclusion in the study, with an overall leak rate of 3.8% (n=2060) and incidence of MS of 6.9% (n=3645). On univariate analysis, there was no significant difference in leak rate between individuals of normal BMI, overweight BMI, and class I obesity. Class II obesity, however, was associated with significantly higher leak rate (4.6% vs 3.6%, p<0.001). Furthermore, presence of 0, 1, or 2 of the comorbidities comprising MS all had similar leak rates of 3.6-3.7%, whereas presence of all three comorbidities together correlated with a significantly higher leak rate of 4.6% (p=0.045). Within the class I obesity group, MS conferred no higher risk of leak (3.7% vs 3.2%, p = 0.285), however for patients with BMI >35, MS increased leak rate from 4.1% to 5.8% (p = 0.002). On multivariate analysis, neither diabetes nor hypertension was an independent risk factor for leak, but class II obesity was (OR 1.286, 95% CI 1.110-1.490). Metabolic syndrome was associated with a non-significant increased risk for leak (OR 1.142, 95% CI 0.898-1.452) among all patients, and this effect was accentuated with BMI >35 (OR 1.979, 95% CI 0.966-4.055).

Conclusions: We have found that class II obesity, but not class I obesity, is a significant predictor for anastomotic leak. Furthermore, the constellation comprising MS increases leak risk beyond its component parts. These findings will help with risk prediction in patients undergoing colorectal resection. Furthermore, it highlights the importance of considering constellations of comorbidities, rather than comorbid conditions in isolation when performing risk analysis.

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ASSESSING THE NATIONAL TRENDS IN COLON CANCER AMONG NATIVE AMERICANS: A 12-YEAR DATABASE STUDY.

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Purpose: The racial disparities in the incidence of colon cancer (CC) are established. Native Americans forma a unique cohort of CC patients among whom the variability in demographics and caner characteristics remains unclear. The aim of the study was to assess the variability in demographics and characteristics among Native American patients with CC in the United States.

Methods: We abstracted the national estimates for patients with diagnosis of CC using the Surveillance, Epidemiology, and End Result (SEER) database between 2000 and 2012. We only included Native American patients with CC. Patients were stratified into groups based on year of diagnosis, gender, location of CC (ascending colon, transverse colon, and

descending colon), stage of CC, and insurance status. Outcome measures such as incidence of CC, variation in location of CC and patient demographic analysis were performed. Trend analysis was performed.

Results: A total of 355,115 patients with diagnosis of CC were assessed of which 6.9% (n=26,674) Native American patients with CC were included. The rate of diagnosis of CC increased significantly (p=0.004) from 5.29% in 2000 to 8.4% in 2012 compared to national rate which decreased (p=0.01) from 28.32% to 24.69% over the same years. The incidence of CC was higher among Native American females compared to males (p=0.02). Patients had a trend towards (33% vs. 31.7%, p=0.07 presentation in higher stage (stage III/IV) whose trend remained unchanged through the years. Sigmoid colon was the most common site of CC (38%) Interestingly there was a trend towards decrease (p=0.1) in the incidence of sigmoid CC over the years. Majority of cancer patients had moderately differentiated CC (62.49%). 92.4% of the patients were insured. Interestingly, there was a significant reduction in the insured Native American patients with CC over the years (p=0.02)

Conclusions: Demographic and disease variability exists among Native American patients with CC in the United States. The incidence of CC among Native American continues to rise in the past decade despite national decreasing trends. Furthermore, patients continue to present at higher stage of colon cancer with moderate differentiation. Furthermore, uninsured Native American patients with CC continue to rise. Further research is required to understand the reasons for the differences among Native American patients with CC to help improve patient outcomes.

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ENHANCED RECOVERY AFTER COLORECTAL SURGERY: THE ESSENTIAL COMPONENTS.

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Purpose: The goal of an Enhanced Recovery after Surgery (ERAS) model in colorectal surgery is earlier return of bowel function with a reduction in length of stay without an increase in complication rate. Previously, our institution utilized an informal surgeon-driven recovery program, primarily focused on minimizing narcotics along with early feeding and ambulation. However, a dedicated multidisciplinary ERAS team and program was implemented in January 2015, incorporating essential recovery components with an emphasis on patient education. We hypothesize that our ERAS program, with a dedicated team and extensive patient education, will result in a significant improvement in patient outcomes.

Methods: Our ERAS pathway was implemented for patients undergoing elective colorectal surgery starting in January 2015; the pathway is detailed in Table 1. ERAS patients (January 2015 through June 2015) were compared to patients who underwent elective colorectal surgery prior to the implementation of the ERAS protocol, non-ERAS (January 2013 through November 2014). The primary outcomes measured were length of hospital stay (LOS), surgical site infection (SSI; superficial, deep, and organ space), and readmission rates. Outcomes were collected from the National Quality Improvement Database and patient charts after obtaining IRB approval. Analyses were completed using Welsh's t-test and Fisher's exact test; $p<0.05$ was considered significant.

Results: A total of 262 patients were included in our analysis: 70 ERAS and 192 non-ERAS patients. In the ERAS group, 60% of patients were female, compared to 45% of non-ERAS patients. Baseline characteristics, such as mean age, body mass index, ASA class, preoperative weight loss, history of smoking, diabetes, steroid use and malignancy were similar in both groups. Significant differences between groups were found in LOS and superficial and organ space SSIs. LOS in the ERAS group was 4.4 days, compared to 6.6 days in the non-ERAS group (p=0.00002). There were no superficial SSIs in the ERAS group, compared to 13 (6.8%) in the non-ERAS group (p=0.02); two (2.9%) ERAS patients had organ space SSIs compared to 24 (12.5%) in the non-ERAS group (p=0.02). Readmission rates in the ERAS group were also decreased compared to non-ERAS patients; six (8.6%) ERAS patients were readmitted within 30 days compared to 33 (17.2%) non-ERAS patients (p=0.12).

Conclusions: A comprehensive ERAS pathway with a dedicated multidisciplinary team and emphasis on patient education is key to a successful colorectal surgery program, and has been demonstrated to result in improved patient outcomes.

: ERAS Protocol: Essential Components

Preoperative
• Surgeon: ERAS identification, completion of preoperative order sets
• Clinic nurse: standardized patient education (written and verbal), oral and mechanical bowel prep, carbohydrate drink
• Preoperative nurse: administration of alvimopan and pregabalin (minimize postoperative ileus and narcotic use)
Intraoperative
• Surgeon: minimally invasive surgery, transversus abdominis plane blocks
• Anesthesia: opioid-sparing medications (i.e. IV acetaminophen, ketorolac), epidural catheters, goal-directed fluid therapy
Postoperative
• Surgeon: early oral intake, minimize narcotics, encourage ambulation
• Floor nurse: early oral intake, mobilization and urinary catheter removal; opioid-sparing medications (i.e. scheduled IV acetaminophen, ketorolac), prevention of ileus (i.e. gum chewing, alvimopan)
• Physical therapy: early mobilization
• Case manager: early discharge planning
• Clinic nurse: telephone follow up after discharge

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IMPACT OF SURGICAL SITE INFECTION (SSI) CONTROL BUNDLE IMPLEMENTATION IN REDUCING INFECTION RATE FOLLOWING COLORECTAL SURGERY A SINGLE-CENTER QUALITY IMPROVEMENT STUDY.

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Purpose: Surgical site infection following colorectal surgery is reported to range between 18 to 30%. Our Hospital has participated in the American College of Surgeons National Quality Improvement (NSQIP) study since 2014. The risk adjusted SSI outcomes from participating hospitals is expressed as an observed versus expressed ratio (O/E). An O/E ratio more than 1 indicates that hospital has more SSI than would be expected. Data on SSI following colorectal surgery showed need for quality improvement at our institution.

Methods: The study design was a prospective implementation of a colorectal SSI control bundle with a comparison to retrospective analysis of previously collected data. The data was gathered from January 2014 to present for all patients undergoing colorectal procedures, including preoperative, intraoperative and 30 day postoperative. This data was then analyzed against quarterly NSQIP data.

Results: the first two quarters of 2014 52 patients were analyzed demonstrating a >1 O/E ratio. After implementation of the SSI control bundle there was a statistically significant drop in our SSI rate. Observed to expected ratio fell within acceptable range.

Conclusions: Implementation of a SSI bundle, even in a single moderate volume center, is an effective strategy to decrease SSI in colorectal surgery

Result

year	N=number of procedures	number of infection	SIR-Standardized infection ratio expected	SIR-Standardized infection ratio Observed	SIR 95% CI
2014 Q1	31	5	1.640	3.048	1.117,6.756
Q2	21	4	1.067	3.749	1.191, 9.043
Q3	30	3	1.638	1.831	0.466, 4.984
Q4	29	2	1.4	1.5	0.243, 4.786
2015 Q1	18	1	0.9	number too small to calculate	0

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SHORT-TERM OUTCOMES OF LAPAROSCOPIC VERSUS OPEN TOTAL COLECTOMY WITH ILEORECTAL ANASTOMOSIS: A CASE-MATCHED ANALYSIS FROM NATIONWIDE DATABASE.

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Purpose: This study aims to compare peri- and postoperative 30-day outcomes of patients undergoing laparoscopic versus open total colectomy with ileorectal anastomosis using recently released procedure-targeted database in a case-matched design.

Methods: Patients who underwent elective total colectomy with ileorectal anastomosis in 2012 and 2013 were identified from the American College of Surgeons National Surgical Quality Improvement Program database. Patients were divided into two groups according to the type of surgery approach (Laparoscopic and Open). Laparoscopic and open groups were matched (1:1) based on age, gender, diagnosis, body mass index and American Society of Anesthesiologists classification. Patient comorbidities, characteristics and short-term (30-day) postoperative outcomes were compared between the matched groups. Converted cases were evaluated in the laparoscopic group. Patients who underwent robotic total colectomy, proctectomy with or without diverting ileostomy, colectomy with end ileostomy, and with incomplete data were excluded.

Results: During the study period 1442 patients were identified; 549 in the laparoscopic group and 893 patients in the open. After case-matching, there were 326 patients in each group. There were 48 (14.7%) patients who had conversion in the laparoscopic group. Open group had higher proportion of patients with ascites [7 (2.1%) vs. 0 (0%) p=0.015], weight loss [45 (13.8%) vs. 26 (8.0%) p=0.018], and contaminated wound [Clean/Contaminated 240 (74%) vs. 261 (80%), Contaminated 54 (16.6%) vs. 55 (16.9%), and Dirty/ Infected 28 (8.6%) vs. 8 (2.5%), (p=0.003)]. Laparoscopic group was associated with significantly longer operative time (p<0.001), shorter hospital stay (p<0.001), and lower ileus rates (p=0.045) compared to open group [Table]. After adjusting for covariates, the differences in terms of operative time and hospital stay remained significant (p< 0.001).

Conclusions: Laparoscopic approach for total colectomy with ileorectal anastomosis is associated with shorter length of hospital stay but longer operative time compared to open approach.

Outcomes after case-matched analysis of the laparoscopic and open total colectomy and ileorectal anastomosis groups

Outcomes	Laparoscopic (N=326)	Open (N=326)	P-value
Operative time*, minutes	241.8 ± 98.3	202.1 ± 115.5	<0.001
Length of hospital stay*, days	9.4 ± 8.5	13.3 ± 10.7	<0.001
Superficial SSI	18 (5.5%)	29 (8.9%)	0.10
Deep SSI	8 (2.5%)	4 (1.2%)	0.25
Organ space SSI	21 (6.4%)	30 (9.2%)	0.19
Wound disruption	2 (0.61%)	6 (1.8%)	0.29
Pneumonia	8 (2.5%)	11 (3.4%)	0.49
Urinary tract infection	18 (5.5%)	19 (5.8%)	0.87
Pulmonary embolism	0 (0%)	3 (0.9%)	0.25
Unplanned intubation	7 (2.1%)	10 (3.1%)	0.46
Bleeding requiring transfusion	43 (13.2%)	58 (17.8%)	0.11
Ventilator dependency¶	5 (1.5%)	12 (3.7%)	0.10
Sepsis	17 (5.2%)	29 (8.9%)	0.07
Septic shock	6 (1.8%)	12 (3.7%)	0.16
Progressive renal failure	3 (0.9%)	4 (1.2%)	>0.99
Acute renal failure	5 (1.5%)	4 (1.2%)	>0.99
DVT requiring therapy	11 (3.4%)	13 (4.0%)	0.68
Myocardial infarction	1 (0.3%)	3 (0.9%)	0.62
Ileus	78 (23.9%)	100 (31 %)	0.045
Anastomotic leak	17 (5.2%)	17 (5.2%)	0.99
Readmission	56 (17.2%)	59 (18.1%)	0.76
Reoperation	25 (7.7%)	27 (8.3%)	0.77
Morbidity	92 (28.2%)	114 (35%)	0.06
Mortality	5 (1.6%)	8 (2.7%)	0.37

Values are expressed as absolute numbers (percentages) unless indicated otherwise; * values are expressed as mean (Standard Deviation). ¶ Ventilator support for more than 48 hours. SSI: Surgical Site Infection, DVT = Deep Venous Thrombosis.

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MONEY VS. MISSION: ROLE OF ACADEMIC MEDICAL CENTERS IN PROMOTING COLORECTAL CANCER SCREENING IN UNDERSERVED COMMUNITIES.

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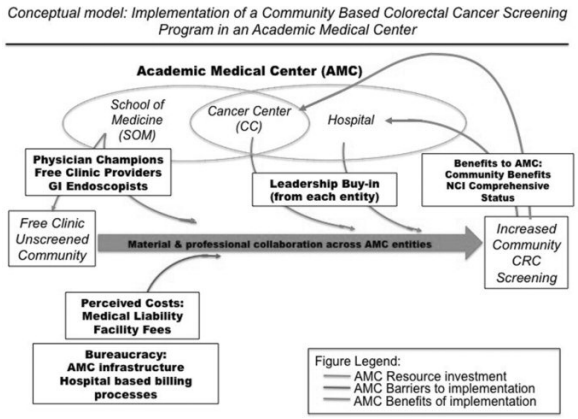
Purpose: Academic medical centers (AMC) face challenges balancing financial viability with population health in the current environment of healthcare reform. We aimed to identify institutional mechanisms for building a sustainable program to increase colorectal cancer (CRC) screening in our surrounding communities. We hypothesized that the conflict between the financial and mission-driven incentives of an AMC would pose a major challenge to implementation.

Methods: Using qualitative methods, we studied the implementation of a no-cost CRC screening program at an AMC as a natural experiment. Snowball sampling technique was used to identify and recruit stakeholders representing the Hospital, School of Medicine (SOM) and Cancer Center (CC). Semi-structured key informant interviews were conducted and audio-recorded. Questions focused on AMC mission vis-a-vis community interventions, relationships between AMC entities, and perceived barriers to implementation of a sustainable program. Interview transcripts were coded and key themes identified using a grounded theory approach to develop a conceptual framework for implementation.

Results: Twenty-five interviews were conducted with participants affiliated with SOM (13), Hospital (8), and SOM and Hospital jointly (4); 4 informants were affiliated with CC. SOM informants perceived hospital processes, bureaucracy and costs to be major barriers to implementation (Figure). In contrast, Hospital informants suggested that cost was not an insurmountable barrier, but expressed concern about the complexity of developing processes for referrals and no-cost service authorization within the AMC infrastructure. Buy-in from AMC leadership, "physician champions" invested in community health, and increased collaboration across entities were felt to be important facilitators of successful implementation and sustainability. SOM and CC informants recognized the importance of these types of programs for the AMC community benefits profile and for National Cancer Institute comprehensive cancer center designation.

Conclusions: At first glance, implementation of a small-scale, community-based CRC screening program in an AMC appears to face financial disincentives to achieve goals which serve the institutional mission. However, if implementation efforts successfully engage cooperation from all entities and shared investment of resources, these barriers can be overcome. Given the emphasis on population health embedded in the Affordable Care Act, AMCs must be poised to serve this mission while simultaneously maintaining solvency. In general, the SOM and CC are incentivized by a mission to serve the surrounding population, while the Hospital may focus more on revenue generation and resource allocation. On the surface, these goals seem to be in conflict, but our results suggest that both may peacefully coexist in the service of CRC prevention and control.



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IMPLEMENTATION OF AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM FOR COLORECTAL PATIENTS IN A COMMUNITY-BASED HOSPITAL.

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Purpose: Enhanced Recovery After Surgery (ERAS) programs aim to improve outcomes by reducing complications and decreasing length of acute care needs of patients following surgical procedures. Multidisciplinary ERAS protocols in academic settings have been shown to standardize practice, reduce morbidity, improve the patient's overall experience, and decrease length of hospitalization and readmission rates. In our community-based hospital, a resident-led ERAS project aimed to standardize care and improve outcomes with a multidisciplinary team model and amongst surgeons trained in various specialties.

Methods: A multidisciplinary ERAS team was developed and selected a group of peri-operative interventions for pilot testing based on best practices and hospital culture. Educational materials regarding the ERAS project were then developed and information was disseminated to key stakeholders, staff, and patients. The ERAS protocol was applied for all patients who underwent colon or rectal surgery starting January 2015. Outcomes were compared to patients undergoing surgery in the previous calendar year. Data regarding compliance and clinical factors was subsequently collected. Chi-square or Fisher's exact test was used to compare differences between ERAS and non-ERAS patient outcomes.

Results: Data was collected on 226 patients (ERAS n=86, historical n=140). There was no statistically significant difference in demographic characteristics, ASA scores, and surgical approach (open versus laparoscopic) between the groups. The median length of stay was shorter for ERAS (5 days) when compared to the historical patients (6 days). Post-operative complications occurred less frequently in the ERAS (15/86, 17%) compared to the historical group (32/140, 23%). A reduced length of stay could lead to an estimated reduced cost of hospitalization of over $1million USD.

Conclusions: ERAS programs can be implemented to standardize care in a community-based hospital and amongst surgeons trained in various specialties. Multidisciplinary teams, resident leadership, and stepwise implementation increased acceptance of this resident-led initiative. Length of stay and postoperative complications decreased in the ERAS patients. Ongoing review of project goals will help continue to improve the quality of care.

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CASE-MATCHED COMPARISON OF INTERSPHINCTERIC PROCTECTOMY VERSUS PROCTECTOMY WITH STAPLED COLOANAL ANASTOMOSIS FOR LOW RECTAL CANCER.

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Purpose: The role of intersphincteric proctectomy in low rectal cancer remains controversial and the operation is infrequently performed. This study compared the perioperative and oncologic outcomes of intersphincteric proctectomy to proctectomy and stapled coloanal anastomosis.

Methods: A retrospective case-matched study was conducted of operations performed for low rectal cancer at Kaiser Permanente, Los Angeles, California between January 2006 and December 2012. All intersphincteric proctectomy cases were identified and matched for gender, race, age, and co-morbidities with patients who underwent proctectomy with stapled coloanal anastomosis.

Results: 34 patients were matched [Group A (intersphincteric) 17 and Group B (stapled) 17]. Mean age was 57.2 years, with 12 males and 5 females in each group. All patients received neoadjuvant chemoradiation and underwent sphincter preservation with diverting ileostomy. The perioperative and oncologic outcomes are presented in the Table. Estimated blood loss was higher in Group A (771 ml vs 327 ml, p<0.05). Similarly, operative time was longer in Group A (295 vs 235 minutes, p<0.05). No difference was noted in post-operative complication rate between Group A and B (29.4% vs 17.6%, p=0.688). Length of stay was similar (6.9 vs 6.3 days, p=0.565). There was no difference in radial or distal margin positivity (0%, both groups) and lymph node harvest was similar. Distal margin was longer in Group B (3.7 vs 1.6 cm, p=0.007). During a mean follow-up of 22 months, the local recurrence rate was 0% in both groups and distant recurrence rate was 17.6% vs 0%, p=0.227 (Group A vs Group B).

Conclusions: Intersphincteric proctectomy was associated with higher blood loss and longer operative time compared to stapled coloanal anastomosis but post-operative outcome was similar. Short and long term oncologic outcomes were comparable to patients with stapled coloanal anastomosis. Due to the retrospective nature of study, limited number of patients, and lack of functional and quality of life data, a randomized clinical trial comparing intersphincteric proctectomy with abdominoperineal resection is warranted.

Intersphincteric versus Stapled Proctectomy

Outcomes	Group A Intersphincteric (n=17)	Group B Proctectomy (n=17)	P value
Intraoperative			
Surgical Technique	-	-	-
Open	8 (47.1%)	7 (41.2%)	1
Laparoscopic	5 (29.4%)	9 (52.9%)	0.296
Robotic*	4 (23.5%)	1	0.335
OR time (mean, min)	295	235	0.019
EBL (mean, ml)	771	327	0.046
Post-operative			
Overall Complications	5 (29.4%)	3 (17.6%)	0.688
Abdominopelvic abscess	1 (5.9%)	0	1
Anastomotic leak	2 (11.8%)	0	0.485
Readmission (within 90 days)	3 (17.6%)	5 (29.4%)	0.688
Length of stay (mean, days)	6.9	6.2	0.565
Oncologic			
Complete pathologic response	4 (23.5%)	3 (17.6%)	1
# Lymph nodes (mean)	13	13.3	0.888
Positive radial margin	0	0	1
Distance distal margin (mean, cm)	1.56	3.65	<0.001
Specimen length (mean, cm)	31.1	25.9	0.031
Local Recurrence Rate	0	0	1
Distant Recurrence rate	3 (17.6%)	0	0.227
Mean Follow-up (mean, months)	19	23.7	0.479

* 1 Robotic case converted to open

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NPO VERSUS NO NPO: PREOPERATIVE CARBOHYDRATE DRINK UNTIL 2 HOURS BEFORE LAPAROSCOPIC COLORECTAL CANCER SURGERY.

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Purpose: Overnight fasting changes patient metabolic state and influences their perioperative stress response. Preoperative carbohydrate loading may have accelerated recovery and better overall outcome after major abdominal surgery. The aim of the study was to investigate the effects of preoperative carbohydrate-rich drinks on postoperative nausea and vomiting and pain after day care laparoscopic colorectal cancer surgery.

Methods: The study group included 71 patients who received NPO and 72 patients who received no NPO for laparoscopic colorectal cancer between July 2013 and August 2015.

Results: Demographic characteristics except age were similar between two groups. The median time to liquid diet (no NPO group 4.7 days vs. NPO group 6.3 days, p<0.001) and the hospital stay (9.5 vs. 11.7 days, p=0.004) were significantly shorter in the No NPO group. There were no significant differences in the rate of postoperative nausea and vomiting between the groups and the morbidity were comparable between the two groups.

Conclusions: Preoperative carbohydrate drink until 2 hours before laparoscopic colorectal cancer surgery is safe and was associated with better short-term outcomes.

Patient characteristics and clinical outcomes

	No NPO (N = 72)	NPO (N = 71)	P value
Age (years), median (range)	66.5±9.2	66.5±10.7	0.990
Sex, n(%)			0.153
Male	34 (47.2)	38 (52.8)	
Female	42 (59.2)	29 (40.8)	
Body-mass index (kg/m2), median (range)	24.1±3.3	24.8±3.3	0.618
Preoperative chemoradiation, n (%)	11 (15.3%)	6 (8.5)	0.207
Previous abdominal surgeries, n (%)	13 (18.1)	14 (19.7)	0.799
Location of tumor, n (%)			0.596
colon	50 (69.4)	58 (81.7)	
rectum	22 (30.6)	13 (18.3)	
Total operation time (min), median (range)	179.4±65.2	189.4±58.2	0.352
Protective ileostomy, n (%)	12 (16.7)	8 (11.3)	0.352
Postoperative nausea or vomiting	9 (12.5)	12 (16.9	0.457
1st flatus POD (day), median (range)	3.2±1.2	3.5±1.5	0.161
Time to soft diet (day), median (range)	4.7±1.5	6.4±4.2	0.002
Time to urinary catheter removal(day), median (range)	3.7±3.1	3.8±4.3	0.843
Hospital stay (day), median (range)	9.2±3.2	11.8±6.7	0.035
Morbidity within 30 days after surgery, n (%)			
Overall	10 (13.9)	15 (21.1)	0.255
Surgical site infection	2 (2.8)	7 (9.9)	
Anastomotic leakage	3 (4.2)	0 (0)	
Anastomotic site bleeding	1 (1.4)	0 (0)	
Ileus	0 (0)	5 (7.0)	
Pseudomembranous colitis	2 (2.8)	0 (0)	
Intraabdominal abscess	2 (2.8)	1 (1.4)	
Pulmonary edema	0 (0)	1 (1.4)	
Urinary tract infection	0 (0)	1 (1.4)	
Reoperation within 30 days after surgery, n (%)	2 (2.8)	2 (2.8)	0.989

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SERIAL ENDOSCOPIC SURVEILLANCE AFTER LOW ANTERIOR RESECTION TO UNDERSTAND AND PREVENT ANASTOMOTIC LEAK: SAFETY AND FEASIBILITY.

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Purpose: Despite oral and IV antibiotics and improved surgical technique, anastomotic leaks persist while their etiopathogenesis remains unclear. While animal studies provide compelling evidence that collagen expressing bacteria (*E. faecalis* and *P. aeruginosa*) play a crucial role in leak pathogenesis, only with clinical trials that directly and serially examine healing anastomotic tissue will it be possible to define the role that intestinal microbes play in leak. In the present study, we tested the hypothesis that serial endoscopic surveillance (SES) with fluid lavage of anastomotic surfaces is feasible and safe in patients following low anterior resection (LAR) for rectal cancer.

Methods: This ASCRS funded trial intends to enroll 10 patients in an IRB approved protocol at three Chicago medical centers over one year. Following LAR with ileostomy, participants in the SES trial underwent endoscopy at three postoperative time points: SES-1 in the OR (POD0), SES-2 before discharge (POD3-7) and SES-3 at outpatient follow-up (POD10-28). SES consisted of flexible endoscopy, image capture, anastomotic lavage and lavage fluid retrieval. Clinical outcomes were recorded. To generate preliminary data for an upcoming clinical trial, lavage samples were analyzed for bacterial composition and inflammatory mediators.

Results: To date, 9 SES patients have been enrolled and we expect completion by Dec 2015. Trial enrollment rate was 60%. There were no withdrawals; however, two patients did not undergo the final endoscopy. Among the 8 completed patients, there were no adverse events or worsening of subjective or clinical symptoms associated with endoscopy or sampling. Two patients developed evidence of anastomotic leak, each from different surgical practices. Patients generally tolerated the SES procedure very well and expressed feeling reassured that their anastomosis was evaluated. Over 100 images revealed significant changes over time, ranging from complete healing to ulceration, edema, and necrosis. Lavage analysis was completed in 7 patients. Bacterial composition and phenotype analysis (e.g. high collagenase production) suggested that there was a high prevalence of leak-associated pathogens despite mechanical bowel prep, oral and IV antibiotics. Inflammatory mediators were easily detectable in lavage fluid, suggesting that SES with lavage can identify biomarkers that may be predictive of anastomotic complications.

Conclusions: SES following LAR with diverting ileostomy appears to be safe and feasible and holds promise to finally understand, predict and potentially prevent anastomotic leak. Visualization of the anastomosis allows for active postoperative monitoring and lavage analysis may identify bacteria that threaten anastomotic integrity. A multicenter trial is planned to define the specific role that the microbiome plays in anastomotic healing.

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ADDITION OF SUBCUTANEOUS ABDOMINAL WOUND DRAINS TO A COLON BUNDLE IN COLORECTAL SURGERY: A SINGLE-CENTER STUDY ASSESSING SUPERFICIAL SURGICAL SITE INFECTIONS.

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Purpose: Colorectal Resections (CR's) have long been associated with a high rate of superficial surgical site infections (SSI). In an effort to lower the SSI rate, many centers have instituted focused care bundles for CR patients that include some or all of the following elements: periop antibiotics with strict redosing, special skin prep, gown/instrument change before closure, temperature control, etc. Results thus far have been mixed; 11/14 published series report SSI rates greater than 8% with a bundle. In August 2014 the Mayo Clinic colon bundle was initiated at the authors' hospital. About the same time, independently, 1 surgeon began routinely using subcutaneous drains in the abdominal wounds (laparotomy or extraction site) of all CR patients to lower the SSI rate. This retrospective study was undertaken to determine the impact of the colon bundle and subcutaneous drains on the superficial SSI rate.

Methods: A review of elective CR's performed by 1 surgeon for both benign and malignant indications between 2011-2015 was carried out by reviewing an IRB approved prospective data base as well as hospital and office charts. Resections with/without anastomosis and/or stoma creation were included. From August 2014 onward, either a Jackson-Pratt drain (JP) or Penrose drain (series of drain segments, vertically oriented from fascia to skin, sutured at intervals along the incision length) were placed in the main abdominal wounds. The drain(s) was left in place for 7 to 10 days. The chi square and Fisher's exact test were used to compare the groups and evaluate the results.

Results: A total of 431 CR patients (pts) were identified (98 with stoma). Subcutaneous drains were used in 79 pts vs 352 pts without drains. All of the drain group had the colon bundle (vs 2% in no drain group). There was no difference between the drain and no drain groups in regards to demographics, indication, operation, surgical methods (MIS %: drain, 83.5; no drain 77.3), stoma formation rate, incision length, steroid use, neoadjuvant RT/chemo, etc. However, the blood transfusion rate was higher in the no drain group (13.6 vs 1.3%). The rate of superficial SSI's was 12.3% (43/352) in the group without drains or colon bundle whereas only 3.8 % of pts (3/79) with drains/bundle had SSI's ($p < 0.0264$).

Conclusions: A 69% drop in SSI rate was noted in CR pts in whom subcutaneous drains and the Mayo colon bundle were used. Since both changes were started simultaneously it is impossible to determine the contribution of each element. However, since the SSI rate was notably lower than the results of the great majority of published colon bundle series, the authors believe the use of drains further decreases SSI rates. A prospective study comparing bundle alone vs bundle plus drains is indicated.

P354

PREDICTORS FOR UNPLANNED REOPERATION FOLLOWING COLECTOMY.

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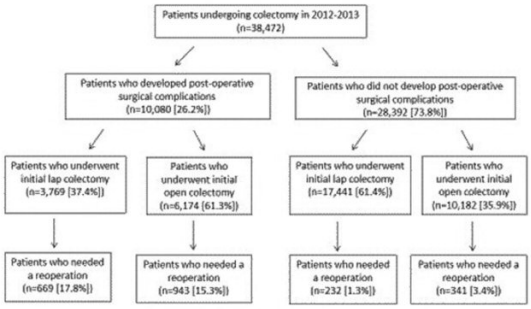
Purpose: In an increasingly cost conscious health care environment, unplanned reoperation leads to substantial resource utilization and adverse outcome. Factors associated with reoperation following colectomy are not clear. The aim of this study was to identify factors that are associated with the need for unplanned reoperation following colectomy.

Methods: The American College of Surgeons National Surgical Quality Improvement Program colectomy targeted database for the years 2012 – 2013 was used. Patients undergoing unplanned reoperation after primary colectomy were identified. Demographics, clinical variables, surgical approach and postoperative outcomes were compared for patients undergoing reoperation and those who did not. Multivariable logistic regression was used to determine the odds of having a reoperation controlling for all variables.

Results: A total of 38,472 patients (figure 1) were identified of whom 2221 (5.8%) underwent an unplanned reoperation. The median time to reoperation was 8 days (IQR: 4-13) after the primary colectomy. The commonest type of reoperation was resection of bowel (72.3%). The median age of patients undergoing a reoperation was 64 (IQR: 52-74), with 55.2% being male and 72.0% being White. Patients who underwent open colectomy compared to laparoscopic resection were more likely to need unplanned reoperation (7.8% vs. 4.3%, p<0.001). However, in the presence of post-operative surgical complications (n=10,080, 26.2%), patients who underwent an initial laparoscopic colectomy were more likely to need an unplanned reoperation (17.8% vs. 15.3%, p=0.001). (Figure 1) This remained significant after controlling for demographics and clinical variables, with laparoscopic colectomy being associated with a 35% increased odds (95% CI: 1.17-1.56, p<0.001) of needing an unplanned reoperation compared to open colectomy among patients with surgical post-operative complications.

Conclusions: Overall, an initial open colectomy was associated with increased unplanned reoperations. Interestingly, when patients developed a surgical post-operative complications, those who had an initial laparoscopic colectomy were more like to need an unplanned reoperation. Vigilance should be high when postoperative complications occur in patients who have post-operative complications as they have a higher risk of needing re-exploration.

Figure 1: Reoperations by surgical technique stratified by presence of post-operative surgical complications



P355

A STEP-WISE APPROACH TO DISPOSITION AT DISCHARGE IS LIKELY BEST STRATEGY TO IMPACT HOSPITAL LENGTH OF STAY AFTER COLECTOMY.

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Purpose: The ability to predict which patients may need admission to a discharge facility rather than to home after colectomy will reduce discharge delays and potentially reduce length of stay. The aim of this study is to identify preoperative, intraoperative and postoperative factors in a step-wise fashion along the perioperative continuum which may determine whether a patient will need discharge to a healthcare facility after colectomy since this will facilitate patient care and minimize discharge delays.

Methods: From the American College of Surgeon (ACS) National Surgical Quality Improvement Program (NSQIP) Colectomy-targeted datasets of (2012 – 2013), patients who were admitted from home for colectomy were identified. The included individuals were classified based on their post-surgical discharge destination into two groups: discharged home (DH) or healthcare facility (HF). The two groups were compared for demographics, co-morbidity, diagnosis, type of surgical resection/approach and postoperative, but pre-discharge events.

Results: Of 22489 patients admitted from home for colectomy, there were 20524 (91.3%) DH and 1965 (8.7%) HF patients. HF patients tended to be older, female, overweight or obese, functionally dependent, have poor nutritional status, with greater ASA class and preoperative cardiovascular or renal co-morbidity. On multivariate analysis, preoperative factors associated with HF included advanced age, female gender, functional dependence, weight loss, presence of cardiovascular, respiratory, renal, bleeding disorders and preoperative sepsis. Intraoperative factors associated with HF included ASA class III and above, open surgery or stoma creation and prolonged operative time. Postoperative factors associated with HF included intra-abdominal infection, sepsis or septic shock, wound disruption, reoperation, reintubation and medical complications such as pulmonary embolism and acute kidney failure. On the other hand, reduced hospital stay (< 5 days) was significantly associated with DH.

Conclusions: Specific pre, intra and postoperative factors are associated with discharge to HF. A step-wise re-evaluation of disposition at every stage of the perioperative continuum based on these identified factors will facilitate discharge planning and minimize discharge delays.

Multivariable analysis of factors at each stage (pre, intra and postoperative) associated with discharge to healthcare facility (HF) for patients admitted from home for colectomy

Variable	Odds ratio (OR)	95% Confidence interval (CI)	p-value
Age	1.090	1.082 - 1.098	<.0001
Sex (male vs female)	0.750	0.647 - 0.869	<.0001
Functional status (Independent vs dependent)	0.388	0.280 - 0.539	<.0001
Prior sepsis	1.371	1.070 - 1.756	0.013
Weight loss (>10%)	1.539	1.204 - 1.968	0.001
Pre-op albumin	0.663	0.588 - 0.747	<.0001
Pre-op WBC	1.028	1.009 - 1.048	0.003
Pre-op Hematocrit	0.971	0.957 - 0.985	<.0001
Pre-op oral antibiotics	0.834	0.698 - 0.997	0.046
Renal co-morbidity	2.758	1.672 - 4.547	<.0001
Respiratory co-morbidity	1.356	1.127 - 1.630	0.001
Cardiovascular co-morbidity	1.330	1.133 - 1.562	0.001
Bleeding disorders	1.564	1.224 - 1.999	0.001
ASA classification (I-II vs III-IV)	0.567	0.467 - 0.688	<.0001
Surgical approach (Minimal invasive vs open)	0.782	0.668 - 0.916	0.002
Stoma producing surgery	1.895	1.587 - 2.261	<.0001
Wound classification (Clean+clean/contaminated vs other)	0.776	0.648 - 0.931	0.006
Total operative time (≥4h)	1.246	1.028 - 1.511	0.025
Organ space infection	2.189	1.530 - 3.132	<.0001
Sepsis or septic shock	1.779	1.304 - 2.427	0.001
Wound disruption	2.332	1.300 - 4.183	0.005
Unplanned re-operation	2.540	1.831 - 3.522	<.0001
Unplanned re-intubation	2.029	1.285 - 3.202	0.002
Pulmonary embolism	2.571	1.315 - 5.028	0.006
Acute renal failure	3.069	1.345 - 7.001	0.008
Total hospital length (<5)	0.292	0.220 - 0.388	<.0001

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ROBOTIC VERSUS LAPAROSCOPIC TOTAL MESORECTAL EXCISION FOR SPHINCTER-SAVING SURGERY: A SINGLE-CENTER SERIES OF 400 CONSECUTIVE PATIENTS.

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Purpose: Robotic total mesorectal excision (R-TME) compared to Laparoscopic TME (L-TME) has drawn contradictory disputes. The ROLARR trial was the only phase III multicentric trial conducted to study the conversion rate. It was lower but showed no statistically significant difference. 40 surgeons included 471 patients with a different baseline experience between the median numbers of interventions performed before inclusions (91.5 laparoscopies/25 robotic procedures).

Methods: From 08.2008 to 04.2015, 400 consecutive rectal carcinomas underwent surgery performed by a single surgeon of the Montpellier Cancer Institute (ICM), 200 L-TME until 12.2011, followed with 200 R-TME since 02.2012. R-TME was standardized as a single-docking fully-robotic procedure. Data were prospectively recorded in an institutional database at the ICM.

Results: Baseline characteristics were well-balanced between the two populations, respectively R-TME and L-TME (median or %): age 64/63.5, BMI 25/25.5, gender male 65.5%/68%, lower rectum (≤5 cm) 44%/41%, T3 stage 75%/73%, preoperative radiochemotherapy 70%/66%. Regarding the surgical procedure, the type of anastomosis (CAA: 40%/49%), intersphincteric resection (39%/47%) and diverting stoma (66.5%/68%) were similar as well as the median operative time (243 min/232 min; p=0.076). A statistically significant difference between R-TME and L-TME was observed in terms of trans-anal (Ta) TME (5%/13%; p=0.005) and conversion rate (2%/9.5%; OR: 0.19 [95%CI: 0.05-0.60], Moreover, a lower risk of conversion was observed for R-TME compared with L-TME in all subgroup analyses conducted, *i.e.* in male patients (n: 267; 3.1%/9.6%; OR: 0.30 [95%CI: 0.07-1.00]), in obese patients (n: 55; 0%/9.1%; OR: 0.0 [95%CI: 0-0.65]) and for lower tumors (<5cm) (n: 160; 1.3%/9.5%; OR: 0.13 [95%CI: 0.003-0.99]). Circumferential radial margins (CRM ≤1 mm) involvement was similar (10.1%/14.2%; p=0.28) as was the curability composite criteria (negative CRM, free distal margins and complete mesorectal excision): 73%/74.5%; p=0.733).

Conclusions: In our monocentric homogenous series, the R-TME procedure was less likely converted into open surgery compared with the L-TME. Operative time and curative pathologic criteria were equivalent while Ta-TME was performed more often during L-TME. Future prospective randomized trial should take into account the need to compare standardized procedures for specific subgroups of high-risk patients. Acknowledgments We thank all the patients for their trust, Nabila Bouazza, clinical research assistant, and Sylvain Boudon, datamanager for their work, and Dr. Hélène de Forges for her help as medical writer.

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SHOULD CLASSIFICATION AS AN ACS-NSQIP HIGH OUTLIER BE USED TO DIRECT HOSPITAL QUALITY IMPROVEMENT EFFORTS?

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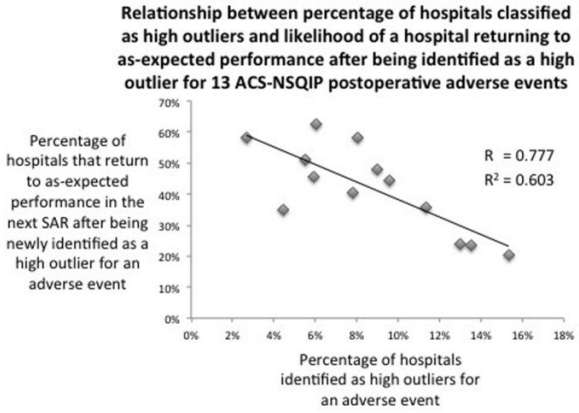
Purpose: There is a 6-9 month reporting lag from the date of surgery to publication of hospital performance in the ACS-NSQIP Semi-Annual Report (SAR). Thus, the identification of a hospital as a new high outlier (worse-than-expected performance) for an adverse event and then subsequently returning to as-expected performance in the next SAR is unlikely to be reflective of new quality improvement efforts by that hospital. Our objective was to determine how often hospitals return to as-expected performance in the next SAR after being newly identified as a high outlier for an adverse event.

Methods: Consecutive ACS-NSQIP SARs from July 2008 through July 2011 were used to identify hospital outlier status at each time point for 13 postoperative adverse events: surgical site infection (SSI), urinary tract infection, myocardial infarction, venous thromboembolism, pneumonia, reintubation, prolonged ventilation, renal failure, morbidity, mortality, colorectal surgery (CRS) SSI, CRS morbidity, and CRS mortality. We determined the proportion of hospitals newly identified as a high outlier for each of these events who then return to as-expected performance in the next SAR. Pearson correlation and R^2 were calculated to determine the strength of the relationship between the frequency of changes in high outlier status, frequency of hospitals identified as outliers, and overall adverse event rate.

Results: Of the 284 hospitals included in the study, 75% were classified as high outliers for at least one time period in one or more of the adverse events analyzed. The percentage of hospitals classified as a high outlier for an event ranged from 2.7% for CRS mortality to 15.3% for SSI. Among hospitals newly classified as high outliers, mortality had the highest percentage of hospitals return to as-expected performance in the next SAR (62.7%), while SSI had the lowest (20.5%). There was a strong correlation between the percentage of hospitals classified as a high outlier for an adverse event and the frequency of hospitals returning to as-expected performance in the next SAR after being newly identified as a high outlier (correlation coefficient -0.77). Therefore, 60% of the variation in high outlier hospitals returning to as-expected performance was explained by the number of hospitals classified as high outliers. There was no correlation between frequency of change in high outlier status and overall adverse event rate.

Conclusions: The likelihood of a hospital returning to as-expected performance in the next SAR after being identified as a high outlier is inversely related to the percentage of hospitals classified as high outliers for that event. High outlier status may thus be a less meaningful measure of quality for adverse events that have relatively few outlier hospitals. Hospitals should be cautious of redirecting quality improvement efforts based solely on classification as an ACS-NSQIP high outlier.



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SURGICAL SITE INFECTION IN ELECTIVE COLORECTAL SURGERY: RESULTS FROM A CLINICAL TRIAL.

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Purpose: Surgical site infections (SSI) after colorectal surgery add significantly to patient morbidity and hospital costs. In addition, this publically reported outcome may impact hospital or physician reimbursement in pay-for-performance models. Reported rates of SSI following colorectal surgery vary widely due to unstandardized definitions and underreporting. In this study, we examine the rates of SSI and the predictors for SSI in a multi-hospital health system as part of a prospective clinical trial.

Methods: Between 2011-2015, 787 patients undergoing clean-contaminated procedures by colorectal surgeons in the health system were enrolled in a prospective randomized trial evaluating skin anti-sepsis. Data collected included patient demographics and perioperative data related to wound infection. SSI was defined as the occurrence of cellulitis requiring antibiotics, or superficial or deep surgical site infection, based on CDC guidelines, within 30 days of discharge. SSIs were identified by blinded review of the patient's clinical course and wound photographs by the study P.I. Backwards, stepwise logistic regression was used to identify the variables significantly associated with SSI in this cohort.

Results: Overall SSI rate was 21.5% (169/787). Univariate analysis identified 7 variables associated with SSI with a p<0.1 (preoperative steroids, indication for surgery, BMI, presence of stoma, open vs laparoscopic, incision length, postoperative hyperglycemia). After multivariable adjustment, only three of these, incision length, BMI, and surgical indication, were significantly associated with SSI (Table 1). Striking degrees of increased risk were seen in the underweight (OR of 4.20), as well as in the superobese (2.40), those with large incisions (4.6) and those undergoing surgery for IBD (1.67). Adjusted predicted rates of SSI revealed that the risks of SSI were amplified by having more than one of these factors. Adjusted risk for SSI ranged from 3.2% to >60%.

Conclusions: This prospective study identifies discrete variables that are significantly associated with SSI and demonstrates a wide range of adjusted SSI risk based on these three variables. Pay-for-performance metrics should take this wide range of risk into account and recognize that a "one-size-fits-all" risk of wound infection is not appropriate in this patient population. In particular, this study demonstrates a high risk of SSI in patients at the extreme ends of BMI and for those with IBD. The risk of infection is directly and linearly correlated with increasing incision length. Stratifying risk for SSI is an important step towards identifying modifiable factors that can be targeted for SSI reduction. Increased use of minimally invasive approaches, preoperative counseling, and targeted interventions for risk reduction for those with IBD may be beneficial.

Table 1

	Odds Ratio	95% Wald Confidence Limits		p value
BMI				
18.5-24.6	Reference			
<18.5	4.2	1.10	16.4	0.04
25-29.9	1.41	0.89	2.23	0.15
30-34.9	1.32	0.77	2.28	0.31
35+	2.40	1.30	4.46	0.006
Incision Length				
<7cm	Reference			
7-13.9cm	1.86	0.84	4.13	0.13
14-20.9	3.41	1.56	7.43	0.002
21cm+	4.6	2.01	10.69	<0.001
Indication				
Cancer	Reference			
Diverticulitis	1.14	0.65	1.98	0.64
IBD	1.67	1.10	2.54	0.02
Other	0.46	0.24	0.90	0.02

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ARE WE STILL TOO SURGICALLY AGGRESSIVE IN ANAL MELANOMA CASES: A CONTEMPORARY ANALYSIS OF PRACTICE PATTERNS?

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Purpose: Anorectal melanoma (AM) is a particularly aggressive disease, and while more radical surgery was believed to improve survival, multiple studies have shown no survival benefit in patients undergoing abdominoperineal resection (APR) when compared to those undergoing local excision (LE). Despite this, recent data showed that, in the previous decade, the rate of APR was still 43%. The aim of this study is to identify the rate of APR in a contemporary national cohort as well as the impact of APR on survival.

Methods: A publically available Surveillance, Epidemiology, and End Results database was queried for all histologically proven anal melanoma in adults diagnosed from 2004 to 2012. Excision practices and survival were examined. Chi square and Anova analyses were used for univariate analysis. Kaplan Meyer analysis was used survival. A COX multivariate analysis was also undertaken to assess the impact of the extent of surgery on survival.

Results: Of the 147 that met the inclusion criteria, 27.8% (n=41) underwent APR while the majority underwent LE (n=106, 72.1%). Fifteen patients underwent sentinel lymph node biopsy. The majority of patients were older than 70 (n=79, 53.7%), but there was no difference in the extent of surgery among age groups. The rate of APR did not differ throughout the years examined (p=0.494). The 5- year survival in the LE group was 30.6 % while it was 30.0% in the APR group (p=0.758). After stratifying by stage, the extent of surgery had no impact on survival. In the multivariate analysis the type of surgery was not a predictor of survival (HR=0.72, 95%CI (0.41-1.29),p=0.271). Stage was a predictor of survival in the univariate analysis and remained so in the multivariate analysis (HR= 3.26, 95%CI (2.17-4.91),p<0.001).

Conclusions: In the largest contemporary cohort reported to date, more than a quarter of patients with anal melanoma still undergo APR, a procedure that is not without significant morbidity. Survival rates were similar in patients undergoing LE and those undergoing a more aggressive APR. Stage continues to remain a significant predictor of survival. While APR does not improve survival rates at present, with the advent of immunotherapy, the role of more aggressive surgery may be redefined in the future.

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MINIMAL INVASIVE REOPERATION FOR ANASTOMOTIC LEAKAGE FOLLOWING LAPAROSCOPIC COLORECTAL RESECTION REDUCES THE RISK OF PERMANENT STOMA AND DEATH.

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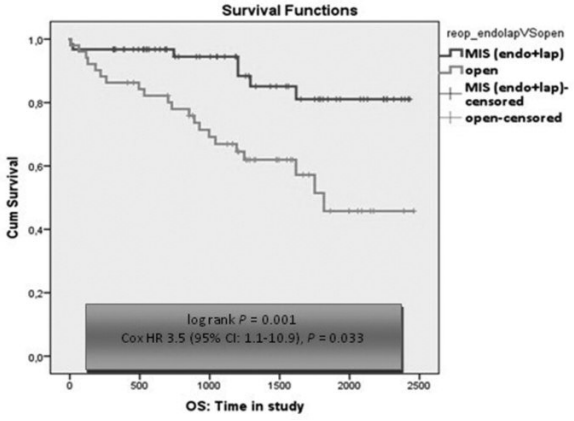
Purpose: Anastomotic leakage (AL) is one of the most frequent and feared surgical complications after colorectal resection with reported 30-day mortality up to 20 %. Most reoperations for AL are still performed by

open surgery, although the laparoscopic experience has increased along with the implementation of laparoscopic surgery for the primary resection. The main aim of the study was to investigate the short- and long-term outcomes for patients reoperated for AL, with special focus on re-intervention approach, defined as open or minimal invasive treatment (MIT); MIT refers to the endoscopic and laparoscopic approach. Primary outcome parameters were length of stay (LOS), bowel-continuity, adjuvant chemotherapy and death.

Methods: All patients undergoing elective laparoscopic resection for colorectal adenocarcinoma with a primary anastomosis from January 2009 to December 2014 were extracted from our prospectively maintained database, including parameters related to preoperative status, operative data and follow-up data. Patients registered with af symptomatic AL within the first 30 postoperative days were included in the study. Symptomatic leaks were defined as Grade B (endoscopic reoperation without anesthesia, n=26) or C leaks (open, n=51, or laparoscopic, n=36). The type of re-intervention was based on the choice and judgement of the surgeon.

Results: A total of 113 out of 1030 patients (11%) developed a symptomatic AL. Median follow-up was 40 months. Total LOS was significantly associated with ICU stay (P = 0.01) and intraabdominal absces (P = 0.0001). The chance of restoration of bowel-continuity was significantly associated with age under 67 years (adjusted odds ratio (OR) = 3.67; 95% confidence interval (CI): 1.11-12.06; P = 0.033) and type of reoperation method (adj. OR = 0.26 for open vs. MIT; 95% CI: 0.08-0.85; P = 0.026). The chance of receiving adjuvant chemotherapy if indicated, was associated with age under 67 years (adj. OR = 4.66; 95% CI:1.21-17.9; P = 0.025). There was no difference in 30- or 90-day mortality between treatment groups, but overall mortality was significantly higher in the open group compared with the MIT group (41% vs. 11%, log rank P = 0.001). A Cox regression analysis identified three significant predictors for death: UICC-stage III-IV vs. I-II (adj. hazard ratio (HR) = 4.3; 95% CI: 1.8-10.4; P = 0.001), open reoperation vs. MIT (adj. HR = 3.5; 95% CI: 1.1-10.9; P = 0.003) and conversion to open surgery at the primary operation (adj. HR = 2.8; 95% CI: 1.2-6.6; P = 0.019).

Conclusions: AL treated with MIT may increase bowel-continuity rate and improve overall survival, compared with open reoperation. We suggest a primary minimally invasive approach in the management of AL if the expertise is available.



P361

SURVIVAL AFTER PRIMARY TUMOR RESECTION FOR LARGE BOWEL OBSTRUCTION IN STAGE IV COLORECTAL CANCER.

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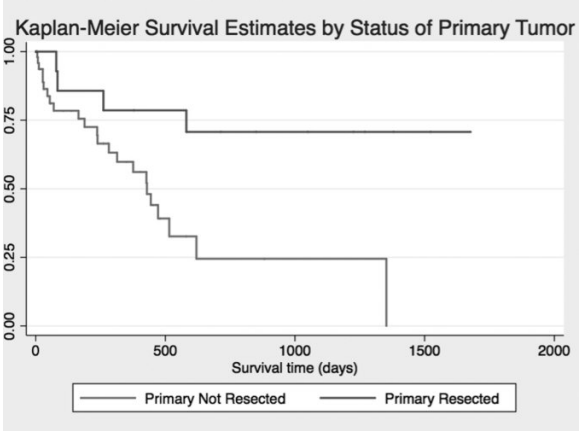
Purpose: Large bowel obstruction is a complication of colorectal cancer associated with worse prognosis. Treatment for obstruction include surgical interventions or use of self-expandable metal stents (SEMS). SEMS are increasingly used to relieve obstruction and can offer an alternative to surgical intervention in palliative situations. However, the primary tumor remains in situ after a procedure for diversion alone or SEMS placement. The benefit of primary tumor resection in metastatic colorectal cancer remains unclear. We sought to evaluate the survival among patients found to have metastatic disease after presenting in acute obstruction based on management of the primary tumor.

Methods: A retrospective review of patients presenting with large bowel obstruction from 2006-2014 at a county hospital. Patient demographics, laboratory evaluation including carcinoembryonic antigen (CEA) level, lesion location, presence of metastatic disease and surgical versus endoscopic interventions were analyzed using Chi-square and one way analysis of variance. A Kaplan Meier curve was constructed using mortality or hospice care as the primary endpoint for survival.

Results: Of 182 patients identified, 136 (74.7%) had large bowel obstruction due to colorectal cancer. The next most common causes of large bowel obstruction were metastases from other cancers (10%) and diverticular disease (7.7%). Sixty seven (49.2%) had metastatic colorectal cancer found at time of obstruction. Fourteen (21%) of these patients underwent primary tumor resection. Eight (57%) had the primary tumor removed at time of obstruction and the remainder had decompressive SEMS placement prior to resection. While there was no difference in gender or age, CEA was significantly elevated among those not undergoing resection than those who had resection (1548.3+/-4681.4 μg/L vs 269.1+/-854.5μg/L, p<0.01). A disproportionate number of resected lesions were in the ascending colon (63% vs 37%, p=0.03). Median survival at both one (78.5% vs 59.8%) and two years (70.7% vs 24.4%, p<0.01) was improved in those with the primary tumor removed versus remaining in situ (Figure 1).

Conclusions: Primary colorectal cancer accounts for the majority of large bowel obstructions. At a county facility nearly half of those presenting in obstruction due to colorectal cancer were stage IV. Median survival in patients presenting in obstruction with metastatic colorectal cancer was improved after resection of the primary tumor.



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THIRTY-DAY READMISSION FOLLOWING COLECTOMY: SHOULD HOSPITALS BE PENALIZED?

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Purpose: Increased medical costs related to readmissions have prompted the Centers for Medicare & Medicaid Services (CMS) to implement policy changes focused on decreasing hospital reimbursement rates for patients requiring readmissions. The policy was broadened in 2015 to include readmissions following total hip and knee arthroplasty and will add coronary artery bypass graft procedures in 2017. With the possibility of

expanding financial penalties, we investigated factors associated with variation in 30-day readmission rates across hospitals in New York State.

Methods: Patients undergoing colectomy from 2005-2013 in New York State were selected by ICD-9 code from the Statewide Planning and Research Cooperative System (SPARCS). Surgeon and hospital procedure volumes were grouped into tertiles based on the average number of colorectal resections performed per year. Bivariate and mixed effects logistic regression analyses were performed to assess patient, surgeon, operative, and hospital characteristics associated with 30-day readmissions.

Results: The analysis included 107,097 patients who underwent colectomy, of which 33.8% underwent minimally invasive surgery. Overall, 13.1% of patients were readmitted within 30-days. Among 197 hospitals, the unadjusted 30-day readmission rates ranged from 5.8% to 15.6%. After controlling for patient, surgeon, and hospital-level factors, the adjusted 30-day readmission rates ranged from 2.6% to 4.1%. In accounting for the between hospital-level variation in 30-day readmission rates, 51% was attributable to patient-level factors, 12% was explained by surgeon-level factors, 3% was attributable to hospital-level factors, and 34% remained unexplained by the known patient, surgeon, and hospital-level factors included the multivariable model. Modifiable risk factors associated with 30-day readmissions included ileostomy formation (OR=1.95, CI=1.81,2.12), afternoon discharge (OR=1.18, CI=1.13,1.23), discharge to skilled nursing facility (OR=1.64, CI=1.52,1.76), and discharge between Wednesday and Friday (see Table).

Conclusions: A majority of the variation in 30-day readmission rates following colectomy between hospitals is attributable to patient-level factors. After risk-adjustment, little variation was observed when comparing readmission rates between hospitals, arguing against future CMS expansion of financial penalties of hospitals for 30-day readmissions following colectomy. However, physicians and hospitals should continue to identify possible interventions to reduce readmission rates. This study identified several targets for intervention including quality of discharge planning and ostomy care pathways.

Mixed Effects Multivariable Logistic Regression Analysis Evaluating Factors Associated with 30-Day Readmissions after Colectomy

	Odds Ratio (95% C.I.)	P-value
Race		
White	Reference	
Black	1.09 (1.01, 1.17)	0.026
Other	1.00 (0.93, 1.07)	0.886
Comorbidities		
Hypertension	1.07 (1.03, 1.13)	<0.001
CHF	1.29 (1.20, 1.38)	<0.001
COPD	1.14 (1.09, 1.20)	<0.001
Diabetes Mellitus	1.18 (1.11, 1.24)	<0.001
Steroids	1.34 (1.07, 1.67)	0.012
Medicaid Insurance	1.22 (1.16, 1.30)	<0.001
Primary Diagnosis		
Neoplasm	Reference	
Diverticular Disease	0.90 (0.85, 0.97)	0.004
Ulcerative Colitis	0.92 (0.74, 1.10)	0.430
Crohn's Disease	1.23 (1.08, 1.42)	<0.001
Obstruction	1.17 (1.06, 1.26)	<0.001
Bowel Ischemia/Perforation	1.15 (1.02, 1.31)	0.026
Other	1.02 (0.95, 1.09)	0.520
Non-Elective Surgery	1.12 (1.06, 1.19)	<0.001
Minimally Invasive Surgery	0.87 (0.82, 0.91)	<0.001
Procedure		
Right Colectomy	Reference	
Left Colectomy	0.87 (0.83, 0.92)	<0.001
Total Colectomy	1.01 (0.93, 1.09)	0.878
Unspecified Colectomy	1.27 (1.10, 1.44)	0.002
Ileostomy	1.95 (1.81, 2.12)	<0.001
Pre-discharge Major Complication	1.24 (1.19, 1.30)	<0.001
Discharge Day of Week		
Sunday	Reference	
Monday	1.10 (1.01, 1.20)	0.034
Tuesday	1.06 (0.97, 1.15)	0.228
Wednesday	1.14 (1.03, 1.24)	0.004
Thursday	1.14 (1.03, 1.25)	0.008
Friday	1.13 (1.04, 1.24)	0.002
Saturday	1.06 (0.96, 1.18)	0.222
Discharge Time of Day		
8am - 2pm	Reference	
2pm - 11pm	1.18 (1.13, 1.23)	<0.001
11pm - 8am	1.17 (0.93, 1.48)	0.198
Discharge Destination		
Home	Reference	
Home with services	1.26 (1.18, 1.32)	<0.001
SNF	1.64 (1.52, 1.76)	<0.001
Other	0.79 (0.70, 0.91)	0.002

Model also controls for age, sex, liver disease, anemia, weight loss, substance abuse, distance to hospital colostomy, occupational therapy, speech language pathology, colorectal surgeon, surgeon years in practice, surgeon volume, major academic center, and hospital volume which were not statistically significant (p>0.05); and PVD, ESRD, bleeding disorder, obesity, metabolic disturbance, psych disorder, physical therapy, post-op length of stay, and rural/urban hospital which were statistically significant (p<0.05).

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THE IMPACT OF SURGEON CHOICES ON COSTS ASSOCIATED WITH UNCOMPLICATED MINIMALLY INVASIVE COLECTOMY-YOU ARE NOT AS IMPORTANT AS YOU THOUGHT.

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Purpose: To identify the impact of surgeons' choices on the direct cost of elective uncomplicated minimally invasive segmental colectomy. Pressure from insurers, politicians, policy makers and the public to reduce the cost of health care delivery while maintaining quality is directed at procedural based health care providers. Little data exists regarding the impact of individuals' decisions on cost. There is no data regarding the contribution of individual surgeon's decisions on cost of uncomplicated minimally invasive colon surgery.

Methods: Using a retrospective hospital-based cost accounting database the direct costs of elective laparoscopic or robotic segmental colectomy by three dedicated colorectal surgeons over a one year period were reviewed. Patients with comorbidities that would be known to increase costs (emergent cases, significant cardiac, pulmonary and renal disease) were excluded. Patients with postoperative complications (anastomotic leak, myocardial infarction, pulmonary embolism) were excluded. LARs were considered separately; total colectomies were excluded. Costs related to operation and admission were determined.

Results: 93 patients underwent laparoscopic colectomy,18 underwent robotic colectomy. Average cost was $5057 and $7806 in the laparoscopic and robotic groups respectively. Equipment costs were nearly 3 times higher in the robotic group. Operating room times were 176 minutes vs 246 minutes in the laparoscopic vs robotic group; average lengths of stay were similar across groups. More expensive cases were associated with higher Charlson comorbidity scores and left sided resections. Left colectomies were more expensive than right colectomies ($5482 vs $4835), had higher surgical supply costs ($1402 vs $968) and longer OR times (211 vs 157 min).**Overall cost differences between individual surgeons were not statistically significant. Average OR supply costs between surgeons ranged from $980 to $1201 with a standard deviation of $311 (equivalent to 6.1% of the overall cost). OR times were nearly equivalent. There was no statistically significant difference between surgeons with regards to lengths of stay, radiology and laboratory costs.**

Conclusions: Laparoscopic left and robotic colectomies cost more than right colectomies. Differences are attributed to surgical equipment costs and operative times required rather than patient or surgeon factors. Association was found between increased costs and resection for malignant disease and increased Charlson comorbidity scores. Radiology and laboratory costs added relatively little. **There was no significant difference in costs when comparing surgeons despite varying equipment preferences, experience levels and operative techniques. In the setting of standardized care, total costs are relatively fixed institutionally and minimally influenced by variations in individual surgeon preferences**.

Cost quartiles

Table 5- Laparoscopic Cases	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
Total Cost Range	<$4234	$4234 to $4878	$4879-> $5913	> $5913
Average OR Supply Cost (standard deviation)	$957 ($187)	$1135 ($260)	$1150 ($306)	$1227 ($388)
Average Number of Staple Loads	4	3	3	3
Average Age	57	61	66	66
% Male	22%	57%	50%	44%
Average Charlson Score	2.2	3.3	4.5	5.2
% Right Hemicolectomy	96%	65%	54%	52%
% Left/Sigmoid Colectomy	4%	35%	46%	48%
% Resection for Benign Disease	70%	61%	50%	42%
% Resection for Malignancy	30%	39%	58%	57%
Average LOS	2.3 days	2.5 days	3.3 days	4.7 days
Average Operative Time	135 min	172 min	192 min	203 min
Average Time in PACU	176 min	219 min	227 min	224 min
% with Chief Resident Assisting	52%	70%	75%	57%

OR- Operating Room, LOS- Length of Stay, PACU- Post Anesthesia Care Unit

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INTRAOPERATIVE EVALUATION OF THE INCIDENCE AND VARIATION OF THE VASCULAR ANATOMY FOR THE RIGHT COLON.

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Purpose: Vascular structure of the right colon has become a matter of concern because of high variability in its incidence and variation. . Furthermore, its clinical implementation is important during minimally invasive surgery. There are many anatomical studies which were either cadaveric or radiological based, assessing these variables. According to that, we tried to find out the intraoperative incidence and variations of the vascular anatomy at the right colon.

Methods: We evaluated prospectively consecutive patients who underwent right hemicolectomy using medial to lateral technique which were done according to the concept of complete mesocolon excision (CME) and central vascular ligation (CVL) by either laparoscopic or open approaches . All patients had right-sided colon pathology indicated for surgery. The observed and collected data were mainly focusing on the incidence and variations of the arterial branches including the Ileocolic artery (ICA), the right colic artery (RCA) and the Middle colic artery (MCA). The venous tributaries such as the Ilecolic vein (ICV), the right colic vein (RCV), the Middle colic vein (MCV), the Accessory middle colic vein (aMCV), and the Gastrocolic Trunk of Henle (GTH) were evaluated as well. The vascular anatomy of the cases in the study was documented using snapshot pictures captured form laparoscopic recorded videos or from open cases using digital camera.

Results: A total of 70 patients were enrolled, 37 cases were women (52.8 %) and 33 cases (47.2 %) were men, with mean age of 62.7 years. The ICA and the MCA were always present in all cases (100%). However, the RCA is present only in 41.4 % of cases. On the other hand, the venous drainage of the right colon showed that the ICV and MCV exist in all cases. The ICV drains always into the superior mesenteric vein (SMV), whereas the MCV drains into the SMV and the GTH in 94.3% and 5.3% of the cases respectively. The RCV was observed in 42.9% of cases, in 43.3% of them, drains into the SMV and in the other 56.7% drains into the GTH. The aMCV was found in 15.7% of cases where in 54.5% and 45.5 % of cases it drains into the SMV and the GTH respectively. In addition, the GTH was seen in 88.6% of cases and drains mainly into the SMV. Interestingly, there is no significant statistical difference between women and men in the incidence and variations of the RCA, the RCV, the aMCV and the GTH (P> 0.05).

Conclusions: The evaluation of the incidence and variations of the arterial and venous structures of the right colon intra-operatively is feasible and can be at least as what cadaveric and radiological studies reported.

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DOES AN ENHANCED RECOVERY AFTER SURGERY PROTOCOL INFLUENCE READMISSION?

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Purpose: Hospital readmission rates have become an important quality metric due to enactment of the Hospital Readmissions Reduction Program in 2012 as part of the Affordable Care Act. In the next calendar year, 2,600 institutions will pay over $400 million in penalties to Centers for Medicare and Medicaid Services (CMS) related to excess readmissions. With the proliferation of enhanced recovery (ER) protocols and earlier discharge, there are concerns of potentially increased readmission rates. We sought to evaluate the effect of ER on readmissions and to identify risk factors for readmission within an ER protocol.

Methods: A multidisciplinary ER protocol was implemented for all elective colorectal surgery patients at a large academic medical center. This cohort study compared patients before ER implementation (pre-ER, 8/2012-8/2013) and after ER initiation (8/2013-8/2014), looking at 30-day readmission as the primary outcome. A multivariable logistic regression model identified predictors of 30-day readmission in the study population. Kaplan-Meier analysis and log-rank test were used to identify differences in time to readmission.

Results: 359 patients underwent a colorectal procedure during the study period—190 pre-ER patients were compared to 169 patients following ER protocol implementation. Median length of stay (LOS) decreased from 5 days in the pre-ER group to 3 days with ER implementation (p<0.0001). Thirty day readmission was reduced from 20% (38/190) in the pre-ER pathway to 12.4% (21/169) in the ER pathway (p = 0.05). There were no differences in time to readmission (p=0.25). Univariate analysis demonstrated presence of an ileostomy, regardless of care group, had a statistically significant association with 30-day readmission (p<0.0001). Additionally, initial LOS (p=0.04) and living in closer proximity to the principal institution (p=0.0025) were associated with higher risk of readmission. Multivariable logistic regression identified presence of an ileostomy (OR 2.8, 95% CI 1.4-5.9) and partially dependent functional status (OR 3.7, 95% CI 1.0-13.2) as independent predictors of 30-day readmission.

Conclusions: In the current pay for performance era, readmissions rather than LOS have become the focus of increasing scrutiny as a quality metric. This may serve as a barrier to the proliferation of enhanced recovery efforts to reduce LOS. However, these data suggest that the use of a highly standardized ER protocol significantly reduces readmission rates in addition to LOS in an elective colorectal surgery population.

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EFFICACY OF FIBRIN GLUE THERAPY FOR ABSCESS ASSOCIATED ENTERIC FISTULAS.

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Purpose: Spontaneous and post-operative abdominal abscesses may be complicated by enteric fistulas and are routinely treated with percutaneous catheter drainage. Fistulas that fail to resolve may require surgery; however, fibrin glue therapy may be a suitable alternative in patients who fail conservative management. The purpose of this study was to describe our experience with fibrin glue therapy for abscess associated enteric fistulas and determine characteristics associated with therapeutic success.

Methods: We retrospectively identified patients at our institution that underwent fibrin glue therapy for an abscess associated enteric fistula from 2004 to 2015. Patients were included if they were found to have an abscess associated enteric fistula originating from bowel between the ligament of Treitz and rectum on interventional radiology sinogram. Insertion of an additional drain within the abscess cavity proximal to fibrin glue therapy was at the discretion of the attending physician. Success was defined as closure of the fistula tract on follow up sinogram or resolution of the abscess cavity on follow up computed tomography of the abdomen and pelvis after drain removal. A forward selection multivariable logistic regression analysis was utilized to identify factors associated with fibrin glue therapy success.

Results: We identified 34 patients meeting our inclusion criteria with a median age of 54.5 (23-87) years and 20 (62.5%) males. The median time from diagnosis of fistula to fibrin glue therapy among all patients was 17.5 (1-80) days. Overall, fibrin glue was successful in 23 (67.6%) patients. On univariate analysis, fistula tract length greater than 2 cm (p=0.038), fistula tract width less than 5 mm (p=0.005), no additional drain placed (p=0.009), and no residual fluid collection (p=0.036) were statistically associated with fibrin glue success (Table 1). On multivariate analysis, a tract width less than 5 mm (OR 18.4, 95% CI 1.79 to 189.65) and avoiding insertion of an additional drain (OR 16.14, 95% CI 1.54 to 169.15) predicted fibrin glue therapy success.

Conclusions: Fibrin glue therapy is a suitable alternative to surgery for closure of abscess associated enteric fistulas that fail conservative management, particularly in patients who have a fistula tract to the bowel less than 5 mm in diameter. We recommend avoiding insertion of a drain after fibrin glue therapy, which may compromise the integrity of the fibrin glue; however, prospective studies with a larger sample size are needed to confirm these findings.

Efficacy of Fibrin Glue Therapy

Variables	Fibrin Glue Success (n=23)	Fibrin Glue Failure (n=11)	p-value
Patient Demographics			
Age (years)	54.5 (31-87)	53.5 (23-79)	0.665
Male gender	16 (69.6)	8 (72.7)	1.000
Diverticulitis	3 (13.6)	1 (8.3)	1.000
Inflammatory Bowel Disease	1 (4.4)	2 (18.2)	0.239
Pancreatitis	5 (21.7)	1 (9.1)	0.638
Cancer	10 (44.5)	7 (63.6)	0.465
Immunosuppression	7 (30.4)	4 (36.4)	1.000
Prior surgical intervention	16 (69.6)	8 (72.7)	1.000
Fistula Characteristics			
Tract width >5 mm	3 (13.0)	7 (63.6)	0.005
Tract length >2 cm	15 (65.2)	3 (27.3)	0.038
Small bowel fistula	9 (39.1)	5 (45.5)	1.000
Colonic fistula	11 (47.8)	5 (45.5)	1.000
Rectum fistula	3 (13.0)	1 (9.1)	1.000
High output (>200 cc/day)	0 (0)	2 (18.2)	0.098
Residual fluid collection	6 (27.3)	8 (66.7)	0.036
Management			
NPO prior to gluing	2 (8.70)	1 (9.1)	0.279
NPO after gluing	1 (4.4)	0 (0)	1.000
TPN prior to gluing	5 (21.7)	3 (27.3)	0.722
TPN after gluing	1 (4.4)	2 (18.2)	0.239
Time from diagnosis to fibrin glue (days)	16 (1-35)	23 (1-80)	0.269
Insertion of additional drain	7 (30.4)	9 (81.8)	0.009

Table 1. Patient demographics, fistula characteristics, and management in patients undergoing interventional radiology fibrin glue therapy on univariate analysis. Median (range), n (%).

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EVALUATIONS OF THE RISK FACTOR FOR STOMA SITE INCISIONAL HERNIA AFTER LOOP ILEOSTOMY REVERSAL FOLLOWING RECTAL CANCER RESECTION.

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Purpose: The incidence and risk factor of incisional hernia after loop ileostomy reversal are not elucidated. The aim of this study was to evaluate the risk factor for stoma site incisional hernia after loop ileostomy reversal.

Methods: A retrospective review was conducted on eighty-six patients who underwent loop ileostomy reversal following rectal cancer resection from January 2010 to July 2015. Patient demographics, operative details, and surgical outcome were analyzed. Stoma site incisional hernia was determined by abdominal CT scan during follow up. Data were compared using the Pearson's chi-square test or Mann-Whitney U test, and multivariate analysis was determined with logistic regression, statistically.

Results: Mean ages were 61 years, and there were 63 male patients. Mean body mass index was 22.7 (16.7-32.8). Mean stoma age was 175 days. Incidence of stoma site incisional hernia was 14% in all patients. The patients with stoma site incisional hernia have significantly higher body mass index (p<0.01) and older stoma age (p=0.04) in univariate analysis.

Conclusions: Our findings show that one in seven patients may develop stoma site incisional hernia, and higher BMI and older stoma age were the risk factor of stoma site incisional hernia after loop ileostomy reversal.

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SAFETY AND INDICATIONS OF LAPAROSCOPIC SURGERY FOR POST-OPERATIVE SMALL-BOWEL OBSTRUCTION: A SINGLE-CENTER STUDY IN 121 PATIENTS.

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Purpose: This study was designed to evaluate the safety and effectiveness of laparoscopic surgery for the treatment of small-bowel obstruction caused by postoperative adhesion, to clarify risk factors for conversion to open surgery, and to define the indications for laparoscopic surgery.

Methods: The study group comprised 121 patients who underwent laparoscopic surgery for small-bowel obstruction from January 1999 through March 2015. We studied the intraoperative and postoperative course, complications, and postoperative recurrence of bowel obstruction.

Results: The median follow-up was 32 months (range, 3 to 195). Previous operations were open surgery in 107 patients (88%) and laparoscopic surgery in 14 (12%). The median disease duration was 34 (±53) months. The median number of previous bowel obstructions was 4.6 (range, 1 to 30). The procedure was intraoperatively switched to open surgery in 15 patients (12%)On univariate analysis, 4 risk factors were related to conversion to open surgery: radiotherapy (p = 0.0002), a previous episode of intestinal obstruction (p = 0.0064), a bleeding volume of 50 mL or more (p = 0.0059), and the presence or absence of previous bowel resection (p = 0.0269). On multivariate analysis, only radiotherapy was an independent risk factor for conversion to open surgery (odds ratio, 5.5141; p = 0.0091).

Conclusions: Laparoscopic surgery could be safely performed in patients with postoperative small-bowel obstruction and was considered an effective treatment with a low rate of recurrent bowel obstruction.

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RETURNS TO THE OPERATING ROOM (ROR): A MEASURE OF SURGICAL QUALITY?

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Purpose: Returns to the operating room (ROR) have been suggested as a marker of surgical quality. With an increasing focus on healthcare quality and resource utilization reporting to inform the public and payers, RORs rate can represent a reasonable surrogate for both. To better characterize the incidence and indications for RORs in a high-volume, high acuity colorectal surgery practice, we reviewed one year of ROR data from our division. Additionally, we wished to determine if a simple ROR rate represents a reasonable quality metric.

Methods: With approval of Institutional Review Board, we reviewed all cases with RORs within 45 days of an initial colon and rectal surgery performed within our division at a quatenary referral center from 1/1/2014 through 12/31/2014. An internally developed and validated electronic system that tracks RORs was used to classify ROR as an unplanned return to the OR, planned return due to complications, planned staged return, or an unrelated return. Additional information collected on each patient with ROR included demographics, diagnosis, index operation, days to ROR, postoperative complication, surgery at ROR, number of ROR within 45 days for each patient.

Results: Of 2389 colorectal patients who underwent surgery between 1/1/2014 and 12//31/14, 249 patients had a ROR (10.4%) performed at our institution. Among the 249 patients there were a total of 274 RORs with an average of 1.1 ROR per patient (minimum=1 and maximum=6). Of the 274 ROR, 96 (35.0%) were unplanned returns to the operating room, 56 (20.4%) were planned returns due to complications, 118 (43.1%) were planned staged returns, and 4 (1.5%) were unrelated RORs. The most common reason for an unplanned ROR was an anastomotic complication either a leak or abscess (n=21; 21.9%); the most common reason for planned return due

to complications was a wound complication (n=46; 82.1%); the most common reason for planned staged return due to a prior complication was continuation of wound care (n=56; 47.5%); and all four unrelated return cases were exam under anesthesia for perianal disease. Overall, unplanned reoperations were uncommon events (n=96/2389; 4%), largely comprised of patients experiencing an anastomotic abscess or leak (n=21/2389; 0.9%).

Conclusions: In a high volume, high complexity academic colon and rectal surgery practice, RORs occur after 10.4% of cases. Unplanned ROR were relatively uncommon (4% of all cases) and most commonly associated with an anastomotic complication. Since the majority of ROR were planned staged returns or unrelated events, ROR should be questioned as a valid metric for surgical quality unless there is clinical review to determine the nature of the ROR. Among colon and rectal operations, anastomotic leak alone may be a better metric for surgical quality and to monitor for ongoing quality improvement.

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LOOP ILEOSTOMY CLOSURE: IS NEXT-DAY DISCHARGE SAFE AND EFFECTIVE?

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Purpose: Enhanced recovery pathways (ERPs) have decreased length of stay (LOS) after colorectal surgery. However, loop ileostomy closure remains a challenge as patients suffer from high (10-15%) readmission rates. So far, validation of ERPs after loop ileostomy closure has not been demonstrated. Our institution has developed a protocol where patients are discharged POD#1 and are instructed to advance their diet at home with telephone follow-up. The hypothesis of this project was that patients can be safely discharged POD#1 after loop closure, leading to clinically significant decreased length of stay (LOS) without increased readmission rates or complications.

Methods: Patients undergoing loop ileostomy closure were queried using CPT codes from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) Database (2011-2013) and from our institution through retrospective chart review. LOS, 30-day readmission, and 30-day morbidity data were collected. Postoperative LOS was analyzed using Wilcoxon rank-sum test and 30-day readmission was analyzed using the chi-squared test.

Results: A total of 8,735 patients were identified, 8,650 from the NSQIP database and 85 from our single institution. Median LOS was 2 days less at our institution compared to the NSQIP data (2 vs. 4 days, p<0.001, IQR 2 vs. 3 and 3 vs. 7 days respectively). Thirty-day readmission (11.1 vs. 15.3%, p=0.220) and overall 30-day complications (20.0 vs. 15.3%, p=0.283) were similar between NSQIP and single-institution data.

Conclusions: Overnight discharge with protocoled diet advancement and close telephone follow-up as an outpatient is acceptable after loop ileostomy closure. Patients benefit from decreased length of hospital stay without increased rates of readmission or complications. This has the potential to change the practice of postoperative management of loop ileostomy closure as well as decrease cost.

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SIMETHICONE IN POSTOPERATIVE ILEUS (SPOT), A RANDOMIZED CONTROLLED TRIAL.

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Purpose: Postoperative ileus is a common complication following abdominal surgery, resulting in abdominal distension, nausea, vomiting and abdominal pain. The etiology of post-operative ileus is multifactorial, and few reliable interventions exist. The purpose of this study is to determine if simethicone is an effective intervention to prevent postoperative ileus.

Methods: A multi-site, double-blind, randomized controlled trial investigating the effect of simethicone on postoperative ileus in patients undergoing elective colorectal surgery was performed. Patients received either 80mg of oral simethicone or placebo QID for the first five days after surgery. Primary endpoint was time to first flatus. Secondary endpoints included time to first bowel movement, length of hospital stay, postoperative pain scores, and postoperative complications. Count data were analyzed using Poisson regression; statistical significance was set at p<0.05.

Results: One hundred and eighteen patients were randomized to receive either oral simethicone or placebo. Median time to first flatus in the simethicone group was 25.2 hours; median time to first flatus in the placebo group was 26.7 hours (p=0.98). There was no significant difference in other endpoints including time to first bowel movement (median in simethicone group - 41.1 hours, median in placebo group - 42.9 hours; p=0.91), or length of stay (simethicone group median - 4.5 days, placebo group median - 4.0 days, p=0.63). There were no statistically significant differences in postoperative pain scores over the first five postoperative days or postoperative complications.

Conclusions: This study failed to show a difference in time to return to gut function in patients receiving simethicone following elective colorectal surgery. Postoperative pain scores and complication rates did not differ either. Further research into other management options is necessary.

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RIGHT-SIDED DIVERTICULITIS REQUIRING COLECTOMY: AN EVOLVING DEMOGRAPHIC? A REVIEW OF SURGICAL OUTCOMES FROM THE NATIONAL INPATIENT SAMPLE DATABASE.

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Purpose: Most depictions of right-sided colonic diverticulitis describe it as rare, more prevalent in Asian populations, often misdiagnosed as appendicitis, and managed primarily with bowel rest and intravenous antibiotics. Unfortunately, there remains a paucity of recent data on this disorder, especially those undergoing colectomy. We sought to describe clinical features of patients undergoing surgery for right-sided diverticulitis and hypothesized that morbidity and mortality following resection would be low.

Methods: Review of the National Inpatient Sample (NIS) database from 2006-2012. Right-sided diverticulitis was defined based on ICD-9-CM coding for all cases with a primary diagnosis of diverticulitis (562) which had either a laparoscopic (17.33) or open (45.73) *right* colectomy based on ICD-9-CM procedural coding. Demographics, co-morbidities, and postoperative outcomes were identified for all cases. A comparative analysis of a laparoscopic vs. open approach was performed.

Results: We identified 1099 admissions including 326 laparoscopic and 773 open procedures for right-sided diverticulitis. The median age was 60 years [interquartile range (IQR): 47-73], and 47% were male. The majority of cases were Caucasian (57%), with only 3% of cases identified as Asian or Pacific Islander. Co-morbidities included hypertension (46.3%), diabetes mellitus (15.3%), and chronic pulmonary disease (14.2%). **Table 1** demonstrates rates of postoperative complications, with an overall morbidity and mortality rate of 32.1% and 1.7%, respectively. Median length of stay (IQR) was 5.9 (4.1-9.3) days with a median (IQR) total hospital charge of 41,414 (27,795-66,024) dollars. The rate of postoperative complications was greater in the open versus laparoscopic cohorts (34.7% vs. 25.9%, p<0.01), including higher pulmonary (6.1% vs. 2.8%, p=0.04) and septic (5.7% vs. 1.9%, p<0.01) complications. Stoma creation was performed in 96 cases (8.8%), and an open approach was associated with a greater rate of ostomy formation compared to the laparoscopic group (11.2% vs. 3.2%, p<0.01).

Conclusions: This investigation represents one of the largest cohorts of colon resections to treat right-sided diverticulitis in the United States. In this series, right-sided diverticulitis undergoing surgery occurred most commonly in the Caucasian population and is most often approached via an open surgical technique. Due to coding limitations, these results only rep-

resent operative procedures, and the true cohort of right-sided diverticulitis may be even greater. Our results demonstrate the safety of a laparoscopic colectomy for those patients that require an operative resection.

Table 1. Morbidity and mortality following colectomy for right-sided diverticulitis.

Complication	*n*	*Weighted %*
Mortality	18	1.7
Any complication (all complications)	350	32.1
Mechanical wound	13	1.2
Infections	44	4.0
Urinary	9	0.8
Pulmonary	55	5.1
Gastrointestinal	154	14.0
Cardiovascular	23	2.2
Systemic	12	1.1
Surgical	27	2.5
Specific Complications		
Acute kidney injury	55	5.0
Urinary tract infection	44	4.1
Deep vein thrombosis	6	0.6
Pulmonary embolism	10	0.9
Myocardial infarction	15	1.4
Pneumonia	37	3.4
Sepsis/septic shock	50	4.6
Stroke	2	0.2
Surgical site infection	44	4.0
Post-op intubation	51	4.7

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HOW LONG UNTIL REVERSAL? AN EPIDEMIOLOGIC STUDY OF OUTCOMES FOLLOWING REVERSAL AFTER HARTMANN COLECTOMY FOR DIVERTICULITIS.

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Purpose: The standard treatment of perforated diverticulitis remains a Hartmann's rectosigmoidectomy with end colostomy. The current literature reports just over half of Hartmann's procedures are reversed. The purpose of our study is to characterize successful Hartmann's reversals relative to the amount of time that has passed between the initial resection and the reversal.

Methods: Patients undergoing emergent Hartmann's resection for diverticulitis were identified using ICD-9-CM codes from the Health Care Utilization Project State Inpatient Database (HCUP SID) for Florida and California 2007-2011. Patients who subsequently underwent Hartmann's reversals were identified and each operation was classified as a success or failure. Reversal was considered a failure if the patient died postoperatively or if the stoma was unable to be closed. Demographics, length of stay, postoperative complications, and the time to reversal was stratified and compared in both groups.

Results: 18,871 patients underwent Hartmann's resection for diverticulitis; mean age was 59.8 and 47.3% were female. 54.2% (n=10,218) had their colostomies reversed, and the average time to reversal was 185.2 days (SD=157.5). Of attempted reversals, the mean failure rate was 3.3% (n=337). Pertinent post-operative outcomes are described in Table 1. The incidence of failure was highest in those patients who had their reversals more than 1 year after their index resection (10.95%, p<0.001). These patients experienced significantly more postoperative complications including pneumonia, surgical site infectious (SSI), leak, and ileus, and also required blood transfusions more frequently. Patients who were reversed the earliest, within 3 months of their index operation, had a higher incidence of SSI (5.5%, p<0.001) compared to those who were reversed between 3 and 6 months. In general, patients reversed earlier had improved surgical outcomes with a lower failure rate, however these individuals had fewer medical comorbidities (CCI = 0.55 vs 1.1 in patients reversed after 1 year, p<0.001) and a shorter length of stay at the time of their initial Hartmann's resection (9.7 days vs. 16.4 days in patients reversed after 1 year, p<0.001).

Conclusions: Our study shows that still just over 50% of Hartmann's are reversed. When attempted, success occurs when the reversal is performed early - within 6 months of the index resection. More postoperative complications were found in patients that had reversal > 12 months after their initial resection. Since multiple factors including age, comorbidities and complexity of the initial hospitalization are important when evaluating for reversal, we aim to take these findings to devise a predictive model that can assist surgeons in determining the optimal time for Hartmann's reversal.

Table 1. Epidemiology of Hartmann's Reversal by Time to Operation

Stratification of time to reversal	<3 months	3-6 months	6-9 months	9-12 months	>12 months	p-value
Total number of patients	n=1585	n=5068	n=1897	n=717	n=822	
Age at Hartmann's resection (years)	58.0	60.3	61.0	61.4	60.5	0.061
Gender (% female)	45.7%	46.6%	48.4%	52.3%	50.1%	0.543
Race (% Caucasian)	80.5%	79.7%	74.1%	72.0%	70.9%	
CCI	0.55	0.68	0.92	1.12	1.1	<0.001
LOS after initial surgery (days)	9.7	11.3	13.6	14.9	16.4	
LOS after reversal (days)	6.6	6.8	7.9	8.3	10.1	
Time to reversal (days)	70.7	126.4	217.4	308.4	592.8	
Failure	1.26% (n=20)	1.99% (n=101)	4.16% (n=79)	5.86% (n=42)	10.95% (n=90)	
After All Reversals						
Post-op Leak	8.71% (n=138)	11.6% (n=591)	13.5% (n=256)	17.6% (n=126)	19.6% (n=161)	<0.001
Post-op Pneumonia	1.32% (n=21)	1.52% (n=77)	2.0% (n=38)	4.04% (n=29)	5.96% (n=49)	<0.001
Post-op SSI	5.43% (n=86)	4.79% (n=243)	6.67% (n=127)	8.23% (n=59)	9.61% (n=79)	<0.001
Post-op Ileus	15.33% (n=243)	16.23% (n=825)	18.13% (n=344)	18.13% (n=130)	19.7% (n=162)	0.025
Transfusion Requirement	7.08% (n=112)	7.79% (n=395)	10.21% (n=196)	11.39% (n=86)	13.62% (n=122)	<0.001
After Successful Reversal						
Post-op Leak	8.43% (n=132)	10.99% (n=546)	11.72% (n=203)	14.37% (n=97)	15.57% (n=114)	<0.001
Post-op Pneumonia	1.28% (n=20)	1.47% (n=73)	1.60% (n=29)	3.85% (n=26)	4.51% (n=33)	<0.001
Post-op SSI	5.5% (n=86)	4.55% (n=226)	6.16% (n=112)	6.52% (n=44)	7.24% (n=55)	0.003
Post-op Ileus	15.5% (n=242)	16.15% (n=802)	17.93% (n=326)	17.04% (n=115)	17.9% (n=131)	0.239
Transfusion Requirement	6.78% (n=106)	7.38% (n=366)	9.31% (n=170)	10.04% (n=70)	11.73% (n=91)	<0.001

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REAL TIME INTRAOPERATIVE ASSESSMENT OF COLONIC PERFUSION IN COLON AND RECTAL SURGERY.

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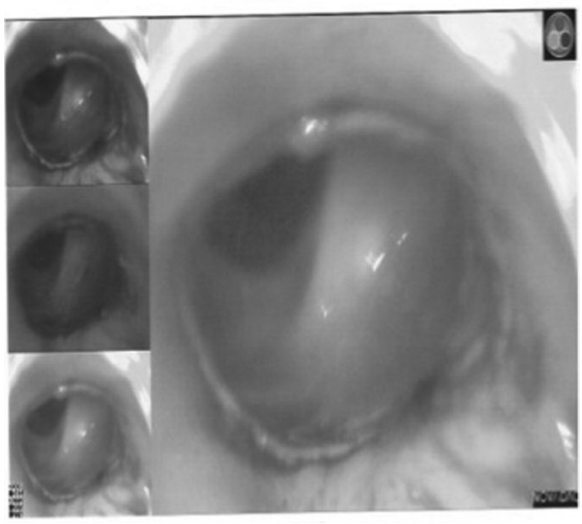
Purpose: To assess if real time intraoperative evaluation of colonic perfusion with fluorescence imaging decreases anastomotic complications in colon and rectal surgery.

Methods: Retrospective chart review included all patients who underwent colon or rectal resection from 1/1/15-9/1/15 with or without intraoperative assessment of colonic perfusion with Pinpoint Endoscopic Fluorescence Imaging System (Novadaq - Onatario, Canada). Two cohorts compared BMI, smoking status, DM, indications, and resection. Post-op complications including SSI, anastomotic leaks or stricture were collected. Chi-square statistic or the Fisher's exact test and Student's t test were used for statistical analysis.

Results: A total of 199 patients underwent colon or rectal resection and 118(59.3%) had intra-op Pinpoint imaging and the control group of 81 patients did not. The study group had 54.2% male, with a mean age of 62.2 years, a BMI of 29.1 kg/cm2 and albumin of 3.6 g/dL. The control had 44.4% males with a mean age of 62.3 years, BMI of 27.7 kg/cm2 and an albumin of 3.4 g/dL. Prevalent indications were diverticulitis (30.5%), cancer (35%) and polyp (27.9%) compared to diverticulitis (29.6%), cancer (14.8%) and polyp (24.6%) in the control. Mean operative time was 193.6mins compared to 159.6mins in the control (p=0.004) and length of stay was 5.3 days com-

pared to 6.6 days in the control (p=0.012). 34% patients underwent a right sided anastomosis compared to 36% in the control. There were 2.5% abdominal abscesses, 2.5% wound infections and 13.5% patients had post-op ileus compared to 5% abdominal abscesses, 2.5% wound infections, and 11.2% post-op ileus in the control. 4.2% patients had a change in the resection margin based upon Pinpoint with a mean length of 3.9 cm additionally resected; one of these patients had a pelvic anastomosis revised. No patients with revisions had complications. There was 1 (0.84%) anastomotic complications in the Pinpoint group compared to 4 (4.94%) in the control (p=0.161). In the latter was one anastomotic leak (1.23%), 1 anastomotic disruption in a patient who was diverted (1.23%), and 2 strictures (2.47%).

Conclusions: Preliminary data demonstrate intra-op assessment of colonic perfusion with Pinpoint did not significantly change the rate of anastomotic complications but changed the intra-op management in 5 patients and none developed complications. Whether this will eventually translate into decreased leaks remain to be proven. Pinpoint imaging increased OR time but this may represent a learning curve in an emerging technology. Pinpoint's use was associated with a shorter length of stay which may reflect increased surgeon confidence in the integrity of the anastomosis. Further research is needed with larger population to determine its effect in colorectal surgery



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OUTCOMES OF OPERATIVE MANAGEMENT FOR COLONIC VOLVULUS: AN ACS-NSQIP DATA ANALYSIS.

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Purpose: To examine the outcomes of operative management of colonic volvulus and to identify predictors of major morbidity and mortality following operations for left and right colonic volvulus.

Methods: After Institutional Board Review approval, all patients who underwent an operative intervention with the diagnosis of colonic volvulus, between 2005-2013 were identified from the American College of Surgeons National Surgical Quality Improvement Program database. Patients were classified into 4 groups according to the type of operation: cecostomy/pexy, total, left or right colectomy. Multivariate logistic regression was used.

Results: Of 3864 patients, 72%, 24%, 3%, and 1.5% underwent a left colectomy, right colectomy, total colectomy and cecostomy/pexy, respectively. On univariate analysis, patients who underwent a left colectomy were older (66 vs. 62 years, $p<0.001$) whereas patients who underwent a right colectomy were more likely to be female (75.0% vs. 49.5%, $p<0.0001$). Patients who underwent a total colectomy had the highest rates of mortality (16.0% vs. 6.0% vs. 4.0%, p<0.0001), major morbidity (52.0% vs. 26.0% vs. 20.3%, $p<0.0001$), stoma formation (100% vs. 24.5% vs. 0% $p<0.0001$), reoperation (18.3% vs. 8.9% vs. 7.0% $p<0.0001$) and hospital stay (17.6 vs. 9.4 vs. 8.6 days, $p<0.0001$), compared to patients who underwent left and right colectomies, respectively. Laparoscopy was most often used in cecostomy/pexy (72%) followed by right (12%), total (6%) and left (5%) colectomies ($p<0.001$). On multivariate logistic regression, significant predictors of mortality following left colectomy were age, male gender, emergency operation, preoperative dyspnea, dependent functional status and disseminated cancer; while significant predictors of major morbidity were male gender, preoperative acute kidney injury, preoperative weight loss, preoperative dyspnea, an open approach, dependent functional status, chronic obstructive pulmonary disease, an emergency operation, congestive heart failure, residence in a chronic care facility, American Society of Anesthesiology (ASA) Physical Status Class 4 and dirty wound classification (table 1). Following right colectomy, significant predictors of mortality were age, preoperative stroke, preoperative weight loss, dirty wound classification, peripheral vascular disease, chronic obstructive pulmonary disease and any preoperative wound infection; while significant predictors of major morbidity were male gender, preoperative dyspnea, dependent functional status and hypertension (table 1).

Conclusions: Operative management of colonic volvulus is associated with a high morbidity and mortality. Careful preoperative assessment and optimization of patients' pre-existing co-morbidities may improve outcomes. Emergency surgery for left-sided volvulus is a strong predictor of poor outcome, as such, bridging to an elective setting is advisable when feasible.

Table 1. Significant predictors of mortality and major morbidity following left and right colectomies for colonic volvulus

	Variable	OR (95% CI)
Mortality following left colectomy	Age	1.05 (1.03-1.07)
	Male gender	1.65 (1.02-2.67)
	Emergency operation	2.27 (1.42-3.63)
	Preoperative dyspnea	3.17 (1.86-5.41)
	Dependent functional status	2.51 (1.57-4)
	Disseminated cancer	5.91 (1.66-21.04)
Major morbidity following left colectomy	Male gender	1.52 (1.16-1.98)
	Preoperative acute kidney injury	3.75 (1.23-11.48)
	Preoperative weight loss	2.26 (1.1-4.67)
	Preoperative dyspnea	1.52 (1-2.3)
	Open approach	3.1 (1.4-6.66)
	Dependent functional status	1.51 (1.11-2.06)
	Chronic obstructive pulmonary disease	1.57 (1.03 - 2.41)
	Emergency operation	1.37 (1.05-1.78)
	Congestive heart failure	2.82 (1.36-5.84)
	Residence in a chronic care facility	1.55 (1.03-2.32)
	ASA 4	2.58 (1.13-5.88)
	Dirty wound classification	1.68 (1.03-2.75)
Mortality following right colectomy	Age	1.34 (1.10- 1.63)
	Preoperative stroke	111.9 (5.38-2326.92)
	Preoperative weight loss	30.2 (1.20-761.85)
	Dirty wound classification	21.83 (1.66-287.4)
	Peripheral vascular disease	67.52 (1.94-2345.9)
	Chronic obstructive pulmonary disease	27.31 (2.97-250.79)
	Any preoperative wound infection	96.42 (2.54-3657.88)
Major morbidity following right colectomy	Male gender	1.99 (1.14-3.48)
	Preoperative dyspnea	4.00 (2.01-7.92)
	Dependent functional status	2.32 (1.29-4.19)
	Hypertension	1.84 (1.09-3.13)

ASA; American Society of Anesthesiology Physical Status Classification.

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DO BMIS INFLUENCE THE OUTCOMES OF LAPAROSCOPIC COLORECTAL SURGERY?

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Purpose: Obesity is associated with various disease and considered as a risk factor for postoperative morbidity after laparoscopic colon surgery. Little is known about surgical outcomes of laparoscopic colon surgery in

Asians. The purpose of this study was to evaluate the influence of laparoscopic surgery in obese Asian patients with colon cancer.

Methods: We retrospectively reviewed the prospectively collected data on 1740 consecutive patients who underwent laparoscopic surgery for colorectal cancer between January 2008 and December 2010. Patients were classified according to the categories proposed by the International Obesity Task Force, as Nonobese (body mass index [BMI] < 25.0 kg/m^2), Obese I (BMI 25.0 – 29.9 kg/m^2), and Obese II (BMI ≥ 30 kg/m^2). Surgical outcomes, including open conversion, operation time, postoperative hospital stay, were compared in Nonobese, Obese I, and Obese II patients.

Results: Of the 1192 patients after exclusion 812 (68.1%), 360 (30.2%), and 20 (1.7%), were classified as Nonobese, Obese I, and Obese II, respectively. The Obese II group had higher conversion rates (10.0% versus 1.6% and 3.6%, p=0.008), longer operation time (180.35 versus 147.84 and 162.54 min, $p < 0.001$) than the Nonobese and obese I groups. However, location ($p = 0.927$), postoperative hospital stay ($p = 0.990$), and size of cancer ($p = 0.537$) were similar in nonobese and obese patients. The Overall survival and disease free survival were not significantly different in both groups ($p = 0.952$).

Conclusions: With sufficient experience, laparoscopic colorectal surgery in obese patients is similar in outcomes comparing to nonobese patients, offering all the benefits of a minimally invasive approach. Management of colorectal cancer patients with BMI ≥ 30 kg/m^2 requires meticulous perioperative care, and colorectal surgeons must be familiar with obesity-related challenges in such patients.

Clinicopathological Characteristics among Three Groups

	Nonobese (< 25 kg/m^2) (N=812)	Obese I (25.0–29.9 kg/m^2) (N=360)	Obese II (>30 kg/m^2) (N=20)	*P* value
Location				0.927
Right Colon	275 (33.9%)	120 (33.3%)	6 (30.0%)	
Left Colon	537 (66.1%)	240 (66.7%)	14 (70.0%)	
Diverting stoma	2 (0.2%)	2 (0.4%)	0 (0.0%)	0.688
Adhesiolysis	15 (1.8%)	7 (1.9%)	0 (0.0%)	0.821
Polypectomy	75 (10.5%)	45 (12.5%)	2 (10.0%)	0.586
Cancer obstruction	94 (11.6%)	35 (9.7%)	4 (20.0%)	0.291
Cancer perforation	6 (0.7%)	2 (0.6%)	0 (0.0%)	0.877
Total operation time (min) (±SD)	147.84 (±46.77)	162.54 (±46.77)	180.35 (±69.63)	< 0.001
Conversion	13 (1.6%)	13 (3.6%)	2 (10.0%)	0.008
Postoperative Hospital stay (day) (±SD)	9.76 (±3.43)	9.78 (±3.19)	9.85 (±1.53)_	0.990
Size (mm) (±SD)	3.95 (±2.20)	3.80 (±2.27)	3.81 (±1.92)	0.537
T Stage				0.049
0, I	237 (29.2%)	131 (36.4%)	6 (30.0%)	
II, III	575 (70.8%)	229 (63.6%)	14 (70.0%)	
N Stage				0.778
0, I	570 (70.2%)	260 (72.2%)	14 (70.0%)	
II	242 (29.8%)	100 (27.8%)	6 (30.0%)	

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SECURING A JOB IN COLON AND RECTAL SURGERY: PERSPECTIVES FROM RECENT FELLOWSHIP GRADUATES.

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Purpose: Colon and rectal surgery (CRS) has become an increasingly popular specialty for general surgery residents. Although the path to becoming CRS trained is competitive, studies analyzing the current state of the job market for recent CRS graduates are lacking.

Methods: We identified 204 graduates of CRS residency programs from 2013-2015. In May 2015, these graduates were invited to complete an online questionnaire regarding their attitudes toward the current CRS job market.

Results: 100 graduates responded. A majority (60%) preferred a large metropolitan practice setting, while 13% had no preference. 50% preferred to practice either on the west coast or the east coast, while 19% and 12% preferred the Midwest and South, respectively. 58% of graduates attended 3 or more job interviews. 97% received at least one job offer, although only 89% reported currently having a job. 65% of those with a current job offer reported that it is the job they wanted. 64% felt that the most important factor for a successful job search was a contact or a mentor, while 15% rated academic pedigree as the most important. Only 54% of responders felt somewhat prepared and up to 32% felt unprepared for their job search. When asked about their impressions of the current job market, 82% reported a limited, saturated or very unfavorable market.

Conclusions: Although the majority of recent colon and rectal surgery residency graduates found jobs, many did not get the job they wanted and most felt that the current job market is overall unfavorable. Overall, the most influential factor to finding a job was a personal contact.

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IS THERE ANY DIFFERENCE OF TME TIME RELATED TO PELVIC DIFFICULTY BETWEEN ROBOT AND LAPAROSCOPIC SURGERY IN RECTAL CANCER?

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Purpose: TME (total mesorectal excision) is regarded as standard operation for rectal cancer. However, with technical developments, minimal invasive surgery (MIS) is worldwidely accepted in colorectal surgery, allows surgeon perform fine dissections. Especially, robot seems to provide better view of surgical field and maximizes surgeon's comfort. We compared TME time in rectal cancer between robot and laparoscope, according to pelvic difficulty to identify the difference.

Methods: We obtained data of rectal cancer patients who underwent laparoscopic or robotic surgery between August 2014 and July 2015, in Severance Hospital. Rectal cancer was defined located less than 15cm from anal verge, and all patients underwent with preoperative rectal MRI. TME time was calculated starting dissection from sacral promontory line until down to the exposure of the levators. Single surgeon was enrolled to reduce TME time bias. Total 124 patients (Robot n=69, Laparoscope n=55) were included. Pelvis was divided into easy and difficult pelvis by number of possesing pelvic parameter risk factors based on rectal MRI pelvimetry. Risk factors were measured from MRI with cutoff values which were positively correlated with pelvic dissection. Possesing 0 or 1 risk factor was considered as "easy" pelvis and 2 or more risk factors were considered as "difficult" pelvis.

Results: There were no statistical differences in age, body mass index, American Society of Anesthesiologists (ASA) class, operative method, tumor location, preoperative chemoradiotherapy status, TME completeness, resection margin and TME time (50.87 ± 13.13 min vs. 55.98 ± 17.53 min; p=0.067) between easy and difficult pelvis. However, retrieved lymph nodes were less (16.0.5 ± 6.72 vs 19.59 ± 9.21; p=0.027) and more proportion of female (M:F = 48:30 vs 38:8, p=0.014) was seen in easy pelvis. Laparoscopic and robotic surgery group were analyzed in each pelvis group, and there were statistical differences in TME time (Robot: 48.2 ± 11.71 min vs. Laparoscope: 54.03 ± 13.7 min; p=0.049) in easy pelvis. Each pelvis group was subdivided by sex, preoperative chemoradiotherapy status, previous operation history status and BMI. However, female (Robot: 43.93 ± 12.2 min vs. Laparoscope: 57.0 ± 13.8 min; p=0.011) and no previous operation history (Robot: 48.12 ± 11.4 min vs. Laparoscope: 54.8 ± 14 min; p=0.033) in easy pelvis showed less TME time in robotic surgery.

Conclusions: Although this is preliminary study, TME time differences according to pelvic anatomical difficulty is not apparent. Robotic surgery shows some TME time reduction, but not in difficult pelvis and the maximal time reduction was no more than 15 minutes. However, as new technique keep evolves, time consuming issue will be more considerable factor performing operation.

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ANASTOMOTIC LEAK OR ORGAN SPACE SURGICAL SITE INFECTION: ARE OUR QUALITY IMPROVEMENT PROGRAMS COLLECTING ACCURATE DATA?

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Purpose: Anastomotic leak remains among the most important quality metrics for colectomies. A large number of databases do not collect data on anastomotic leaks and rely on reported organ space surgical site infections (OSI) as a proxy for identifying anastomotic leaks. Previous research has shown OSIs to be a poor surrogate for anastomotic leak, resulting in underestimated leak rates. In 2012, the colectomy procedure targeted American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) database began data collection on specific quality measures for colectomies including anastomotic leak. This study questions the accuracy of anastomotic leak reporting using OSI as a surrogate for anastomotic leak.

Methods: Cases with an OSI and/or anastomotic leak were selected from the 2012-2013 colectomy procedure targeted NSQIP database. Cohen's kappa statistic was calculated to determine the agreement between OSI and anastomotic leak. Patient characteristics and outcomes were compared for cases with OSI and anastomotic leak using Chi square test.

Results: From 2012 to 2013, 38,486 colectomies were captured by the colectomy procedure targeted NSQIP database. Overall, 5.0% of colectomies had a reported OSI and 3.7% had an anastomotic leak. Among cases having anastomotic leaks, only 66.3% were also coded as having an OSI, leaving 33.7% of anastomotic leaks not captured using OSI as a surrogate by the colectomy procedure targeted NSQIP database (κ=0.544, p<0.001). Comparing patient characteristics and outcomes, patients with an anastomotic leak were more likely to have an unplanned return to the operating room (48.2% vs. 21.1%, p<0.001). Cases with an OSI had a higher rate of major complications (53.2% vs. 47.2%, p=0.032). Partial colectomies with anastomosis made up the largest portion of OSI and anastomotic leaks (24.9% and 40.5% respectively).

Conclusions: OSI continues to be a poor surrogate for anastomotic leak. The addition of anastomotic leak as a procedure specific quality measures in the colectomy procedure targeted ACS NSQIP database has increased the accuracy and capture rate. However, there is still discrepancy in how OSI is recorded relative to anastomotic leak. Quality improvement strategies should reevaluate how their cases are being coded.

Patient Characteristics and Outcomes in Colectomy Procedure Targeted ACS NSQIP

Variable	*Control (n = 36,075; %)*	*OSI (n = 984; %)*	*AL (n = 481; %)*	*Both (n = 946; %)*	*P value*	*OSI vs. AL P value*
Primary Indication for Surgery					<0.001	<0.001
Acute Diverticulitis	2,905 (8.1)	155 (15.8)	42 (8.7)	53 (5.6)		
Chronic Diverticular Disease	5,276 (14.6)	96 (9.8)	55 (11.4)	126 (13.3)		
Cancer	13,320 (36.9)	240 (24.4)	182 (37.8)	347 (36.7)		
IBD	2,722 (7.5)	130 (13.2)	41 (8.5)	94 (9.9)		
Non-Malignant Polyp	3,310 (9.2)	24 (2.4)	31 (6.4)	58 (6.1)		
Volvulus	937 (2.6)	23 (2.3)	15 (3.1)	23 (2.4)		
Other	7,605 (21.1)	316 (32.1)	115 (23.9)	245 (25.9)		
Operative Approach					<0.001	<0.001
Robotic	629 (1.7)	8 (0.8)	6 (1.3)	16 (1.7)		
Laparoscopic	20,400 (56.7)	298 (30.4)	203 (42.3)	464 (49.3)		
Open	14,957 (41.6)	675 (68.8)	271 (56.5)	462 (49.0)		
Operative Procedure					<0.001	<0.001
Partial Colectomy with Anastomosis	13,410 (37.2)	245 (24.9)	195 (40.5)	319 (33.7)		
Ileocecectomy with Ileocolostomy	8,108 (22.5)	187 (19.0)	93 (5.8)	234 (24.7)		
Hartmann Type Procedure	2,778 (7.7)	209 (21.2)	28 (5.8)	41 (4.3)		
Low Anterior Resection	8,240 (22.8)	157 (16.0)	107 (22.2)	269 (28.4)		
Total Colectomy without Proctectomy	1,973 (5.5)	108 (11.0)	32 (6.7)	58 (6.1)		
Other	1,566 (4.3)	78 (7.9)	26 (5.4)	25 (2.6)		
Major Complication	3,987 (11.1)	523 (53.2)	227 (47.2)	634 (67.0)	<0.001	0.032
Return to the Operating Room	1,219 (3.4)	208 (21.1)	232 (48.2)	562 (59.4)	<0.001	<0.001
Readmission Within 30 Days	3,063 (8.5)	338 (34.3)	142 (29.5)	413 (43.7)	<0.001	0.064
Postoperative Death Within 30 Days	1,102 (3.1)	71 (7.2)	50 (10.4)	70 (7.4)	<0.001	0.038

P381

A PILOT STUDY OF PATIENT CENTERED OUTCOME ASSESSMENT FOR PATIENTS UNDERGOING COLORECTAL SURGERY WITHIN AN ENHANCED RECOVERY PROTOCOL.

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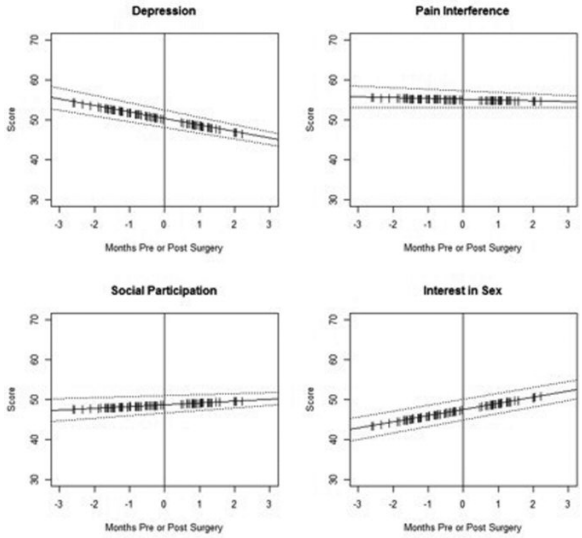
Purpose: Patient Reported Outcomes measurement provides a patient-centered perspective on the impact of colorectal surgery on patient quality of life. Few studies have assessed these types of measures, and the absence of this information makes it difficult to inform patients about the near term effects of surgery, beyond outcomes assessed by traditional clinical measures. This study was designed to provide information about the effects of colorectal surgery among patients in an enhanced recovery program on physical, mental, and social well-being outcomes.

Methods: The NIH Patient Reported Outcomes Measurement Information System (PROMIS®) Assessment Center was used to collect patient responses prior to surgery and at their routine postoperative visit. Four domains were selected based on patient consultation and clinical experience: depression, pain interference, social participation, and interest in sexual activity. Adult patients undergoing major elective colorectal surgery at an academic medical center were consented and administered the survey using a tablet computer. Each domain is measured using a series of questions, with hierarchically structured responses. Each domain is scored referent to an underlying population distribution, ranging from 0-100, where 50 is the population mean, and 10 point differences from the mean indicate one standard deviation. Multilevel random coefficient models were used to assess the change in scores during the follow-up period, and to assess the statistical significance of differences in trends over time associated with key clinical measures.

Results: In total, 131 patients were consented and completed a baseline survey, with 107 patients completing a postoperative assessment (81%). Technical or scheduling difficulties accounted for the majority of follow-up survey omissions. There was one immediate postoperative death. Depression scores significantly decreased over the perioperative period (p = 0.029). No statistically significant changes were demonstrated for pain interference, ability to participate socially, or interest in sexual activity (Figure). Pain interference scores for patients with neoadjuvant chemotherapy significantly increased (worsened) over the perioperative period (p = 0.032). Social participation scores significantly increased (improved) for patients with preoperative ileostomy (p = 0.037). Scores for interest in sexual activity decreased (worsened) for patients with cancer (0.030), compared to other patients.

Conclusions: Patient reported outcomes, as measured by PROMIS, are not adversely affected during the immediate period following surgery. These data suggest that the majority of patients quickly return to baseline physical, mental and social function following colorectal surgery within an enhanced recovery program. This information can be used as a guide for counseling patients prior to surgery.



P382

EXTENDED POSTDISCHARGE VENOUS THROMBOEMBOLISM PROPHYLAXIS AMONGST MEMBERS OF THE AMERICAN SOCIETY OF COLON AND RECTAL SURGEONS.

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Purpose: Venous thromboembolism (VTE) is one of the most common complications in surgical patients. Colorectal patients are 2-times more likely to develop VTEs. Nearly 40% of VTEs occur upon discharge with cessation of chemoprophylaxis. Extended post-discharge prophylaxis has been demonstrated to significantly reduce VTEs without a concomitant increase in bleeding. However, physician prescribing practices and adherence to post-discharge prophylaxis in colorectal surgery remains varibale. The purpose of this study is to evaluate physician prescribing practices and perceptions regarding extended post-discharge VTE prophylaxis in colon and rectal surgery.

Methods: ASCRS Research Foundation and IRB approved descriptive study of the current clinical standards by which US members of the American Society of Colon and Rectal Surgeons use and prescribe extended post-discharge VTE prophylaxis. Questionnaire-based study queried surgeons on clinical environemnt, as well as current opinions and standards regarding post-dishcharge chemoprevention of VTE in colorectal surgery. The survery was distributed and data compiled using the on-line application, surveymonkey.com.

Results: 218-respondents completed the survery; 90% of whom endorsed a colorectal practice, and 10% a combined colorectal/general surgery practice. Nearly 60% of physicians practiced in an urban setting, and 42.1% described a teaching environment. Greater than 50% of members indicates that a history of cancer, particularly metastatic disease, prior VTE, and pelvic dissection are important when deciding on discharge needs. In contrast, age, gender, insurance coverage, and steroid use were not important in discharge decision making. 69.8% of surgeons reported risk stratifying patients to determine discharge needs, wtih 58.8% using the current CHEST guidelines. Barriers to discharge recommendations included financial constraints and perceived low risk populations. 40% of respondents indicated a lack of patient compliance as detering discharge recommendations. Finally, 86.3% of respondents indicated that if a colorectal specific risk stratification model existed, physician compliance with discharge chemoprevention would improve.

Conclusions: Venous thromboembolism prophylaxis amongst ASCRS remains variable. Preliminary data suggests that while extended prophylaxis is important, there is no consensus regarding this practice. A history of malignancy and prior VTE are important qualities that guide discharge recommendations. While many barriers exists, financial constraints and perceived low risk populations are important considerations This study helps to elucidate salient patient characteristics as well as potential limitations to prescribing practices. Importantly, the study highlights the fact that post-discharge VTE prophylaxis may be enhanced with a colorectal specific risk stratification model.

P383

WHICH IS THE BETTER PROGNOSTIC FACTOR IN RECTAL CANCER PATIENTS WHO RECEIVED NEOADJUVANT CHEMORADIOTHERAPY: CTNM STAGE VS. YPTNM STAGE?

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Purpose: Neoadjuvant chemoradiotherapy (nCRT) in rectal cancer is widely applied in patients with cTNM II and III stage. However, it is still obscure which staging system, either clinical (c) or pathologic (yp), influences in prognosis. This study aims to evaluate the current staging system predicting prognosis in the locally advanced rectal cancer patients

Methods: Among 221 patients who were diagnosed with rectal cancer and underwent curative resection from January 2009 to February 2013, 141 patients who received nCRT were included. The ypTNM stage was categorized: complete remission and stage I to ypI.

Results: Mean follow-up period was 36.3 ± 15.1 months. Disease-free survival (DFS) was not associated with age, sex, Anesthesiologists classification, types of operative procedure, tumor cell differentiation, tumor location, tumor infiltration, preoperative CEA level, adjuvant chemotherapy. cTNM stage did not demonstrate any correlation with DFS (cII % vs cIII %, $P = 0.266$). However, DFS did exhibit statistically significant association with postoperative CEA level ($P < 0.001$) and ypTNM stage. 3-year DFS rate for each categorized stage is as followed – ypI, 87.9%; ypII, 67.8%; ypIII, 53.3% (ypI vs. ypII $P = 0.009$, ypI vs. ypIII $P < 0.001$, ypII vs. ypIII $P = 0.185$). (Fig 1)

Conclusions: Oncologic outcome of the patients with locally advanced rectal cancer is associated with pathologic TNM stage.

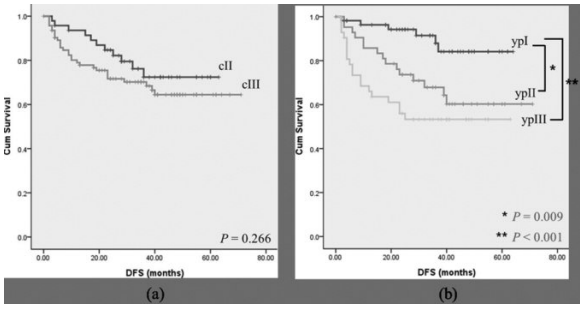

Fig 1. (a) shows that the difference of DFS between cII and cIII was not significant. ($P = 0.266$). (b) shows the significant differences among ypI, ypII, and ypIII in DFS; ypI vs. ypII $P = 0.009$, ypI vs. ypIII $P < 0.001$, and ypII vs. ypIII $P = 0.185$.

P384

COMPARISON OF THERAPEUTIC BENEFIT OF BUPIVACAINE HCL TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCKS AS PART OF AN ENHANCED RECOVERY PATHWAY VS.TRADITIONAL ORAL AND INTRAVENOUS PAIN CONTROL AFTER ELECTIVE MINIMALLY INVASIVE COLORECTAL SURGERY.

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Purpose: Enhanced Recovery Pathways (ERP), when combined with transversus abdominis plane (TAP) blocks, have been proven to reduce length of stay (LOS) and improve quality outcomes. Non-opioid pain management is an essential component of this pathway, leading to a reduction in immobility, post-operative ileus, and an increase in patient satisfaction. TAP block variations have been studied in general surgery and gynecology. This study evaluates the effectiveness of Laparoscopic TAP blocks in conjunction with the benefit of an ERP.

Methods: Enhanced Recovery Pathways (ERP), when combined with transversus abdominis plane (TAP) blocks, have been proven to reduce length of stay (LOS) and improve quality outcomes. Non-opioid pain management is an essential component of this pathway, leading to a reduction in immobility, post-operative ileus, and an increase in patient satisfaction. TAP block variations have been studied in general surgery and gynecology. This study evaluates the effectiveness of Laparoscopic TAP blocks in conjunction with the benefit of an ERP.

Results: All cases were elective, with the main diagnosis colon cancer or dysplastic polyps (53%). The median age was in each group was comparable (p=0.14), with both groups a majority female (61%). Most procedures were segmental colon resections (90%). Forty-six patients received a placebo, 41 bupivacaine TAP, and 39 bupivacaine TAP plus ERP. In terms of primary endpoints, the bupivacaine plus ERP arm used statistically significant less IV hydromorphone on POD #1 (p=0.019). All patients ambulated on average within the first 24 hours postoperatively, with TAP plus ERP group approximately 0.5 days sooner (p=0.001). The TAP plus ERP group also had a return of bowel function and length of stay approximately 24 hours early (p= 0.001 and p =0.002). The TAP plus ERP group on average used less total narcotics, however this difference was not statistically significant different (Placebo 8.8 mg vs TAP 8.6 mg vs. TAP + ERP 5.1 mg , p=0.089). Fifteen patients received placebo TAP blocks plus ERP. All end points of these 15 patients were compared to 31 patients receiving only placebo. There were no significant differences found amongst these two placebo groups.

Conclusions: This study shows that bupivacaine laparoscopically placed TAP when used as part of an ERP can reduce length of stay, post-operative narcotic use on POD #1, time to ambulation and bowel function as well as length of stay. Defined pain regimens with auxiliary staff teaching can add to the improvement in quality outcomes in laparoscopic colorectal surgery, and with the addition of the bupivacaine TAP block, can add to patient satisfaction and lower hospital costs.

P385

ASSESSMENT OF SHORT- AND LONG- TERM OUTCOMES OF BIOLOGICAL MESH USE IN EXTRALEVATOR ABDOMINOPERINEAL RESECTION.

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Purpose: Extralevator abdominoperineal excision (ELAPE) is purported to have a better oncological outcome due to proposed lower iatrogenic perforation rates and smaller incidence of a positive circumferential margin compared to standard abdominoperineal excision (SAPE). However, due to the larger perineal defect caused by a wider excision in ELAPE patients, primary closure is not usually possible. There is still controversy regarding the best method of closure. The aim of our study was to present outcomes of perineal closure with the use of a biological mesh in patients undergoing ELAPE.

Methods: Data were collected on all ELAPE resections at a single UK centre for patients with rectal cancer between January 2009 and December 2014. Patient notes and computer records were reviewed to obtain data including method of perineal wound closure, perineal wound complications (specifically wound breakdown) and perineal herniation.

Results: 23 patients were eligible for inclusion [median age 69 years, range 49-86 years, 17 males (74%). The median length of hospital stay was 10 days (range 3-57 days). There were two perineal complications (9 %) requiring surgical intervention, but no meshes were removed. There were 8 (35%) incidences of superficial perineal breakdown. All of these healed by secondary intention. There were no perineal hernias. The median length of follow-up was 60 months (range 7-143 months). The overall mortality was 4 (17%).

Conclusions: Our results concur with the growing evidence that good outcomes can be achieved for perineal wound closure with biological mesh in patients undergoing ELAPE. Our reported low major complication rate, high level of perineal wound healing and the absence of perineal hernia demonstrates that this is a sound and appropriate method of closure.

P386

OPTIMIZING IMPLEMENTATION OF ENHANCED RECOVERY PROGRAMS: DEVELOPMENT OF AN AUDIT TOOL AND STRATEGY.

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Purpose: Enhanced Recovery Pathways (ERP) are one of the best examples of adopting a systems-based approach to surgical care. Implementation of an ERP bundle is correlated with optimal clinical outcomes, value, and patient experience. Achieving high compliance with ERP bundled processes is challenging but integral to success. We hypothesized that surfacing defects and engaging frontline providers to identify system-level changes to facilitate compliance would be an effective approach to optimizing ERP implementation.

Methods: We developed a multidisciplinary ERP incorporating best practices for colon and rectal surgery, including prevention of surgical site infections, venous thromboembolism prophylaxis and enhanced patient engagement. An audit tool, based on the key processes in the ERP, was created to perform defect analysis. For 6 months, process measure data was abstracted on all patients; patients whose length of stay (LOS) was greater than the mean LOS pre-ERP were considered to have not met the expected metric. Given that defects were concentrated in patients who did not meet expected LOS, and prior work that has shown focusing efforts on reviewing only patients who did not meet expectations is an efficient and effective strategy for identifying processes in greatest need of improvement while minimizing the burden of manual data collection, we focused review exclusively on that group of patients. This data was shared with frontline providers and system-level fixes were developed to improve compliance over the 1.5 year period post-implementation.

Results: With the implementation of the ERP, overall LOS decreased from an average of 6.9 to 5.3 days. In the first 6 months, of the 413 patients, 102 had a LOS greater (mean 11.3 day) than the procedures' pre-ERP mean. On comparison to the outlier patients, those patients who met expectations were more likely to receive multimodal non-narcotic analgesia, restricted intravenous fluid administration, early resumption of oral diet and increased postoperative ambulation (figure 1). This data was reviewed with the transdisciplinary team. Over the next year, modifications to the electronic health record, provider level interventions to improve analgesia protocols and work flow redesigns to facilitate early mobility were implemented. Process measure compliance was monitored exclusively in patients

who did not meet expected LOS. Using this approach, we observed improvement in these two metrics from 37% to 41% (non-narcotic analgesia) and 33% to 48% (mobility).

Conclusions: ERP implementation is challenging given the multiple stakeholders and phase of care impacted. Continuous review of performance data is essential to determine areas for improvement. Concentrating audits in patients who fail to meet expectations on an ERP is an effective strategy to identify defects in pathway implementation while minimizing the burden of manual data collection.

	All Patients n=413	Success n=311	Outlier n=102	p-value
Mean length of stay (days)	5.3	3.3	11.3	
Male sex, n (%)	205 (49.6)	154 (50.0)	51 (50.0)	0.93
Mean Age (years)	52.9	52.7	56.9	*0.015*
Caucasian Race, n (%)	314 (76.0)	243 (78.1)	71 (69.6)	0.08
Procedure Performed, n (%)				
Colectomy	175 (42.4)	136 (43.7)	39 (38.2)	0.33
Proctectomy	113 (27.4)	76 (24.4)	37 (36.2)	*0.02*
Ileostomy Reversal	94 (22.7)	75 (24.1)	19 (18.6)	0.25
Other	31 (7.5)	24 (7.7)	7 (6.8)	0.78
Procedure Mean Length of Stay				
Colectomy	4.8	3.2	10.5	
Proctectomy	6.6	4.0	11.9	
Ileostomy Reversal	3.8	2.5	9.7	
Other	7.3	4.1	18.0	
Postoperative Fluid Intake				
Mean Day 1 Intake (mL)	2654	2540	3012	*0.028*
Mean Day 2 Intake (mL)	1694*	1551***	2297	*<0.001*
Mean Day 3 Intake (mL)	1171**	1153****	2355	*<0.001*
Anesthesia and Analgesia, n (%)				
Pre-Op Medications	254 (61.5)	199 (64.0)	55 (54.0)	0.07
Epidural Pain Catheter	230 (55.7)	165 (53.1)	65 (63.7)	0.06
Total Intravenous Anesthesia	310 (75.0)	230 (74.0)	80 (78.4)	0.36
Mean Total Narcotic Usage (mg PO Morphine Sulfate)	174	150	244	*0.046*
Diet and Mobility, n (%)				
Taking Diet Day 1	386 (93.5)	301 (96.8)**	85 (83.3)	*<0.001*
Taking Diet Day 2	364 (90.5)*	289 (96.3)****	75 (73.5)	*<0.001*
Taking Diet Day 3	258 (82.4)**	203 (96.2)****	55 (53.9)	*<0.001*
Achieved Mobility Goals Day 1	182 (44.1)	149 (47.9)	33 (32.4)	*0.006*
Achieved Mobility Goals Day 2	187 (46.5)*	150 (50.0)**	37 (36.3)	*0.02*
Achieved Mobility Goals Day 3	139 (44.4)**	90 (42.7)****	49 (48.0)	0.37

Alterations in n due to discharges from hospital on postoperative day 1 and 2:
* n=402 (all patients)
** n=313 (all patients)
*** n=300 (ERAS Success group)
**** n=211 (ERAS Success group)

P387

MODIFIED FRAILTY INDEX PREDICTS COMPLICATIONS AND DISCHARGE DISPOSITION IN PATIENTS UNDERGOING MAJOR COLORECTAL PROCEDURES.

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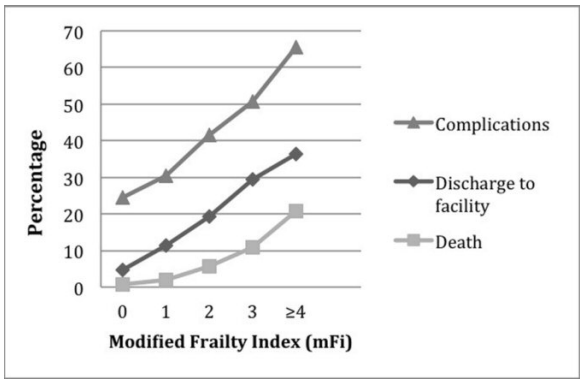
Purpose: Several frailty index models have shown correlation between functional status and post-surgical outcomes. The primary aim of the study was to assess the relationship between the modified frailty index (mFi) in patients undergoing major colorectal procedures and their discharge disposition.

Methods: We reviewed all patients who underwent major colorectal procedures from the year 2008 to 2011 using the National Surgical Quality Improvement Program (NSQIP) public use file (puf). The mFi was calculated based on eleven co-morbidities. Univariate and multivariate analysis was performed to assess the risk for post-operative complications, discharge disposition and death based on the severity of mFi.

Results: We identified 20,049 patients who met the inclusion criteria. The mean age was 61, and 48% were male. The majority of patients had a mFi score of zero (43.5%, n = 8,714), whereas 538 (2.7%) had a score equal or higher than four. Patient with higher mFi suffered more complications, were more likely to be discharged to a nursing or rehabilitation facility and had higher mortality rates. After controlling for several risk factors, a mFi score ≥ 4 was a significant predictor of overall morbidity (OR = 2.3, 95% CI : 1.0 - 1.2, p < 0.006), serious complications (OR = 2.9, 95% CI: 2.4 - 3.6, p < 0.001), discharge to a facility (OR = 3.4, 95% CI: 2.7 - 4.4, p < 0.001) and death (OR = 4.9, 95% CI: 3.4 - 7.1, p < 0.001).

Conclusions: The mFi is significantly related to post-operative complications and disposition to subacute care facilities in patients undergoing major colorectal procedures. Comprehensive preoperative evaluation and counseling as well as a multi-disciplinary approach to discharge disposition should be considered for high frailty index patients.



P388

ONCOLOGIC OUTCOME OF LATERAL PELVIC LYMPH NODE METASTASIS IN LOCALLY ADVANCED RECTAL CANCER.

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Purpose: Lateral pelvic lymph node (LPLN) metastasis is a major cause of recurrence in patients with rectal cancer. This study investigates the oncologic outcome based on LPLN status after neoadjuvant chemoradiotherapy (nCRT).

Methods: Between January 2009 and February 2013, 141 patients with rectal cancer received nCRT followed by curative radical surgery in our hospital. 16 patients were identified with LPLN before nCRT. These patients were categorized to two groups according to nCRT response evidenced by post-nCRT imaging studies with 5mm criteria. Group 1 included 7 patients who showed disappearance of LPLN after nCRT. Group 2 consisted of the patients identified with LPLN after nCRT.

Results: The mean follow-up period was 35.6 ± 12.8 months. The mean overall survival (OS) period and 3-year OS rate for the patient with LPLN before nCRT was 56.0 ± 2.6 months and 93.3%, respectively. The mean relapse free survival period and 3-year RFS rate for the patient with LPLN before nCRT was 32.6 ± 5.7 months and 47.1%, respectively. The risk factors associated with RFS were ypN stage (P = 0.031), tumor location (P = 0.002), and postoperative CEA level (P = 0.022). Comparing RFS between Group 1 and 2, Group 1 tend to demonstrate longer RFS (P = 0.058). (Fig 1a) Analyzing oncologic outcome of two groups compared to the cohort population, Group 1 showed similar oncologic outcome with ypTNM stage II. Group 2 demonstrated a tendency of worse oncologic outcome than ypTNM stage III (Group 1 vs. ypII P = 0.761 and Group 2 vs. ypIII P = 0.135). (Fig 1b)

Conclusions: Preoperative LPLN status after nCRT seems to influence oncologic outcome in rectal cancer patient. If patients with LPLN metastasis before nCRT exhibit persistent LPLN metastasis after nCRT, they may require additional treatment.

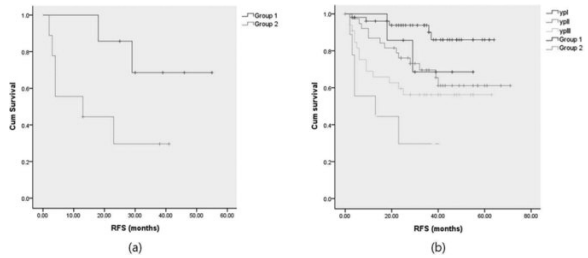

Fig 1. (a) shows relapse free survival (RFS) for LPLN positive group before neoadjuvant chemoradiotherapy (nCRT). In (b), RFSs of two groups were compared to the cohort population (total 141 patients with nCRT). Group 1 shows similar oncologic outcome with ypTNM stage II, but Group 2 demonstrated a tendency of worse oncologic outcome than ypTNM stage III (Group 1 vs. ypII $P = 0.761$ and Group 2 vs. ypIII $P = 0.135$). (Fig 1b).

P389

CHRONIC PREOPERATIVE NARCOTICS INCREASE HOSPITAL LENGTH OF STAY IN ELECTIVE COLORECTAL SURGERY.

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Purpose: Prescription opioid use in the United States is a growing problem and has many negative consequences. No study to date has evaluated potentially deleterious effects of preoperative narcotics in elective colorectal surgery. The purpose of this study is to determine if the chronic use of narcotics prior to elective colorectal surgery has an effect on hospital length of stay (LOS) and surgical site infection (SSI).

Methods: A single-institution, multi-surgeon, retrospective review of adult patients undergoing elective colorectal surgery was performed (2011-2014). Demographic and clinical data was obtained, including the use of chronic narcotics prior to operation. Opioids were converted to morphine equivalents (ME). Preoperative narcotic (PNG) and non-narcotic groups (NNG) were stratified based upon total dose of ME (opioid naïve [no preoperative narcotics], opioid non-tolerant [less than 60 ME daily], opioid tolerant [60-120 ME daily], or opioid tolerant high [greater than 120 ME daily]). Univariate and multivariate analyses were performed, with significance assessed at $p < 0.05$ (Stata 14.0, StataCorp, College Station, TX).

Results: The study population consisted of elective colorectal surgery patients (n = 929), of which 23% (n = 212) were utilizing chronic narcotics preoperatively (82% opioid non-tolerant, 12% opioid tolerant, 6% opioid tolerant high). Age, BMI, diagnosis of diabetes, and creation of a stoma (ileostomy) were similar among PNG and NNG patients ($p > 0.05$). However, PNG as compared to NNG patients, tended to be female ($p < 0.05$), underwent more open surgery ($p < 0.01$), had higher ASA classification ($p < 0.05$), and were more likely undergoing surgery for inflammatory bowel disease (IBD) or benign disease ($p < 0.05$). PNG patients had a significantly longer LOS than patients in the NNG (7.1±6.7 vs 5.4±4.6 days; $p < 0.001$). After stratifying by dose of ME, opioid naïve patients demonstrated a significantly shorter LOS than patients in the opioid non-tolerant group ($p < 0.01$). Multivariate analysis revealed that preoperative narcotic use was an independent predictor of increased LOS—indeed, patients in the PNG had a 19% longer LOS than patients in the NNG (95% CI: 7.7%-30.5%; $p < 0.01$). This analysis also revealed that patients with IBD had a 20.3% longer LOS than patients with benign disease or malignancy (95% CI: 4.2%-38.9%; $p < 0.01$). Univariate and multivariate analyses did not demonstrate an association among narcotic usage and the development of SSI.

Conclusions: Chronic preoperative narcotic use is independently associated with a prolonged hospital LOS, but no change in SSI, among patients undergoing elective colorectal surgery. Innovative strategies may be necessary to eliminate this LOS difference in the patient on chronic opioid prior to surgery.

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IS DA VINCI® XI BETTER THAN DA VINCI® SI IN RECTAL CANCER SURGERY? COMPARISON OF THE TWO GENERATIONS OF DA VINCI® ROBOTIC SYSTEMS.

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Purpose: As new robotic systems have become available, it will be important to identify the impact of emerging technology on surgical procedures and patient outcomes in colorectal surgery. In the present study, we compared perioperative outcomes for procedures performed using the latest generation of da Vinci® robot with those performed using the previous version in patients undergoing surgery for rectal cancer.

Methods: Between January 2010 and March 2015, we performed a total of 53 robotic procedures for rectal adenocarcinoma. We retrospectively reviewed all these procedures and classified the surgeries into two groups according to the type of the robotic system used: da Vinci Xi® *versus* da Vinci Si® groups. Both groups were compared for perioperative parameters, oncologic characteristics and postoperative 30-day outcomes. The primary outcome was console time. Total operative time and total number of harvested lymph nodes were secondary outcomes. Multivariate logistic regression analyses were performed to identify factors related to these outcomes.

Results: The Xi and Si group included 28 and 25 patients, respectively. Both groups were comparable with respect to patient characteristics including age, gender, BMI, ASA score, presence of co-morbidity, tumor localization, and neoadjuvant chemo/radiotherapy use ($p > 0.05$). Comparison of the perioperative characteristics revealed significant differences in terms of type of operative procedure, hybrid technique, re-docking, level and type of anastomosis, stoma creation and y(p)TNM stage. The mean console time (265.7 ± 60.9 *vs* 317.1 ± 70.5 min, $p = 0{,}006$) and overall operative time (321.6 ± 69.4 *vs* 360.4 ± 63.2 min, $p = 0.04$) were significantly shorter in the Xi group. The mean number of harvested lymph nodes was higher in the Xi group (27.5 ± 14.0 *vs* 17.0 ± 9.1, $p = 0{,}008$) (Table 1). In the multivariate analysis, compared to Si robot, Xi robot was associated with a shorter console time (OR:0.09, 95%CI:0.02-0.47, $p = 0.004$) with no significant differences in terms of total operative time (OR:0.35, 95%CI:0.05-2.68, $p=0.3$) and number of harvested lymph nodes (OR:1.84, 95%CI:0.47-7.19, $p=0.38$). Regarding postoperative outcomes, there were no significant differences except the Xi group had a quicker return of bowel function (2.5 ± 2.0 *vs* 3.7 ± 2.5 days, $p = 0.002$) and a longer length of hospital stay (6.2 ± 2.5 *vs* 5.1 ± 3.3 days, $p=0.001$).

Conclusions: Both generations of the da Vinci® technology lead to similar short-term outcomes in robotic rectal cancer surgery, but the Xi robot appears to allow shorter console times.

Table 1. Comparison of the perioperative characteristics between the groups

Patient characteristics	Xi Group (n = 28)	Si Group (n = 25)	p value
Age, years, mean±sd	57.4 ± 11.3	56.9 ± 12.6	0.88
Gender, male/female, n (%)	15/13 (54/46)	15/10 (60/40)	0.64
BMI, kg/m2, mean±sd	27.0 ± 3.8	26.6 ± 4.1	0.77
ASA status, n (%)			0.21
I	8 (28.6)	12 (48.0)	
II	16 (57.1)	12 (48.0)	
III	4 (14.3)	1 (4.0)	
Tumor distance from AV, cm, mean±sd	9.5 ± 4.7	12.0 ± 4.4	0.09
Neoadjuvant chemo/radiotherapy, n (%)	13 (46.4)	12 (48.0)	0.91
Operative procedure, n (%)			0.01
LAR	18 (64.3)	20 (80.0)	
VLAR	9 (32.1)	1 (4.0)	
APR	1 (3.6)	4 (16.0)	
Re-docking, n (%)	0 (0,0)	15 (60,0)	<0.001
Docking time, min, mean±sd	5.3 ± 1.3	8.4 ± 3.6	<0.001
Hybrid technique, n (%)	0 (0,0)	10 (40,0)	<0.001
Console time, min, mean±sd	265.7±60.9	317.1±70.5	0.006
Operative time, min, mean±sd	321.6±69.4	360.4±63.2	0.039
Conversion, n (%)	1 (3.6)	1 (4.0)	>0.99
LN total, median (range)	24.5 (15-70)	18 (2-32)	0.008
Bowel function, days, mean±sd	2.5 ± 2.0	3.7 ± 2.5	0.002
Hospital stay, days, mean±sd	6.2 ± 2.5	5.1 ± 3.3	0.001

BMI: body mass index, ASA: American Society of Anesthesiologists, AV: anal verge, LAR: low anterior resection, VLAR: very low anterior resection, APR: abdominoperineal resection, LN: lymph node

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POSTOPERATIVE PAIN CONTROL AFTER ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCKS IN LAPAROSCOPIC COLECTOMY PATIENTS.

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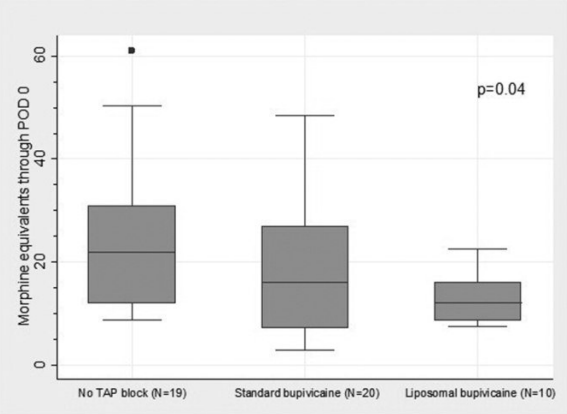
Purpose: Evidence supporting the use of transversus abdominus plane (TAP) blocks in colorectal surgery is inconsistent. The aim of this study was to investigate the effects of preoperative ultrasound-guided transversus abdominus plane blocks on postoperative pain control at an urban, tertiary referral center in patients undergoing elective laparoscopic colectomy.

Methods: A retrospective chart review was performed at a single institution. Consecutive elective laparoscopic colectomy patients with well-documented postoperative opioid medication use and subjective pain scores were reviewed. Baseline characteristics including age, gender, American Society of Anesthesiologists (ASA) score, body mass index (BMI), length of stay, indication for procedure, and type of procedure were collected. Narcotic usage was calculated based on total morphine equivalents administered in the post-operative care unit (PACU), as well as totals from postoperative day (POD) 0 and POD 1. A standardized subjective pain scale was used at various time intervals. All TAP blocks were performed using ultrasound guidance by an attending anesthesiologist in the immediate preoperative period. Either standard bupivacaine solution or liposomal bupivacaine solution was administered, depending on pharmacy availability. Regression methods were used to compare outcomes of bupivacaine TAP block, liposomal bupivacaine TAP block, and no TAP block.

Results: Between July and October 2015, there were 49 patients that met the study criteria. The median age was 66, with most undergoing colectomy for neoplasm (n = 39). 30 patients (61.2%) received a preoperative TAP block: of these, 20 (66.7%) with standard bupivacaine solution, and 10 (33.3%) with liposomal bupivacaine solution. Among the three groups, there were no significant differences in age, gender, ASA score, BMI, indication for procedure, or procedure performed. The amount of opioid medication used in the immediate postoperative period decreased significantly in a step-wise fashion across treatment groups - from no TAP block, to TAP block with standard bupivacaine, to TAP block with liposomal bupivacaine (mean morphine equivalents: 25.3 vs. 17.8 vs. 12.6, p=0.04). There were no differences in subjective pain scores at any time interval among all three groups, and no differences in length of stay.

Conclusions: Preoperative ultrasound-guided TAP blocks are a useful adjunct for immediate postoperative pain management in patients undergoing elective laparoscopic colectomy, with the greatest reduction in opioid medication use in those receiving liposomal bupivacaine.



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RELATIONSHIP BETWEEN PREOPERATIVE BASAL ENERGY EXPENDITURE AND POSTOPERATIVE COMPLICATIONS IN COLORECTAL CANCER PATIENTS.

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Purpose: Perioperative low nutritional status is attributable to the high incidence of postoperative complications via suppressing immune function and impairing the wound healing. Although recent studies reported a significant relationship between low nutritional status and basal metabolic rate, there is a lack of studies addressing the relationship between basal metabolic rate and postoperative complications. The objectives of this study were to evaluate the influence of preoperative low nutritional state on postoperative complications.

Methods: Between March 2003 and September 2014 a total of 1454 patients who consecutively underwent curative resection of colorectal cancer were retrospectively registered. To calculate preoperative basal energy expenditure (BEE), the Harris-Benedict Equation (HBE) were utilized. The association between BEE and postoperative complications were assessed by logistic regression analysis

Results: Patients consisted of 852 men and 602 women, the mean of age was 66.1 ±12.0 years oldThe mean of BEE was totally 1248 ± 198 kcal/day (male 1334±199 kcal/day; female 1126±116 kcal/day)Any postoperative complications were observed in 407 patients. The mean of BEE was significantly lower in patients with any complications than in those without any complications (with complications 1219 ± 205 kcal/day; without complications 1258±174 kcal/day), and BEE/100 was an independent predictive factor for postoperative complications (Odds ratio (OR) = 0.77 [95% confidence interval (CI): 0.67–0.90], p<0.01). This tendency was evident only in male (male p<0.01; female p=0.61). In the adjusted analysis for individual complications, a significant difference was observed only in superficial surgical site infection (SSI) (BEE/100 OR = 0.72 [95% CI: 0.57 – 0.90], p < 0.01).

Conclusions: The findings of this study suggested that preoperative BEE is an independent predictive factor of postoperative complications. Especially in patients with low BEE, the development of superficial SSI should be taken into consideration.

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EFFECTIVENESS OF WOUND-EDGE PROTECTOR FOR PREVENTING SURGICAL SITE INFECTION AFTER OPEN SURGERY FOR COLORECTAL DISEASES: A RANDOMIZED PHASE II TRIAL.

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Purpose: It is well known that the rate of surgical site infection (SSI) after colorectal surgery is relatively high among abdominal surgeries. The various procedures have been performed to reduce SSI. However, the standard procedures to reduce SSI after colorectal surgery are not established. Although some studies reported the effectiveness of wound-edge protector to reduce SSI, the effectiveness of wound-edge protector in Asian patients has not been prospectively investigated. A randomized phase II trial was performed to clarify the rate of SSI in patients who underwent open surgery for colorectal diseases with and without wound-edge protector.

Methods: One hundred Asian patients who underwent elective open surgery for colorectal disease between October 2012 and August 2014 were randomly assigned to wound-edge protector group and wound-edge protector (-) group. The primary end point was a rate of SSI in both groups.

Results: Fifty patients were assigned to wound-edge protector group and fifty patients were assigned to wound-edge protector (-) group. There were no differences in background such as gender, body mass index, diabetes mellitus, tumor site, surgical history, stoma, and serum albumin between two groups. The rate of SSI with and without wound-edge protector was 16% and 36%, respectively (P = 0.021). Age (P = 0.0073) and wound-edge protector (P = 0.021) were risk factors for SSI after open surgery for colorectal diseases using univariate analysis. A multivariate analysis revealed that both age (P = 0.016) and wound-edge protector (P = 0.012) were independent risk factors for SSI.

Conclusions: The present randomized phase II trial clarified the SSI rate of 16% with use of wound-edge protector. The rate of SSI in wound-edge protector group was lower than that in wound-edge protector (-) group. The wound-edge protector may reduce SSI after open surgery for colorectal diseases in Asian patients.

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OUTCOMES OF INTESTINAL OPERATIONS IN PATIENTS WITH LEFT VENTRICULAR ASSIST DEVICES VERSUS HEART TRANSPLANTS: A MULTI-INSTITUTIONAL REVIEW.

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Purpose: To compare outcomes of intestinal surgery in patients with left ventricular assist devices (LVADs) versus heart transplants.

Methods: We conducted a multi-institutional retrospective review of all intestinal (large bowel, small bowel, and anorectal) operations performed on patients with heart transplants or LVADs at three major academic teaching hospitals in Boston, MA between 2003-2013. Data were collected on demographics, comorbidities, anticoagulation and immunosuppression, peri-operative complications, blood transfusion requirements, type of operation, 24-hour and thirty day mortality, and time to surgery after transplant or LVAD. The primary endpoint was 30-day mortality. The LVAD and transplant cohorts were compared using the Chi-square test or Fisher's exact test for categorical variables and Mann-Whitney U test for continuous variables.

Results: Over an 11-year period, a total of 1057 patients had an LVAD or heart transplant and also underwent a subsequent operation. Of these, 20 patients with LVADs and 22 patients with heart transplants had an intestinal operation. The median time between LVAD or heart transplant and surgery was 134 (25-491) days and 401 (73-1453) days, respectively. There were a similar proportion of elective (vs. emergency) cases in the heart transplant (64%, n=14) compared to LVAD cohort (70%, n=14, p=0.66). Postoperative bleeding was significantly more common in the LVAD cohort (40%, n=8), compared to the transplant cohort (0%, n=0, p<0.01). A significantly greater proportion of LVAD patients required a blood transfusion (45%, n=9) compared to transplant patients (9%, n=2, p<0.01). Venous thromboembolic (VTE) events occurred with similar proportions in the LVAD cohort (25%, n=5) compared to the transplant cohort (0%, n=0, p=0.45). There was no statistically significant difference in superficial or deep surgical site infections between the transplant (0%, n=0 superficial; 0%, n=0 deep) and LVAD (16%, n=3 superficial, p=0.09; 5%, n=1 deep, p=0.46) groups. Mortality within 24 hours was 15% (n=3) in the LVAD cohort and 0% (n=0) in the transplant cohort (p=0.10). Thirty-day mortality was significantly higher in the LVAD cohort (21%, n=4) compared to the transplant cohort (0%, n=0, p=0.04).

Conclusions: Outcomes after intestinal operations were better in patients who had undergone heart transplantation compared to those with LVADs, especially with respect to the need for postoperative transfusion, the incidence of VTE, and 24-hr and 30-day mortality. This supports the tendency to minimize surgical procedures in LVAD patients compared to transplant patients. The relatively low post-op morbidity and mortality in heart transplant patients should be considered when assessing pre-operative risk and post-operative outcomes for those undergoing intestinal surgery.

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LENGTH OF STAY AFTER RIGHT COLECTOMY = LENGTH OF STAY AFTER LEFT COLECTOMY + 2 DAYS!!!

A STUDY FROM ACS-NSQIP DATABASE.

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Purpose: A different spectrum of diseases and differences in the anatomy of dissection, mobilization and anastomosis make left colectomy more prone to complications than right. However we have noticed that patients undergoing right colectomy have a longer postoperative ileus than those having a left colectomy, and a longer length of stay. This study aimed to investigate these differences in a nationwide cohort.

Methods: Patients who underwent right-sided and left-sided colectomy between 2012 and 2013 were identified from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database by using current procedural terminology codes. Patient demographics, preoperative comorbidities, and 30-day outcomes were compared between right-sided and left-sided colectomy groups. Primary end points were postoperative ileus, length of surgery, and length of hospital stay. Multivariate logistic regression analysis was conducted with further covariate adjustment for variables demonstrating significant difference between the groups.

Results: 16305 patients met the inclusion criteria [mean age of 60.8 (±15.3) years, female 8594 (52.7%)]. There were 8553 (52.5%) patients in the right colectomy group and 7752 (47.5%) patients in the left colectomy. Right colectomy patients were slightly older (61.4±17.2 vs. 60.1±13.0), more often diabetic (14.9% vs. 12.2%), hypertensive (48.5% vs. 43.6%), with pulmonary disease (6% vs. 4%), preoperative sepsis (9.3% vs.1.9), a lower albumin level (3.7±0.7 vs. 4.0± 0.6), steroid use (13.2% vs. 4.1) and an ASA classification of 3 or greater (54.3% vs. 43.6%). Operating time (mins)(143.7± 85.1 vs. 205.7± 101.6, p< 0.001) was longer in left-sided colectomy group while length of stay (days) (8.4±3.7 vs. 6.7±7.3) was shorter. Table summarizes postoperative outcomes using multivariate logistic regression analysis. 30-day postoperative morbidity and mortality rates were found to be 1.3 times and 3.3 times higher after right-sided colectomy, respectively.

Conclusions: The higher rates of post-operative morbidity and mortality after right-sided colectomies may be related to the higher incidences of comorbidities. However despite right colectomies taking less time, they were more often followed by an ileus and the length of stay was almost 2 days longer.

Outcome	Right vs Left Colectomy*	OR (CI)	P value
Mortality	2.9 vs. 0.77	3.38 (2.23-5.10)	<.0001
Morbidity	29.2 vs. 23.3	1.32 (1.19-1.48)	<.0001
LOSV	8.4±8.37 vs. 7±7.3		<.0001
Specific complications			
Transfusion	11.9 vs. 7.6	1.88 (1.59-2.2)	<.0001
Superficial SSI	6.9 vs. 5.8	1.18 (0.98-1.42)	0.0861
Organ space SSI	4.9 vs. 4.7	1.02 (0.81-1.29)	0.8533
Septic shock	2.9 vs. 1.2	2.48 (1.71-3.60)	<.0001
Pneumonia	2.8 vs. 1.3	2.79 (1.92-4.07)	<.0001
Urinary infection	2.5 vs. 2.9	0.75 (0.57-0.99)	0.045
Anastomotic leak	3.8 vs. 4.3	0.86 (0.67-1.09)	0.2075
Ileus	16.9 vs. 11.5	1.49 (1.30-1.72)	<.0001
Dehiscence	1.1 vs. 1.1	0.78 (0.50-1.22)	0.2792
Readmission	10.4 vs. 9.8	1.03 (0.88-1.20)	0.4106
Ventilation >48h	3.4 vs. 1.3	3.47 (2.43-4.98)	<.0001
Pulmonary Embolism	0.72 vs. 0.61	0.88 (0.51-1.52)	0.641
Re-intubation	2.5 vs. 1.1	2.49 (1.66-3.75)	<.0001

* Reported data is percentage. ¥: Mean ±SD. SSI indicates surgical site infection; CI, Confidence Interval, LOS, Length of stay, OR, Odds ratios (for 0/1 outcomes) are reported for right-sided colectomy relative to left-sided colectomy. (Multivariate analyses adjust for gender, age, BMI, DM, HTN, COPD, preoperative sepsis, preoperative albumin level, steroid use, chemotherapy use, operative indication, ASA scores, elective/emergent and approach of the surgery (open, laparoscopic, robot), construction of omental flap or stoma creation during surgery, and operative time.)

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A COMPARISON BETWEEN THE RATES OF ANASTOMOTIC LEAKS IN PATIENTS UNDERGOING ROBOTIC AND LAPAROSCOPIC COLORECTAL SURGERY.

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Purpose: Robotic colon and rectal surgery is a fairly recent technology that is becoming increasingly popular during recent years. However, there is still not enough data in regards to its safety and whether it is superior or similar or inferior to laparoscopic colorectal surgery. Anastomotic leak is a devastating post-operative complication that can occur after colorectal surgery and is associated with both increased morbidity and mortality. Our primary aim was to determine whether there is a statistically significant difference in the rate of anastomotic leaks between elective robotic and laparoscopic colorectal surgeries involving colon and rectal resections.

Methods: A retrospective analysis was conducted on patients undergoing non-emergent elective colorectal surgeries using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database from 2012-2013. Eligible participants were patients undergoing non-emergent robotic and laparoscopic colorectal surgeries involving colon resection with anastomosis. Benign and malignant pathologies were included in this analysis. Patients who underwent concomitant diverting colostomies or ileostomies and cases which were converted to open procedures were excluded. The rate of anastomotic leaks was compared between both groups. Data was analyzed using SPSS Chi-Square test and Fisher's Exact test to compare proportions. Statistical significance was determined to be at $p<0.05$.

Results: 21,874 patients were included in this study. Patients with incomplete data were excluded. A total of 21,215 patients and 659 patients underwent laparoscopic and robotic surgery for benign and malignant colon and rectal disease requiring resection with anastomosis. The rate of laparoscopic and robotic anastomotic leaks was 3.6% and 4% respectively. There was no statistically significant difference between the rate of anastomotic leaks between laparoscopic and robotic colorectal surgeries ($X1=0.208$, $p=0.648$). This difference remained non statistically significant when comparing laparoscopic and robotic anastomotic lake rates ($P>0.05$).

Conclusions: Robotic surgery appears to be a safe new technology in regards to anastomotic complications when compared to laparoscopic surgery in patients undergoing colon and rectal resections for benign and malignant pathologies. Further studies are needed to determine specific variables affecting morbidity and mortality in between both groups.

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RISK FACTORS ASSOCIATED WITH POSTOPERATIVE MORBIDITY IN OVER 500 COLOVESICAL FISTULA PATIENTS UNDERGOING COLORECTAL SURGERY.

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Purpose: Colovesical fistula is often symptomatic and requires surgical repair. Data on predictors of outcome is limited. The aim of this study was to evaluate the impact of various patient characteristics and treatment factors on 30-day postoperative morbidity in patients who underwent colorectal surgery for colovesical fistula in a nationwide setting.

Methods: Patients who underwent colorectal surgery for colovesical fistula between 2005 and 2013 were identified from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database by using primary and secondary procedure current procedural terminology codes. Patients with colovesical fistula attributed to diverticulitis, colorectal cancer, and Crohn's disease were analyzed. Patients were excluded, if the diagnosis was not clear or if surgery included procedures unrelated to colovesical fistula (Out of 1642, only 512 patients were included in our data). Demographics, preoperative, and operative factors were assessed and compared between two groups classified according to the presence or absence of postoperative complications. Further multivariate logistic regression analysis was conducted.

Results: 512 patients met the inclusion criteria [mean age of 61.4 (±14.7) years, female 214 (42%)]. Etiology of fistula was diverticulitis (85.5%), colon cancer (7.6%), and Crohn's disease (6.8%). 29.7% (N=152) of the procedures were performed laparoscopically. 149 (29.1%) patients had at least one postoperative complication within 30 days. In 186 (36%) patients, no bladder resection or repair was performed. Table summarizes the results of univariate analysis for risk factors. Type of colonic procedure ($p=0.06$), steroid use ($p=0.86$), and body mass index ($p=0.46$) were similar between the groups. Independent risk for 30-day morbidity were increased age [Odds Ratio (OR): 1.23 (1.03-1.47), $p=0.01$], decreased preoperative hematocrit level [OR: 3.04 (1.83-5.06), $p<0.0001$], and an open surgical approach [OR: 2.56 (1.35-4.84), $p=0.003$].

Conclusions: Morbidity in surgery for colovesical fistula remains high. Lower preoperative hematocrit level and increased age were associated with higher risk of complication. Laparoscopic surgery may preferable when it is possible as morbidity is less with this approach. In patients whose bladder site was not addressed had similar outcome as the cohort.

Comparison of demographics, preoperative and operative characteristics between the groups

	Overall (N = 512)	Morbidity (-) (N= 363)	Morbidity (+) (N= 149)	P-value
Age, year	61.4 ±14.7	59.6 ±14.6	65.7 ±14.2	<0.001
Gender*				<0.001
- Female	214 (42.0)	141 (65.9)	73 (34.1)	
- Male	295 (58.0)	220 (74.6)	75 (25.4)	
BMI*	28.6 ±6.9	28.8 ±6.9	28.2 ±7.1	0.46
Steroid use				0.86
- Yes	43 (8.4)	30 (69.8)	13 (30.2)	
- No	469 (91.6)	333 (71.0)	136 (29.0)	
Transfusion				0.02
- Yes	7 (1.4)	2 (28.6)	5 (71.4)	
- No	505 (98.6)	361 (71.5)	144 (28.5)	
Emergency				<0.001
- Yes	29 (5.7)	11 (37.9)	18 (62.1)	
- No	483 (94.3)	352 (72.9)	131 (27.1)	
ASA classification				<0.001
- No disturb (Class I)	19 (3.7)	15 (78.9)	4 (21.1)	
- Mild disturb (Class II)	228 (44.5)	183 (80.3)	45 (19.7)	
- Severe disturb (Class III)	229 (44.7)	150 (65.5)	79 (34.5)	
- Life threat (Class IV)	36 (7.0)	15 (41.7)	21 (58.3)	
Approach				<0.001
- Laparoscopic	152 (29.7)	131 (86.2)	21 (13.8)	
- Open	360 (70.3)	232 (64.4)	128 (35.6)	
Diagnosis				0.007
- Diverticulitis	438 (85.5)	314 (71.7)	124 (28.3)	
- Cancer	39 (7.6)	20 (51.3)	19 (48.7)	
- Crohn's Disease	35 (6.8)	29 (82.9)	6 (17.1)	
Preoperative Hematocrit*	38.3 ±6.0	39.3 ±5.5	35.8 ±6.5	<0.001
Preoperative Albumin* (g/dL)	3.5 ±0.71	3.6 ±0.65	3.3 ±0.77	<0.001

Values are reported as mean ±SD or absolute values (%). *Data was not available for all subjects. Missing values: Gender: 3, BMI: 3, Preoperative hematocrit: 20, Preoperative albumin: 161.

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THE OUTCOME OF DIFFERENT RECTAL CANCER SURGICAL APPROACHES ON THE TOTAL MESORECTAL EXCISION AND CIRCUMFERENTIAL RADIAL MARGIN.

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Purpose: The quality of pathologic rectal cancer specimens has significant importance in surgical outcomes and may serve as a future quality marker for rectal cancer surgery. It is not clear however, if newer minimally invasive techniques, which have been shown to be more costly and perhaps less morbid, make a significant impact on the quality of surgical dissection.

Methods: We retrospectively reviewed 6 years of rectal cancer resections from a single institution. Cases were classified based on surgical approach (open, laparoscopic, robotically-assisted and converted to open). Perioperative variables were collected including, procedure performed, stoma creation, operative time, ASA score, body mass index (BMI), Charlson co-morbidity index, length of stay, and presence of intra- or post-operative complications (based on the Clavien-Dindo grading score). Statistical analysis was performed to ascertain which perioperative variables were more likely associated with the pathologic outcomes of intactness of the total mesorectum excision (TME) and circumferential radial margin (CRM).

Results: We identified 226 patients who underwent surgery for rectal cancer from 2008 to 2014. There were significant differences between surgical groups in terms of distribution of male gender (p=0.013) and sphincter preservation (p=0.026). There was no statistical difference in the rate of close (p=0.58) or positive (p=0.52) circumferential margins between groups. Intactness of the mesorectum was not graded in 13 specimens (6%). The distribution of mesorectal intactness grading did not statistically differ between operative approaches (p=0.42).

Conclusions: In our study population, surgeon selection resulted in comparable pathologic outcomes regardless of surgical approach. A better understanding of surgeon selection will be beneficial in the future to direct patients and surgeons toward the optimal rectal cancer surgery approach.

Table TME

Procedure	Number	Male	BMI	Sphincter Sparing (%)	TME grade (1-2)	CRM <5mm	(+) CRM
Open	98	66%	28.1%	63%	66%	29%	10%
Laparoscopic	71	54%	29.7%	83%	50%	25%	7%
Robotic	31	77%	27.2%	81%	52%	21%	13%
Converted	26	85%	28.9%	65%	66%	32%	17%

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EARLY ENDOSCOPIC TREATMENT OF THE ANASTOMOTIC HEMORRHAGE IN COLORECTAL SURGERY.

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Purpose: Postoperative hemorrhage from the anastomosis in colorectal surgery is not an unsusual complication. In most of cases is a limited mild hemorrhage, revealed as a rectal bleeding, more or less important, during the starting postoperative hours. Most of cases are resolved with conservative treatment (limited rectal bleeding), but in cases with more serious hemorrhage is necessary to perform an active treatment, including endoscopic review and therapeutics. The aim of the study is to present colonoscopy as a therapeutic tool in this complication from our experience.

Methods: Prospective study including 7 years (from January 2008 to April 2015). In this period we performed a total of 562 colectomies with primary anastomosis (494 elective surgery and 68 emergency surgery), including stapled and handmade sutures.

Results: We included a total of 562 colectomies (77% (n=431) were performed by laparoscopic approach). In 4.8% of them, postoperative rectal bleeding was observed (n=27). In 16 (2.8%) of these cases (59%) endoscopic review was required during the first 72 postoperative hours, performing hemostasis in the suture line with adrenaline, clips or both. In all cases we achieved right and definitive hemostasis. There were no cases of anastomotic leak, the most serious complication, in patients with rectal bleeding and early endoscopic review.

Conclusions: Early endoscopic review of the anastomosis in colorectal surgery, well indicated and if necessary, is a useful, reliable and safe technique, and, in our experience, there are not more complications and morbidities.

P402

APPROPRIATE MANAGEMENT OF INTRA-OPERATIVE AIR LEAK DURING LEAK TESTING FOR LEFT-SIDED COLORECTAL ANASTOMOSES.

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Purpose: There is a lack of evidence to guide decision-making in the setting of air leak during intra-operative leak testing. To help inform this process, we evaluated whether suture repair is non-inferior to diversion or re-anastomosis in the setting of air leak during intra-operative leak testing of left-sided colorectal anastomoses.

Methods: Patients with an air leak on intra-operative leak testing were identified from a prospectively maintained institutional database. This database includes pre-operative demographic factors, operative details and findings, as well as 30-day post-operative outcomes such as clinical anastomotic leak. We evaluated the rate of successful anastomosis in patients who underwent suture repair after air leak on intra-operative leak testing in comparison to a predetermined institutional anastomotic success rate of 97%. Given that preliminary data revealed a higher leak rate with suture repair, we powered our study at the 90% level to detect non-inferiority at an alpha level of 0.05 with a non-inferiority margin of 10%.

Results: There were a total of 119 intra-operative air leaks in patients undergoing left-sided colorectal anastomoses. The overall clinical leak rate in this group of patients was 5% (6/119). The mean age of patients was 58±12 years with 54 males and 65 females. Among the 119 patients with an air leak, 68 patients underwent suture repair alone with 6 clinically significant post-operative leaks (6/68, 9%). 51 patients underwent repair plus

diversion or re-anastomosis with no clinically significant post-operative leaks (0/51, 0%). Post-operative clinical leak was not associated with donut integrity, suture method (complete reinforcement, single suture), previous operations, number of associated procedures, or air leak location; however, clinical leak was more common in patients following multiple attempts at suture repair. The overall difference in constructing a successful anastomosis was 9% with a 95% CI of 0.15 to 0.02 for suture repaired anastomosis (91%) as compared to a diverted or redone anastomosis (100%). Given that the a priori inferiority margin of 10% is within the 95% confidence interval of the overall difference in success, we cannot conclude non-inferiority of suture repair.

Conclusions: With appropriate statistical power, suture repair alone does not meet non-inferiority criteria for the management of air leak detected during intra-operative leak testing in patients undergoing left-sided colorectal anastomoses. We cannot recommend suture repair alone as an appropriate method of repair in the setting of an intra-operative air leak.

P403

IMPACT OF PREVIOUS ABDOMINAL SURGERY ON PERIOPERATIVE SURGICAL OUTCOMES IN LAPAROSCOPIC AND ROBOTIC COLORECTAL SURGERY.

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Purpose: When performing a laparoscopic or robotic surgery, previous abdominal surgery (PAS) history might add technical difficulties. However, the impact of PAS on surgical outcomes in laparoscopic and robotic colorectal surgery were inconclusive. This study aimed to investigate the impact of PAS on perioperative recovery outcomes on laparoscopic and robotic colorectal surgery.

Methods: From March 2007 to February 2014, a total 612 and 238 patients underwent a laparoscopic surgery and a robotic surgery, respectively. Each group was divided into previous abdominal surgery history (PAS group) and those without it (NPAS group). Clinicopathologic characteristics and perioperative outcomes were compared between PAS and NPAS group in laparoscopic and robotic group, respectively.

Results: Female was predominant in PAS group both in laparoscopic and robotic group ($p < 0.001$). There was no difference of clinicopathologic difference between PAS and NPAS group. Open conversion rate, operation time and blood loss was not different between the two groups in laparoscopic and robotic group. Postoperative courses, such as days to take soft diet and length of hospital stay were not affected by PAS in both laparoscopic and robotic group. Overall complication rate did not differ between the PAS and NPAS group, respectively.

Conclusions: PAS did not jeopardize the perioperative outcomes in both laparoscopic and robotic surgery group. PAS should not be regarded as an absolute contraindication for robotic colorectal surgery, as well as laparoscopic colorectal surgery.

P404

SHOULD ENTEREG BE ADMINISTERED FOR LOOP IIEOSTOMY CLOSURES TO ENHANCE EARLIER RECOVERY?

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Purpose: Entereg (Alvimopan) has been shown to facilitate earlier recovery in gastrointestinal function after bowel resections by its antagonistic action on opioid receptors. In the literature, there are very few studies on its role in enhanced recovery protocols with loop ileostomy closures. The purpose of this study was to determine its overall benefit in gastrointestinal recovery after a loop ileostomy closure.

Methods: A retrospective review was completed on all patients who underwent loop ileostomy closure from April 2013 to March 2015. Patients requiring a midline laparotomy to facilitate closure were excluded from the study. Patients were grouped into those receiving the standard perioperative Entereg dosing, estimated return of bowel function, and hospital length of stay and then compared. Other data points used were age, recent history of narcotic use, and post-operative morbidity.

Results: At total of 99 patients met the requirements for this study, 74 of them in the Entereg group. There was no statistically significant difference in age or recent history of narcotic use between the two groups. Patients in the Entereg group had a significantly shorter time to a bowel movement (2.45 vs 3.17 days, p= 0.002), flatus (1.56 vs 2.22 days, p= 0.0002), and hospital length of stay (3.24 vs 3.92 days, p= 0.001). There were no significant differences in post-operative morbidities.

Conclusions: Perioperative Entereg use in patients undergoing loop ileostomy closures significantly accelerated post-operative gastrointestinal recovery in our patients. The use of Entereg appears to be beneficial in enhanced recovery protocols for loop ileostomy closures, however, further randomized control trials are needed.

P405

WHAT IS THE IMPACT OF OPERATIVE TIME ON ADVERSE EVENTS FOLLOWING COLORECTAL SURGERY.

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Purpose: There are few data evaluating the impact of operative time on colorectal surgery outcomes. We hypothesized that prolonged operative time is associated with increased 30-day adverse events following routine colorectal surgery procedures.

Methods: We conducted a retrospective cohort study with data from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) from January 2005 through December 2012. First, we identified patients who underwent either right colectomy, partial colectomy, or colorectal anastomosis below the peritoneal reflection using standard CPT codes and excluded patients who had concomitant formation of diverting or end stoma. Then we categorized operative time into short, average, and long based on mean operative times +/- one standard deviation. Last, we used NSQIP approved multivariate models to identify associations between operative time and 30-day adverse events.

Results: We identified 113,615 patients who underwent a colorectal resection of whom 53,478 (46%) underwent a laparoscopic procedure. A total of 14,054 patients (12%) underwent operative procedures that were characterized as "long" by operative time. We noted no difference in work relative value units for "long" operative times 24.9 ± 3.4 as compared to average operative times 24.7 ± 3.4. Patients with "long" operative times had 34% more superficial surgical site infections, 65% more organ space infections, 69% more abdominal dehiscence occurrences, 44% more venous thrombotic complications, 45% more urinary tract infections, 40% more returns to the operating room, and 36% more cases of prolonged length of stay ($p<0.05$ for all analyses) as compared to patients with average operative times. The multivariable analysis revealed an association between cases with "long" operative times and increased adverse events despite adjustment for all NSQIP recommended covariates (Table).

Conclusions: Our results reveal increased 30-day adverse events with increased operative time even after adjusting for work relative value units. We propose that operative time may serve as a proxy for surgical complexity in colorectal surgery.

Adverse Event	Odds Ratio	Confidence Interval	p Value
Superficial SSI	1.3	1.2-1.4	0.0001
Organ Space Infection	1.5	1.4-1.6	0.0001
Abdominal Dehiscence	1.6	1.4-1.7	0.0001
Venous Thrombosis	1.5	1.3-1.6	0.0001
Urinary Tract Infection	1.5	1.4-1.6	0.0001
Return To The OR	1.4	1.3-1.5	0.0001
Prolonged LOS	1.9	1.8-2.0	0.0001

P406

CT PELVIMETRY: APPLICATION TOWARD LAPAROSCOPIC LOW ANTERIOR RESECTION FOR RECTAL CANCER.

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Purpose: Surgery for rectal cancer is notorious for having increased technical difficulties due to the confines of pelvic dimensions. Well-known predictive factors associated with difficult low anterior resections consist of low-lying tumors, higher T-stage of tumor, use of neoadjuvant therapy, and higher body-mass index (BMI). Intuitively, pelvic dimensions play a role in characterizing the difficulty of rectal surgery; however there is no consensus of which dimensions significantly affect the overall technicality and/or surgical outcomes. The aim of this study is to define which anatomic pelvic dimensions are predictive of increased operative difficulty.

Methods: A retrospective analysis of 51 patients who underwent a laparoscopic low anterior resection with double stapling technique and diverting loop ileostomy for rectal cancer. Procedures were performed at New York Presbyterian-Queens Hospital by the same colo-rectal surgical team from the year 2011 to 2015. Independent variables characterized are patient age, gender and BMI. Dependent variables used to measure operative difficulty include total operative time (minutes), estimated blood loss (mL), and total amount of lymph nodes collected in specimen. Nine different pelvic dimensions were measured using three dimensional reconstruction of spiral computed tomography (CT). Measurements include: Interspinous and intertuberous diameter, anteroposterior diameter of pelvic inlet and outlet, diameter of upper pubis to coccyx, sacrococcygeal distance, depth of sacral curvature, height of pubis, and sacrococcygeal-pubic angle. Univariate and multivariate statistical analysis was performed to identify any significant correlation between pelvic dimensions and the dependent variables.

Results: Women had a wider pelvis than men when comparing interspinous and intertuberous diameter (P<0.0001), however the sacrococcygeal-pubic angle was greater in men (P<0.05). Regardless, this increase in pelvic width and smaller angle did not have a significant effect on operative time, estimated blood loss, or total amount of lymph nodes obtained in resected specimens. The total number of lymph nodes collected with the specimen was notably increased with a greater sacrococcygeal distance (P<0.05), whereas an increase in height of the pubis had reduced the number of lymph nodes (P<0.0005). Operative time was significantly decreased with a larger anteroposterior diameter of the pelvic outlet (P<0.05), but was increased with a larger depth of sacral curvature (P<0.05). There was no explicit pelvic dimension that correlated with a significant change in estimated blood loss.

Conclusions: CT pelvimetry provides an essential tool to assist in preoperative assessment of technical surgical difficulty in laparoscopy. This study shows that there are specific pelvic dimensions associated with a more successful oncologic resection as well as a decrease in overall operative time.

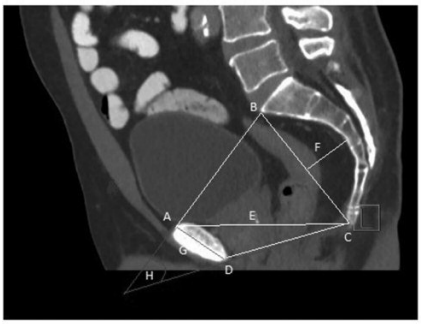

Figure 1- Mid-sagittal image of pelvis with measured dimensions.

AB, anteroposterior diameter of pelvic inlet. BC, sacrococcygeal distance. CD, anteroposterior diameter of pelvic outlet. E, diameter of upper pubis to coccyx. G, height of pubis. F, depth of sacral curvature. H, sacrococcygeal-pubic angle.

P407

IS THE VARIABILITY IN SURGICAL RESECTION RATES FOR DIVERTICULITIS RELATED TO THE AVAILABILITY OF SURGEONS?

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Purpose: Indications for surgery are not standard in diverticulitis treatment leading to potential significant variability. We sought to evaluate geographic variability in surgical resection rates for diverticulitis while identifying potential explanations for the hypothesized variability.

Methods: We designed a retrospective review of all-payer hospital discharge data from 20 U.S. states. Using standard ICD-9 codes, we identified patients with discharges for uncomplicated and complicated diverticulitis as well as elective surgical resection or any surgical resection (both elective and urgent) at the patient county of residence level. Next, we identified factors associated with high surgical resection rates by merging the county data resection rates with diverticular disease burden rates, surgeon distribution data from the American Board of Medical Specialties, U.S. Census data, and the Dartmouth Atlas of Healthcare Resource Files.

Results: We identified 362,401 total inpatient discharges coded with a primary or secondary diagnosis of diverticulitis in a total population of 137,793,346 living in 687 counties. Among this total, 326,437 (90%) had uncomplicated diverticulitis and 35,964 (10%) had complicated disease. A total of 80,546 diverticular resections were performed (22.7%), 18% of all uncomplicated diverticulitis discharges and 64% of all complicated diverticulitis discharges. At the county level, resection rates varied considerably for both complicated and uncomplicated disease. In fact, mean total resection rates varied among sampled counties from a low of 2% to a high of 50% of all patients with diverticulitis. Multivariate analysis revealed no association between resection rates (total or uncomplicated) with county level diverticular disease burden. However, there was an association between increased surgeon availability in a county and total diverticulitis resection rate as well as the uncomplicated resection rate (p<0.05).

Conclusions: Geographic variation in resection rates for diverticulitis may be influenced by the availability of surgeons in the local area. These results indicate that diverticulitis treatment may be an area for both underutilization as well as overutilization of surgical care. Guidelines for surgical intervention are needed to standardize diverticulitis treatment.

P408

OPTIMIZING COLORECTAL SURGERY OUTCOMES: WHAT IS THE CONTRIBUTION OF SURGEON SPECIALTY?

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Purpose: There is intense pressure to deliver high value surgical care by optimizing patient outcomes and reducing costs. Surgical site infections (SSIs) are the leading morbidity after colorectal surgery. A small subset of colorectal surgery in the United States is done by gynecologists largely as part of the treatment for ovarian cancer. At our institution, following successful efforts in colorectal surgery which resulted in a 59.3% reduction in SSIs, collaborative efforts between colorectal and gynecologic oncology surgeons to standardize best practice processes (mechanical bowel preparation with oral antibiotics among others), has resulted in a 71.2% reduction in SSI for gynecologic oncology patients undergoing concurrent colorectal procedure. Therefore, we designed a study to determine the impact of the surgeons specialty on morbidity after colorectal surgery to determine if broader, national, transdisciplinary collaboration may be an effective strategy for further improving outcomes of patients undergoing colorectal surgery.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (2006-2013) was used to identify female patients undergoing elective colorectal surgery with a diagnosis of a solid organ malignancy. The primary surgeon specialty was categorized as either general (general, colorectal or surgical oncologist) or gynecologic. Logistic regression was used to analyze patient and procedure factors in cases with and without SSIs.

Results: 116, 729 patients were identified as undergoing colorectal surgery for a solid organ malignancy, of these, 114,329 were operated on by general surgeons and 2,400 by gynecologists. Patients operated on by gynecologists were younger (67.3 vs 64 yrs, p<0.05), more likely to have contaminated/dirty wounds (9.22% vs 12.29%, p<0.05), be more complex (ASA 3/4 57.2% vs 61.9%, p<0.05), have longer mean operative time (165.9 min vs 263.9 min, p<0.05), less likely to receive preoperative radiation (5.61% vs 2.60%, p<0.05) but more likely to receive preoperative chemotherapy (3.22% vs 10.87%, p<0.05). The unadjusted rate of SSIs was higher for cases performed by gynecologists (superficial: 6.75% vs 9.25%, p<0.05; organ space: 3.42% vs 7.96%, p<0.05). On multivariate analysis, patients operated on by gynecologists remained more likely to have SSIs than their general surgery counterparts [superficial SSI: OR: 1.17 (1.01-2.36), organ space SSI: OR: 1.58 (1.34–1.85)].

Conclusions: Although gynecologists only perform a small subset of colorectal surgery procedures, their patients are at higher risk of developing SSIs, especially organ space SSIs. Further study is needed to understand if this is related to a gap in translating best practice evidence into practice or surgical technique. Based on our experience, we believe that transdisciplinary collaborative efforts between the two specialties is a first step to optimizing patient outcomes.

Patient/Procedure Factor	Superficial SSI Odds Ratio (Confidence Interval)	Organ Space SSI Odds Ratio (Confidence Interval)
Gynecologic Surgeon	1.17 (1.01 - 1.36)	1.58 (1.34 - 1.85)
ASA 3	1.53 (1.24 - 1.89)	1.98 (1.48 - 2.65)
ASA 4	1.48 (1.17 - 1.86)	1.79 (1.30 - 2.47)
Diabetes	1.10 (1.04 - 1.17)	0.96 (0.88 - 1.06)
Obesity (BMI > 30)	1.71 (1.61 - 1.82)	0.95 (0.87 - 1.03)
Operative time (>75% percentile; 208 minutes)	1.52 (1.42 - 1.63)	2.50 (2.26 - 2.76)
Wound Class: Clean/Contaminated	1.88 (1.37 - 2.58)	0.95 (0.69 - 1.31)
Wound Class: Contaminated	2.63 (1.89 - 3.64)	1.53 (1.09 - 2.15)
Wound Class: Dirty/Infected	2.55 (1.82 - 3.58)	2.49 (1.76 - 3.51)

Table 1: Independent Predictors Superficial and Organ Space SSI after Colorectal Surgery for Solid Organ Malignancy

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DIFFUSION OF TECHNOLOGY: TRENDS IN ROBOTIC-ASSISTED COLORECTAL SURGERY.

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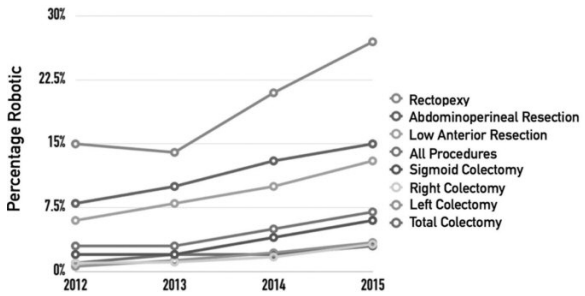
Purpose: Increased utilization of robotic-assisted colorectal surgery (RACS) has been identified following FDA approval in 2000. This study aims to identify recent trends in utilization and cost of RACS in the United States.

Methods: The University HealthSystem Consortium (UHC) database was queried for adult patients who underwent robotic-assisted procedures between October 2011 and September 2015 (fiscal year 2012 to 2015) using the ICD-9 procedure code 17.4. Results were narrowed to the 7 most commonly performed procedures on the colon and/or rectum. We identified the number of procedures, percentages of the selected procedures performed robotically, RACS procedures per hospital, sociodemographic and clinical characteristics, and average total hospital costs per year.

Results: A total of 7,100 RACS patients were identified from 2012 through 2015. Their average age was 58 years, and they were 50% male, 79% white, 53% privately insured, 53% with a minor severity of illness score, and 29% with one medical co-morbidity. The most prevalent co-morbidities were hypertension, diabetes, COPD, and obesity. The RACS procedures performed were low anterior resection (LAR) (33%), sigmoid colectomy (23%), abdominoperineal resection (APR) (15%), right colectomy (13%), rectopexy (8.3%), left colectomy (3.7%), and total colectomy (3.7%). The total number of RACS procedures increased by 158% (1,011 to 2,605) and the percentage of the identified procedures done robotically increased from 2.6% to 6.6% over the study period (Figure 1). The average total cost per procedure was $23,340 ranging from $14,858 for rectopexy to $27,773 for total colectomy. The majority of rectal resections (79%) were performed for rectal cancer. Volumetric data demonstrates that RACS is increasing over time in both the number of centers performing the procedures (105 to 140) as well as the average number of procedures per center per year (6 to 12). The procedure volume cut-off for the 99th percentile increased from 42 to 93 over the study period.

Conclusions: The practice of RACS is rapidly increasing in both overall number and percentage of all procedures done. The expansion of RACS can be explained by both an increasing number of centers performing procedures as well as an increase in development of high-volume centers. Furthermore, based on this dataset, RACS appears to be performed more frequently on white, privately insured and otherwise healthy patients. Further studies are required to compare outcomes, specifically in rectal cancer, and costs of RACS compared to other approaches in order to determine cost effectiveness.



Trends in procedures performed with robotic assistance from 2012 to 2015 (n=7,100 colorectal procedures)

P410

MAKING THE CASE FOR LIGHTED URETERAL STENTS IN LAPAROSCOPIC COLORECTAL SURGERY.

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Purpose: Prevention of iatrogenic injury is paramount to the improvement of any surgical field. Ureteral injuries during colorectal surgery are often discussed, albeit rarely encountered, ranging in the literature from 0.28-7.6%. Much debate surrounds the use of prophylactic lighted ureteral stents to help identify and protect the ureter during laparoscopic colorectal surgery. Large series have suggested that while these stents help to identify injuries at time of surgery, they do not necessarily prevent an injury from occurring. However, if these stents can be placed safely and without post-operative complication, any reduction in ureteral injury should warrant their use.

Methods: The study was a retrospective search through the case logs of two board certified colorectal surgeons at Monmouth Medical Center in Long Branch, New Jersey. From January 2010 through June 2015, every laparoscopic or robotic-assisted colectomy involving ureteral stents was searched. Researchers documented any injury to the ureter intraoperatively, whether it was due to catheter insertion or during the course of surgery. The chart was also reviewed for the complications of urinary tract infection (UTI) and urinary retention post-operatively.

Results: During the 66 months, 402 laparoscopic colon resections were done. Of the 402 cases, 139 were performed for cancer while 263 were for benign disease. There were no ureteral injuries resulting from the cystoscopic catheter insertion or intraoperatively. The lighted ureteral stent was identified during every case in the effort to prevent injury during dissection and resection. No catheter associated urinary tract infections (CAUTI) were identified, while 14 (3.5%) suffered from post-operative urinary retention.

Conclusions: Although ureteral injury is a rare event in colon surgery, it potentially carries high morbidity and mortality. Studies have shown that ureteral injury results in longer length of stay, hospital cost, and overall mortality. The authors of this study present a large series of colon resections over a five and a half year period with no intraoperative ureteral injuries. In addition, the added procedure of insertion of these catheters was associated with no UTIs and a rate of urinary retention similar to that of the at large data. The identification of ureters whether by palpation or via lighted ureteral stents is crucial in their protection during dissection and resection. This series provides compelling data to use lighted ureteral stents during laparoscopic colon surgery.

P411

COLORECTAL SURGERY MAY BE SAFELY PERFORMED IN PATIENTS WITH SOLID ORGAN TRANSPLANTS.

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Purpose: Colorectal surgery is performed on increasingly complex patients. Among those are solid organ transplant patients who are living longer on immunosuppressive anti-rejection medications. It is unclear how these high-risk patients recover after such surgeries. We hypothesized that transplant patients would have more severe postoperative complications following colorectal resections.

Methods: We identified all patients with a history of solid organ transplant who underwent primary colorectal resections between 2006 and 2015 at a single, high-transplant volume institution. Transplant patients were matched 1:1 to non-transplant patients on age, gender, resection type, indication, surgical approach, and emergency case status. Primary outcome of interest was 30-day postoperative complications. Complications were assigned a severity score using the revised Accordion grading system; Accordion grades 1-2 were classified as mild/moderate and grades 3-5 represented severe complications. Patients were categorized by the highest severity complication experienced and differences between groups were evaluated with chi-square and fisher exact tests.

Results: Of 35 transplant patients who underwent colorectal resections, we matched 31 (88.6%) to patients without a history of transplantation. Transplants included renal (n=14), liver (n=7), lung (n=5), heart (n=2), liver/renal (n=1), and renal/pancreas (n=2). The median time between transplantation and colorectal procedures was 6 years (IQR: 2-13 years) and the indication for colorectal resection was most often for cancer (41.9%) followed by benign disease (29.0%), diverticulitis (19.3%), and inflammatory bowel disease (9.7%). An open approach was used in 71.0% of patients and 32.3% of operations were performed under emergent settings. Postoperative complication rates and severity varied between transplant and non-transplant patients: no complication occurrence (41.9% vs 64.5%; p=0.07), mild/moderate complication (45.2% vs 16.1%; p=0.01), severe complication (12.9% vs 12.9%; p=1.00), and death (0.0% vs 6.4%; P=0.49) (Table 1). The highest severity complication in transplant patients was frequently gastrointestinal (25.8%) which included postoperative ileus, small bowel obstruction, or malnutrition. Pulmonary (13.3%) reasons were most common in non-transplant patients.

Conclusions: Transplant patients who undergo colorectal procedures have higher rates of mild/moderate postoperative complications but no difference in severe complications or death compared to non-transplant patients. These findings support the safety of colorectal surgery in the transplant population. Additionally, variations in complication profiles must be considered in the era of publically reported outcomes and can be used to identify unique targets for quality improvement in transplant patients.

	Prior Transplant		No Transplant		
Highest Complication Severity	n	%	n	%	p-value
No Complication	**13**	**(41.9)**	**20**	**(64.5)**	0.07
Mild/Moderate	**14**	**(45.2)**	**5**	**(16.1)**	0.01
Gastrointestinal	7	(50.0)	2	(40.0)	
Pulmonary	1	(7.1)	0	(0.0)	
Wound	2	(14.3)	2	(40.0)	
Other	4	(28.6)	1	(20.0)	
Severe	**4**	**(12.9)**	**4**	**(12.9)**	1.00
Gastrointestinal	1	(25.0)	0	(0.0)	
Pulmonary	0	(0.0)	4	(100.0)	
Wound	2	(50.0)	0	(0.0)	
Other	1	(25.0)	0	(0.0)	
Death	**0**	**(0.0)**	**2**	**(6.4)**	0.49

P412

TRENDS IN LAPAROSCOPIC COLECTOMY FOR THE STATE OF FLORIDA: TIME TO SET A NATIONAL STANDARD.

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Purpose: Overall adoption of laparoscopic colectomy has been slow in the US with recent data reporting rates up to only 31%. We sought to examine rates in Florida, which includes the second largest Medicare beneficiary population, and identify factors associated with utilization in order to develop a strategy for national improvement. We hypothesize that disparities in usage persist and support a formalized training initiative to make laparoscopic colectomy the standard of care.

Methods: We performed a review of the Agency for Health Care Administration Florida Hospital Inpatient and Ambulatory Discharge Data for all colectomies performed from 2010-2014 as categorized by ICD9. We included all patients >15 yrs old who underwent colectomy, exclusive of appendectomy or perineal proctectomy, and compared cohorts. The 2014 cohort was further evaluated by patient demographics, diagnosis, admission and discharge type, and surgeon and hospital colectomy volume. A training program focused on safe adoption of laparoscopy was developed to address deficiencies with consideration for state and national policy constraints.

Results: 17,729 and 15,644 colectomy cases were analyzed in 2010 and 2014, respectively. Colectomies in 2014 were performed at 195 hospitals by 950 surgeons across the state. Overall rate of laparoscopy increased from 36.3% in 2010 to 39.9% in 2014. This rate increased to 57.8% for elective colectomies alone (17.2% for emergencies). Significant characteristics associated with laparoscopy included Asian and Hispanic ethnicities and diagnosis of neoplasia or diverticular disease. Black ethnicity and age >70 were associated with decreased rates of laparoscopy. The rate of laparoscopy increased for both increasing surgeon volume as well as hospital volume of colectomies. 73.5% of laparoscopies were performed by surgeons who performed >20 colectomies/yr. Surgeons who performed >50 colectomies/yr had a 59.6% laparoscopy rate (35.6% for surgeons <50/yr; p<0.0001). Similarly, the rate of laparoscopy in hospitals with volume of >100 cases/yr was 67.3% (32.7% for hospitals <100/yr; p<0.0001). Table 1 summarizes data.

Conclusions: Rates of elective laparoscopic colectomy in Florida are beyond the most recently reported national average. However most colectomies are still performed open. Disparities persist for black and elderly patients. With national data demonstrating improvement in overall cost and patient outcomes, our findings indicate a remaining barrier to laparoscopic colectomy may be the steep learning curve coupled with lack of high individual surgeon volume. Effective national efforts to address low laparoscopic rates, such as the UK's LAPCO program, are warranted but unfeasible for the US. We propose a *simulation-plus-mentoring* training model to assist practicing surgeons safely overcome the learning curve and afford more colectomy patients the benefits of a minimally invasive approach.

Table 1: Percent laparoscopic approach by subcategory and odds ratio within categories for a given reference group.

	Open	Laparoscopic	% Lap*	OR (95% CI)	*P*
total n=15644	n=9399	n=6245	39.9%		
Colon Segment					
Cecum	258	195	43.0%	1.09 (0.90-1.32)	0.3813
Right	2934	2420	45.2%	1.19 (1.10-1.28)	<0.0001
Transverse	356	213	37.4%	0.86 (0.72-1.03)	0.1055
Left	1230	570	31.7%	0.67 (0.60-0.75)	<0.0001
Sigmoid (ref group)	3207	2223	40.9%	1.00	
LAR	189	30	13.7%	0.23 (0.16-0.34)	<0.0001
APR	242	223	48.0%	1.33 (1.10-1.61)	0.0033
Total	427	165	27.9%	0.56 (0.46-0.67)	<0.0001
Unspecified	556	206	27.0%		
Gender					
Male (ref group)	4337	2941	40.4%	1.00	
Female	5062	3304	39.5%	0.96 (0.90-1.03)	0.2431
Age					
16-30	240	154	39.1%	0.86 (0.70-1.06)	0.1518
31-50	1187	942	44.2%	1.06 (0.96-1.17)	0.2245
51-70 (ref group)	4039	3017	42.8%	1.00	
71+	3933	2132	35.2%	0.73 (0.68-0.78)	<0.0001
Ethnicity					
Asian	44	57	56.4%	1.93 (1.30-2.87)	0.0011
Hispanic	635	657	50.9%	1.83 (1.63-2.07)	<0.0001
White (ref group)	7864	5266	40.1%	1.00	
Black	1016	539	34.7%	0.79 (0.71-0.88)	<0.0001
Other/Unknown	475	383	44.6%		
Diagnosis					
Neoplasia	3678	3643	49.8%	3.98 (3.63-4.35)	<0.0001
-Malignant	3141	2509	44.4%		
-Benign/CIS	493	1049	68.0%	2.66 (2.36-3.00)**	<0.0001
-Unspecified	44	85	65.9%		
Diverticular Disease	2579	1850	58.2%	2.88 (2.61-3.18)	<0.0001
Other (ref group)	3187	794	19.9%	1.00	
Admission Type					
Elective (ref group)	3361	4598	57.8%	1.00	
Urgent	753	561	42.7%	0.54 (0.48-0.61)	<0.0001
Emergency	5188	1081	17.2%	0.15 (0.14-0.16)	<0.0001
Trauma Center	97	5	4.9%	0.04 (0.02-0.09)	<0.0001
Surgeon Case Volume					
0-10	1588	499	23.9%	0.53 (0.47-0.60)	<0.0001
11-20	2143	1132	34.6%	0.89 (0.80-0.98)	0.0231
21-30 (ref group)	2025	1203	37.3%	1.00	
31-40	1206	804	40.0%	1.12 (1.00-1.26)	0.0480
41-50	1003	762	43.2%	1.28 (1.14-1.44)	<0.0001
51-60	358	590	62.2%	2.77 (2.39-3.22)	<0.0001
61-70	303	340	52.9%	1.89 (1.59-2.24)	<0.0001
71-80	209	392	65.2%	3.16 (2.63-3.79)	<0.0001
81-90	65	101	60.8%	2.62 (1.90-3.60)	<0.0001
91-100	145	46	24.1%***	0.41 (0.29-0.56)	<0.0001
100+	110	289	72.4%	4.42 (3.51-5.57)	<0.0001
Hospital Case Volume					
0-50	1426	609	29.9%	0.66 (0.59-0.74)	<0.0001
51-100	2477	1432	36.6%	0.90 (0.82-0.98)	0.0164
101-150 (ref group)	2770	1784	39.2%	1.00	
151+	2711	2412	47.1%	1.38 (1.27-1.50)	<0.0001

* Percentage of laparoscopic approach for given subcategory.
**Odds ratio of laparoscopic approach for benign vs malignant neoplasm.
***Data for two surgeons; one performs only open colectomies.

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IMPACT OF MINIMALLY INVASIVE SURGERY ON OUTCOMES FOLLOWING SURGERY FOR RECTAL NEOPLASM WITHIN THE SETTING OF AN ENHANCED RECOVERY PROGRAM.

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Purpose: The use of minimally invasive surgery (MIS) for rectal cancer treatment has seen an uptick in recent years, although the oncologic integrity of laparoscopic resection has recently been called into question. Furthermore, enhanced recovery after surgery (ER) protocols have grown in popularity due to improved patient outcomes, such as length of stay (LOS), and ability to mitigate costs for patients and hospitals. The interaction of MIS within the setting of an ER protocol has not been fully examined. We sought to examine the impact of MIS and an ER protocol on outcomes after surgery for rectal neoplasm.

Methods: Patients at an academic institution undergoing elective surgical resection for rectal neoplasm between 2010 and 2015 were identified and linked with the National Surgical Quality Improvement Program (NSQIP) dataset. A retrospective study was undertaken for any open or MIS rectal neoplasms treated during the study period. MIS was defined as any laparoscopic or robotic procedure. An ER protocol was implemented in 8/2013. Univariate linear and logistic regression models were used to estimate the outcomes for open surgery (OS) or MIS on outcomes, including LOS, 30-day morbidity, and 30-day readmission.

Results: Among 289 patients in the entire study population, 239 (82.7%) patients underwent OS and 50 (17.3%) underwent MIS for rectal malignancy. Prior to ER implementation, only 6% underwent MIS, compared to 19.1% and 50.0% in the two subsequent years following ER implementation (p = 0.001). The majority of patients were male and Caucasian, 60.5%, and 88.7%, respectively, with a median age of 60. Patients receiving OS were significantly older compared to MIS patients (median age 60 vs. 57 (p=0.018). Median BMI was 27.5 and did not differ based on surgery type (p=0.17). Prior to ER implementation, the average LOS was 8.6 days (median 7 days, n=186) with 22.6% 30-day morbidity. Following ER implementation, patients receiving OS had an average LOS of 7.4 days (median 5 days, n=64) and 30-day morbidity of 15.6%. ER patients receiving MIS had an average LOS of 4.4 days (median 4 days, n=39) and 30-day morbidity of 10.2%. Univariate linear regression demonstrated MIS patients on an ER protocol had the shortest LOS, 4.2 days less than OS patients on a non-ER protocol (95% CI 2.09-6.26, p=0.0001). ER protocol and procedure type were not independent predictors of readmission or 30-day morbidity.

Conclusions: The combination of minimally invasive techniques and an ER protocol is significantly associated with reduced LOS for patients undergoing resection for rectal neoplasm. Further research is needed to determine which patients are best suited to MIS from an oncologic standpoint.

P414

PREDICTING READMISSION FOLLOWING COLORECTAL SURGERY.

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Purpose: 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. The objective of this study was to identify risk factors associated with 30-day readmission following colorectal surgery.

Methods: This is a retrospective, single institution review of individuals undergoing colorectal surgery between 2009-2014. Clinico-pathologic variables were analyzed using univariate and multivariate logistic regression models to predict readmission for patients.

Results: One thousand-eight patients were included in this study. One hundred forty-six (14%) were readmitted. Primary diagnoses for patients

included cancer (50.2%), inflammatory bowel disease (13.1%) and diverticular and other benign diseases (36.7%). The median age was 60.6 and the gender distribution showed a slight female predominance (52.2%). Length of stay was just over 4 days. On univariate analysis, creation of an ostomy, estimated blood loss, surgery duration, pre-operative steroid use, IBD, ICU stay, LOS, discharge destination and having a post-operative complication (major or minor) were significantly increased in the patients who were readmitted. Multivariate analysis showed that surgery duration, steroid use, LOS and having a major or minor complication were significantly associated with 30-day readmissions. Specific complications that were significantly associated with readmission included renal, bleeding, thrombo-embolic, skin and soft tissue infection, urinary tract infection (UTI) and Clostridium difficile infection. Patients with Clostridium difficile infection following surgery had a 10-fold increased risk for readmission while renal and UTI complications increased the risk 4-fold.

Conclusions: Postoperative complications, steroid use, increased LOS and increased operative time are predictors of 30-day readmission for patients undergoing major colorectal surgery. Patient gender, smoking, ICU stay and comorbidities were not found to affect readmission rates. Care should be taken to limit postoperative complications and to increase post-discharge surveillance for patients who have had complications in attempt to prevent readmission. Future direction for this study includes creating a model that predicts readmission with the variables that were found to be significant in this study.

P415

OUTCOMES FOLLOWING COLECTOMY IN OCTOGENERIANS WITH COLON CANCER AND THE NEED TO CREATE MORE ELECTIVE CASES.

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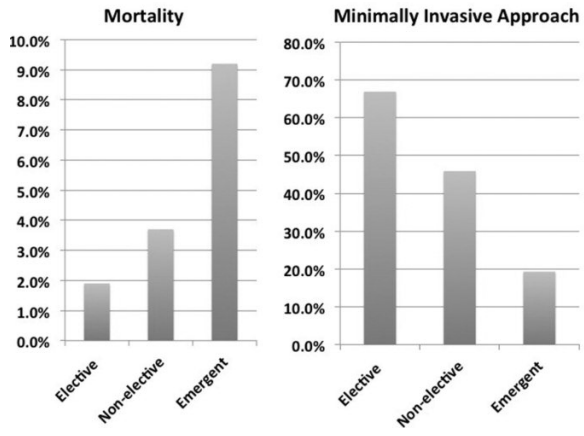
Purpose: The contemporary outcomes of elderly patients undergoing colectomy for colon cancer need to be determined and taken into consideration when screening recommendations are being established or revised. The aim of this study was to determine the proportion of octogenerians undergoing elective, non-elective, and emergent colectomy for colon cancer and to compare 30-day outcomes in these three groups.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database was used to compare outcomes in octogenarian patients with a diagnosis of colon cancer undergoing elective, non-elective, or emergent colectomy for the year 2013.

Results: A total of 1,191 pts were eligible for study - 66.0% underwent elective colectomy, 24.9% underwent non-elective surgery, and 9.1% underwent emergent surgery. The 30-day mortality rate was lowest in the elective group at 1.9%, increasing to 3.7% in the non-elective group, and 12.8% in the emergent group ($p < 0.001$). Length of stay was 5-6 days less in the elective group (7.47 days) then the non-elective group (13.89 days) and the emergent group (12.17 days, $p < .001$). A majority of the elective cases (66.9%) were able to be performed via minimally invasive approach but only 45.9% of the non-elective cases and 19.3% of the emergent cases were able to be performed minimally invasively ($p <.001$).

Conclusions: The mortality rate, length of stay, and the proportion of patients undergoing open surgery increases in octogenerians when they require non-elective or emergent colectomy for colon cancer. Up to one third of octogenerians undergoing colectomy for colon cancer are presenting in the non-elective or emergent setting which emphasizes the need for additional strategies to discover and treat more of these tumors in the elective setting. Given that the outcomes are favorable for octogenerians undergoing elective colectomy, this should be taken into consideration when determining screening guidelines for older patients.



Graph 1. Mortality rate and surgical approach for octogenerians undergoing colectomy for colon cancer based on presentation

P416

ADENOMA DETECTION RATE IN COLONOSCOPY: DOES THE PARTICIPATION OF A RESIDENT MATTER?

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Purpose: Over 11.5 million colonoscopies are performed annually in the United States, with screening being indicated for one third of all colonoscopies and polyp surveillance for one fifth. With recent changes in healthcare a focus has been placed on quality metrics for the purpose of reporting and financial compensation. The American College of Gastroenterology (ACG) and the American Society of Gastrointestinal Endoscopy (ASGE) recently published quality indicators for colonoscopy which include average withdrawal time, adenoma detection rate, and quality of bowel preparation. The ACG and ASGE currently recommend an adenoma detection rate of at least 25% for all sexes or 30% for men and 20% for women. To our knowledge, there are no articles to date that have assessed whether having a resident perform a colonoscopy impacts quality indicators such as adenoma detection rate. The aim of our study is to examine adenoma detection rate in adult patients who undergo screening colonoscopy at a single institution with (ColFacR) and without (ColFac) the participation of a general surgery resident.

Methods: We retrospectively examined consecutive colonoscopies of patients 45 – 80 years of age in a prospectively maintained database at a single institution from 7/2013 to 6/2015 with Institutional Review Board (IRB) approval. Patients with a genetic predisposition to colonic polyposis or adenocarcinoma and patients with inflammatory bowel disease were excluded. The two faculty members performing all the cases (CEC, JST) with or without a general surgery resident are board certified Colon and Rectal Surgeons. Demographics, pre-procedure, intra-procedure, and post-procedure metrics were recorded and analyzed using STATA 12.

Results: Of the 792 patients identified in the dataset, 291 were excluded due to incomplete data or not meeting inclusion criteria leaving 501 patients for analysis. When comparing the ColFac group (n=316) to the ColFacR group (n=185), there was no difference between age, sex, BMI, or ASA score between the two groups. There was no difference in the quality of bowel prep between the two groups with the majority of patients for the ColFac and ColFacR groups having a good or excellent bowel prep at 81.95% and 78.38%, respectively. The mean number of total polyps, hyperplastic polyps, and adenomatous polyps retrieved were similar between the two groups. There was no difference in the adenoma detection rate for the ColFac cases and ColFacR cases (25.95% vs. 27.03%, respectively, p=0.834).

Conclusions: Adenoma detection rate is similar when a resident is present or not for routine screening for colorectal cancer with a trend to slightly higher detection rate seen in cases where a resident was involved. The presence of a resident should not impact routinely reported quality indicators in colonoscopy.

P417

ASSESSING THE NEEDS AND DEVELOPING A COLORECTAL ROBOTICS CURRICULUM FOR A GENERAL SURGERY RESIDENCY.

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Purpose: Robotic-assisted surgery has been taking on an increasing role in the arsenal of tools for the minimally invasive colorectal surgeon. Recent general surgery residents at our institution have been inconsistently exposed to robotics, with a lack of a formal curriculum. We aimed to assess the needs and goals of current and previous general surgery residents with regards to robotic-assisted surgery, and devise a curriculum to serve those needs.

Methods: A brief electronic survey was sent to all current general surgery residents at our institution, as well as recent graduates of the program from the previous 2 years. The survey assessed overall interest in robotic-assisted surgery, as well as current experience in various robotic objectives, tasks, and procedures. Respondents were also asked about simulation experience, and asked for suggestions for improvement. Descriptive statistics were used to analyze trends in the data.

Results: The survey was sent to 40 current and recent graduate general surgery residents at our institution. There were 26 complete responses (65%). Overall trends show that the majority of respondents are interested in using robotics during and after residency training (n = 19, 73%) . Most have had some experience with observing (mean 4.5 per resident) or assisting (mean 2 per resident) robotics cases, however, most have not participated in any type of simulation training.

Conclusions: As a growing part of colorectal minimally invasive surgery, general surgery resident exposure and interest in robotics has been increasing. We confirmed the need for structured learning in robotics and have proposed a curriculum to be instituted at our hospital.

P418

GUM CHEWING REDUCES PARALYTIC ILEUS IN PATIENTS MANAGED WITH ENHANCED RECOVERY PROGRAM AFTER LAPAROSCOPIC COLORECTAL RESECTION: A RANDOMIZED CONTROLLED TRIAL.

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Purpose: Gum chewing has been shown to enhance bowel motility after surgery. However, there are few data on the effect of gum chewing after elective laparoscopic colorectal resection in the setting of an enhanced recovery program. This randomized controlled trial aims to study whether gum chewing can further reduce postoperative ileus in patients who undergo laparoscopic colorectal resection and follow an enhanced recovery program.

Methods: Patients who underwent laparoscopic colorectal resection were randomized into either the control group or intervention group. Patients in the control group received a standardized enhanced recovery program. In the interventional group, patients were given chewing gum three times daily to chew for thirty minutes each time from postoperative day one until discharge from hospital.

Results: Eighty two patients were recruited from July 2014 to June 2015. Forty-one patients were randomized into the control group and 41 patients into the intervention group. Thirty-seven patients underwent low anterior resection with diverting ileostomy or abdomino-perineal resection while 45 patients had either a colectomy or anterior resection performed. Time to passage of flatus after surgery was significantly shorter in the intervention group (22 vs 39 hours, p=0.007). The first bowel motion also occurred earlier in the intervention group (25 vs 51 hours, p=0.001). Patients in the intervention group also noticed feeling of hunger earlier (17 vs 40 hours, p=0.001). The length of hospital stay was not significantly different. Subgroup analysis revealed that the benefits of gum chewing were more obvious in patients who had colectomy or anterior resection performed compared to those with low anterior resection and ileostomy or abdomino-perineal resection. Gum chewing did not result in any complication.

Conclusions: Gum chewing is a simple and safe intervention that can shorten the period of ileus in patients managed with enhanced recovery program after laparoscopic colorectal resection.

P419

FACTORS THAT INFLUENCE QOL IN COLORECTAL CANCER ELDERLY PATIENTS.

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Purpose: Old patients submitted to major surgery may have important Quality of Life impairment. We aimed at determining factors that compromise QOL in surgical elderly colorectal cancer patients.

Methods: We studied a cohort of oncological colorectal surgical elderly patients treated in our intensive care unit from January 2008 to December 2013. Clinical data were gathered prospectively at the ICU database. We administered EORTC QLQ-C30 (v3) to all survivors that acknowledged participating. Prospectively data were demographics, rectal versus colon cancer, emergent versus elective surgery, SAPSII, number of days of mechanical ventilation, number of ICU days. Present data were comorbidities, BMI, years of scholarship, ECOG performance status and EORTC scores. We used uni and multivariate analysis to study factors that influence QOL in this cohort of patients.

Results: We administered EORTC QLQ-C30 (v3) to 111 patients: 57 male (51,4%); mean age 74, (SD 6,9); colon cancer was most frequent 83 (74,77%), emergent surgery represented 13,51%, mean SAPSII 33,56 (SD 13,5), mean days of mechanical ventilation 0,78 (3,35), mean days of ICU stay 3,95 (7,34), mean BMI 26,66 (SD 6,45) ; mean years of scholarship 4,47 (SD 3,4) ; ECOG PS0 10%; PS1 38,74%; PS2 30,63%; PS3 12,61%; PS4 2,7%; 81 patients (72,97%) had ≤ 3 comorbidities; diabetes was present in 26% of the patients; hypertension in 61,26%; chronic heart failure in 36,94%; chronic kidney failure in 18%; chronic obstructive pulmonary disease in 12,6%. When considering EORTC mean scores were: Global QOL 59,9 (22,7), Physical Function (PF) 62,28 (SD 24,4), Role Function (RF) 73,15 (SD 33,3), Emotional Function (EF) 76,3 (SD 22,3), Cognitive Function (CF) 80,99 (SD 24,9), Social Function (SF) 84,57 (SD 23,2), Fatigue 28,89 (SD 26,3), Nausea 2,78 (SD 10,7), Pain 27,62 (SD 30,9), Dyspnoea 9,17 (SD 22,4), Insomnia 24,16 (SD 33,3), Loss of Appetite 16,51 (SD 28,6), Constipation 17,43 (SD 26,8), Diarrhoea 11,42 (SD 22,2), Financial Impact 20,99 (SD 30,5). Analysing factors that influence Global QOL, PF, RF, EF, CF, SF we found that age was correlated with PF (R^2 0,085) and SF (R^2 0,065); Rectal cancer had better CF than Colon cancer (88,9 vs 78,4 p=0,039); BMI was correlated with PF (R^2 0,048); ECOG influenced Global QOL, PF, RF, CF and SF; ≤ 3 comorbidities influenced Global QOL, PF and RF; diabetes had a worse impact on SF; hypertension had a worse impact on Global QOL and PF; chronic heart failure had a worse impact on PF, RF and CF; chronic kidney failure had a worse impact on SF and chronic obstructive pulmonary disease had a worse impact on Global QOL and PF (p≤0,05).

Conclusions: Factors that influence QOL dimensions in our population are age, rectal cancer, BMI, ECOG performance status and comorbidities. FP is the dimension of QOL most affected by the factors that we studied.

P420

THE IMPACT OF CANCER DIAGNOSIS ON PATIENT-REPORTED OUTCOMES IN PATIENTS UNDERGOING COLORECTAL SURGERY.

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Purpose: The impact of a cancer diagnosis on patient-reported outcomes (PROs) related to major abdominal colorectal surgery is unknown. This study measures the difference in health status, pain and depression before and after abdominal colorectal surgery between patients with and without cancer diagnoses.

Methods: Patients were identified from the British Columbia surgical patient registry and booked for abdominal colorectal surgery. Ethics approval was obtained from the University of British Columbia Behavioral Research Ethics Board. Patients completed PROs for health status (EQ-5D), pain (PEG-3) and depression (PHQ-9). The Charlson Index was calculated for each patient. T-tests compared group differences while multivariate ordinal logistic and linear regression models were used to measure changes in instrument scores between groups.

Results: 134 patients completed and returned surveys at both time points. 83 patients had colorectal cancer, while 51 patients had non-cancer diagnoses requiring abdominal surgery. Please refer to Table 1 for summary data on patient demographics and procedural information. The mean EQ-5D Visual Analogue Score (VAS) improved 5.5 (SD=17.2) points with surgery in cancer patients, and by 9.3 (SD=20.9) in non-cancer patients - This improvement and difference is statistically significant (P<0.01). Cancer patients had an increased risk of problems with self-care post-operatively (regression coefficient = 1.36, SD = 0.60, p=0.02). The results found no differences in other EQ-5D measures. Non-cancer patients reported higher preoperative levels of pain than cancer patients (2.9 vs 1.7). The mean improvement in pain for non-cancer patients was 1.2 (SD=2.4, p<0.001) and 0.4 (SD=2.5, p = 0.15) in cancer patients There was no difference in depression scores between either group. One-half of patients in both groups did not have an improvement in pain or depression scores.

Conclusions: Cancer and non-cancer patients tended to experience improvement in overall health as measured by the EQ-5D. Non-cancer patients experience significantly greater improvements than cancer patients with surgery. Colorectal surgery patients may benefit from a focus on pain and mental health, before and after surgery.

Table 1. Summary statistics of patients completing PROs before and after major abdominal surgery.

	Cancer Diagnosis (n=83)		Non Cancer Diagnosis (n=51)	
Age (Median)	66.0		60.0	
Age (Percent > 65)	53.0		27.5	
Males/Females	2.32		0.76	
Diagnosis				
	Colon Cancer	41	IBD	21
	Rectal Cancer	42	Diverticulitis	18
	Post neoadjuvant treatment	9	Other	12
Procedures				
Anterior Resection	31		17	
Segmental Colectomy	30		21	
Hartmann Resection	0		3	
Abdominal Perineal Resection	22		10	

P421

IS LAPAROSCOPIC COLECTOMY SAFE AND FEASIBLE IN THE SETTING OF ACUTE FULMINANT ULCERATIVE COLITIS?

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Purpose: It is questionable whether laparoscopic surgery in the setting of acute fulminant colitis is appropriate, given both the acutely ill status of the patients and the expected fragility of the colon. The aim of this study was to evaluate if laparoscopic total colectomy in fulminant ulcerative colitis refractory to medical therapy is safe and feasible.

Methods: A retrospective chart review of all patients undergoing laparoscopic total abdominal colectomy with end ileostomy between January 2005-September 2015 for acute fulminant ulcerative colitis defined based on Truelove and Witts criteria (≥6 bloody bowel movements daily, combined with at least one among hemoglobin <10.5 g/dl, fever >37.8 ℃ or heart rate> 90 bpm). All patients were hospitalized in a tertiary care center.

Results: A total of 136 patients with mean age of 39.4 ± 16.4 years and including 69 (51%) males, fulfilled the inclusion criteria. Mean duration from hospital admission to surgery was 4.0±3.5(range: 0-18) days. 53% (n=72) of the patients were American Society of Anesthesiology score (ASA) 2, 43% (n=58) ASA 3, and 2.9% (n=4) ASA 4. All surgeries were started laparoscopically of which 15.4% were single incision (SILS). There was one conversion (0.7%) due to intraoperative enterotomy. 91 (67%) and 45 (33%) patients underwent subcutaneous implantation of the rectosigmoid stump vs. Hartmann stump, respectively. Mean operative time was 193 minutes with mean estimated blood loss of 119 ± 147ml (range: 10-1000ml). Mean postoperative length of stay was 7.6 days ± 6.6 (range: 0-52) including inpatient transfers. There were no postoperative deaths. Overall morbidity rate was 24.2% (33 patients, Table). Most common complication was ileus (16%, n=22). Reoperation and readmission rates were 4.4% (n=6), and 18% (n=25) respectively. Of the 6 patients who were re-operated, 2 had septic peritonitis of unknown origin, 2 rectal stump leaks, 1 for fascial dehiscence, and 1 small bowel obstruction refractory to conservative measures. At a mean follow up of 22.8 months (range: 1-98 months), 4 patients died due to causes unrelated to the disease itself.

Conclusions: Laparoscopic colectomy with creation of an end ileostomy is feasible with acceptable outcomes in hospitalized patients with acute fulminant colitis refractory to medical treatment.

Table 1 : Postoperative Complications

Complication	# of Patient	%
Acute Renal Failure	1	0.7%
Arrhythmia	1	0.7%
Bleeding	3	2.2%
Clostridium Difficile	3	2.2%
Ileostomy Dysfunction	2	1.4%
Dehydration	3	2.2%
Enteric Leak	1	0.7%
Ileus	22	16.1%
Rectal Stump Leak	7	5.1%
Delayed Healing	1	0.7%
Pneumonia	1	0.7%
Reintubation	1	0.7%
Sepsis	3	2.2%
Small Bowel Obstruction	10	7.3%
Surgical Site Infection (SSI) - Deep (Fascia)	1	0.7%
Surgical Site Infection (SSI) - Organ Space	17	12.5%
Surgical Site Infection (SSI) - Superficial (Skin)	5	3.6%
Blood Transfusion	5	3.6%
Urinary Retention	1	0.7%
Urinary Tract Infection	4	2.9%
Deep Venous Thrombosis	7	5.1%
Mesenteric/Portal Venous Thrombosis	8	5.8%
Pulmonary Embolism	1	0.7%

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POSTOPERATIVE COMPLICATIONS AND RISK FACTORS FOLLOWING DIVERTING LOOP ILEOSTOMY CLOSURE.

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Purpose: Diverting loop ileostomies are commonly created to defunction distal enteric disease or anastomoses, especially in high-risk patients. Closure of loop ileostomies is a local surgical procedure, but significant morbidity rates are reported in the literature. We sought to identify the rate of postoperative complications and possible independent risk factors following diverting loop ileostomy closure.

Methods: We conducted an IRB approved, retrospective review of patients 18 years of age and older that underwent diverting loop ileostomy closure at two institutions from 2005 to 2015. Patient characteristics, operative details, and postoperative complications were recorded and analyzed. Statistical analyses were performed with SPSS 22.0 (Chicago, IL).

Results: 311 patients with a median age of 56 (range, 18-87) years underwent diverting loop ileostomy closure over the 10-year period. 60.5% were males. The most common index surgeries included low anterior resection (64.3%) and total proctocolectomy with ileoanal pouch (20.3%). The most frequent diagnoses were rectal cancer (53.4%), ulcerative colitis (19.3%), and colon cancer (7.7%). The median duration between ileostomy creation and reversal was 5.5 (range, 1-84) months. Overall median length stay was 4 (range, 1-68) days. The most common postoperative complication was ileus (25.7%), followed by surgical site infection (10%). Readmission rate was 12%. 4.5% of patients required reoperation, most commonly due to small bowel obstruction. The 30-day mortality rate was zero. Increased time interval between stoma creation and closure was significantly associated with postoperative ileus (p=0.006), reoperation (p=0.006), as well as length of stay (p<0.0001). Similarly, postoperative ileus was significantly more common and length of stay longer in patients who had their ileostomy taken down after more than 120 days (Table).

Conclusions: The risk of serious postoperative complications after diverting loop ileostomy closure is low, but minor complications impacting patient care are rather common. Decreasing the time interval between the index surgery and closure of loop ileostomy may decrease the risk of postoperative ileus and length of stay. Implementation of enhanced recovery pathways may also improve these parameters.

Effects of increased time between loop ileostomy creation and reversal on postoperative outcomes

Outcome	Patients with < 120 days between surgeries (N = 105)	Patients with ≧ 120 days between surgeries (N = 206)	P value
Postoperative ileus	18 (17.1%)	62 (30.1%)	0.013
Length of stay: ≦ 5 days > 5 days	87 (82.9%) 18 (17.1%)	148 (71.8%) 58 (28.2%)	0.04
Readmission	10 (9.5%)	29 (14.1%)	0.251
Reoperation	2 (1.9%)	12 (5.8%)	0.115

P423

ASSESSING THE UTILITY OF NEAR-INFRARED FLUORESCENCE IMAGING WHEN CREATING BOWEL ANASTOMOSES DURING ROBOTIC-ASSISTED SURGERY.

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Purpose: Anastomotic leak is one of the most morbid and costly complications following colon and rectal surgery. Recently, the use of intraoperative near-infrared fluorescence imaging has become popular as a way to assess bowel perfusion, and thus to predict the viability of an anastomosis. To date, most studies have used small sample sizes to determine the efficacy of this technique. Using a large cohort of patients, we aim to establish whether or not near-infrared imaging is a useful tool for avoiding anastomotic leak.

Methods: We conducted a retrospective review of 292 patients who underwent robotic-assisted colon or rectal resection at a single institution from 2009 to 2015. The only inclusion criterion was the creation of an anastomosis during the procedure. Pre-operative demographics, intra-operative data, and post-operative outcomes were examined. Student's t-test was used to analyze continuous variables; Fischer's exact test was used for categorical variables.

Results: There were no peri-operative mortalities, and 18 cases were converted to open procedures (6%). Indocyanine green was injected and assessed using the Firefly Fluorescence Imaging for the da Vinci System in 156 cases. This modality was not used in 136 cases. The difference in postoperative anastomotic leak rate was not significantly different (p=0.272) between the ICG group (6%) and the group in which ICG was not used (3%). Age, gender, body-mass index, operative time and estimated blood loss were also not significantly different between the two groups. In addition, 17 patients in the ICG group underwent additional resection prior to anastomosis creation based on interpretation of the near-infrared imaging (11%), but 3 of those patients still developed a post-operative leak.

Conclusions: Our study is one of the largest to date that examines outcomes related to the use of intraoperative near-infrared imaging. Our data demonstrates similar rates of anastomotic leak when this technique is used compared to when it is not. We believe that, while the use of ICG may be useful in helping to avoid anastomotic leaks, there are other important factors such as patient co-morbidities and nutritional status. Further prospective studies will be necessary to establish the reliability of this tool in the field of colon and rectal surgery.

P424

TRANSITIONING FROM LAPAROSCOPIC AND ROBOTIC RIGHT HEMICOLECTOMY WITH EXTRACORPOREAL ANASTOMOSIS TO ROBOTIC RIGHT HEMICOLECTOMY WITH INTRACORPOREAL ANASTOMOSIS: TRENDS IN PERIOPERATIVE & SHORT-TERM OUTCOMES.

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Purpose: We aim to report our short term experience for robotic right hemicolectomy (rRHC) as we move from extracorporeal (rRHC-E), to intracorporeal (rRHC-I) anastomosis on the robotic platform and compare these outcomes to our laparoscopic right hemicolectomy (LRHC) extracorporeal anastamosis (ECA) operations.

Methods: We analyzed our laparoscopic and robotic data from 8/ 11 to 7/ 15. LRHCs and rRHC-E were performed as an extracorporeal anastomosis. Robotic RHC-I were performed in an isoperistaltic side to side fashion. Demographic & perioperative data from 30 LRHC, 17 rRHC-E, & 14 rRHC-I are reported.

Results: Fifteen laparoscopic patients were men, & 15 were women. For robotic cases 14 patients were women and 17 were men. In the laparoscopic group 15/30 patients had previous abdominal surgery, & in the robotic group, 17/31 had previous surgery. Indications for LRHC include: 1 bleeding mass, 11 cancers, 12 polyps, 1 ischemic ulcer, & 5 patients with refractory Crohn's disease. Indications for robotic surgery include: 10 cancers, 18 polyps, 1 mass, and 1 Crohn's patient. No difference was found between age, BMI, or ASA. The average age was 61.5 (LRHC), & 63.2 (rRHC). The average BMI was 32.4 (LRHC), & 31.5 (rRHC). The average ASA was 2.39 (LRHC), & 2.41 (rRHC). The total OR time was statistically different between LRHC (183.6 min) and rRHC (199.8 min). The average difference was 16.2 minutes. For rRHC-E (205.9 min), the average difference was 22.3 minutes compared to LRHC. There was no difference in OR time between LRHC & rRHC-I (192.4 min). Comparing total length of stay (LOS) there was no difference between LRHC and rRHC. There was a significant decrease LOS for rRHC-I cases compared to borth rRHC-E and LRHC. For LRHC, there were 5 readmissions/complications in 30 days which included: bleeding (on Plavix), wound infection, abdominal pain, pelvic abscess, and Crohn's exacerbation. In long term follow up, two incisional hernias. For the rRHC-E group, there were 2 patients with superior mesenteric venous thrombosis, and 1 take back to the OR for bleeding. For the rRHC-I group: 1 ileus, 1 renal embolus, 1 pulmonary edema, urinary retention, and 1 wound infection. No incisional hernias have been noted in the rRHC.

Conclusions: The aim of this study was to report on our results as we transition from LRHC and rRHC-E to rRHC-I. Limits of this study include a small number of patients and short term follow up. Our results show that rRHC-I have a shorter LOS compared to both LRHC and rRHC-E. There was no difference in rRHC-I operating times compared to LRHC. The LRHC had 2 incisional hernias diagnosed, while the robotic group has not reported this complication. This data demonstrates a potential benefit for rRHC-I in reducing LOS, and post operative hernias in patients undergoing a right colectomy.

Length of stay and OR times in laparoscopic compared to robotic right colectomies

	LRHC	rRHC (rRHC-E + rRHC-I)	rRHC-E	rRHC-I	P 1 tail	P 2 tail
LOS (days)	4.57	---	---	3.29	0.001	0.003
LOS (days)	---	---	4.76	3.29	.02	.04
OR time (min)	183.6	---	---	192.4	0.19	0.39
OR time (min)	183.6	199.8	---	---	0.04	0.08

LOS= Length of Stay

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NO TIME TO WAIT: FACTORS ASSOCIATED WITH DELAYED TIME TO ADJUVANT CHEMOTHERAPY AMONG STAGE III COLON CANCER PATIENTS.

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Purpose: Previous studies have shown that initiation of adjuvant chemotherapy beyond 8 weeks after resection among stage III colon cancer patients is associated with worse prognosis. Approximately 20% of stage III patients eligible for systemic therapy receive it after the recommended time period. However, less is known about the reasons that cause this delay. The purpose of this study was to identify patient, surgeon, and hospital-level factors associated with a delayed time to adjuvant chemotherapy.

Methods: The New York State Cancer Registry, Medicare, Medicaid, and Statewide Planning & Research Cooperative System were used to select stage III colon cancer patients with a documented surgical resection from 2004-2011 in New York State. Bayesian mixed-effects multivariable logistic regression models were used to identify independent patient, surgeon, and hospital-level factors associated with odds of delayed time to chemotherapy (> 8 weeks vs. ≤8 weeks). The random effects from then models were used to estimate risk adjusted surgeon-specific and hospital-specific rates of delayed time to chemotherapy among their patients.

Results: Among 1,965 stage III patients who received chemotherapy after colon cancer resection, 740 of the cases (38%) had a delayed time to chemotherapy (>8 weeks). Patients with sepsis, Medicaid insurance, longer length of stay, and those readmitted within 30 days had higher odds of delayed time to chemotherapy. Non-academic hospitals had higher odds of delayed time to chemotherapy. Surgeon volume, type, and experience were not associated with odds of delayed time to chemotherapy. However, after risk adjustment, 80% of the remaining clustering variability relates to surgeon characteristics not captured by the data. After adjusting for case mix and hospital characteristics, the worst performing surgeon's rate of delayed chemotherapy among its patients was 8.6 times higher than that of the best performing surgeon. Similarly, the worst performing hospital's rate of delayed chemotherapy among its patients was 3.1 times higher than that of the best performing hospital.

Conclusions: The rate of delayed chemotherapy among stage III colon cancer patients who received adjuvant therapy is high in NY State. Several factors independently predicted the odds of delayed chemotherapy, however, they explained very little of the between surgeon and between hospital variation in their respected rates of delayed chemotherapy. Most of the variability that remains unexplained is at the surgeon level which suggests that differences in referral practice patterns of surgeons may potentially play a role in the variation of chemotherapy initiation. Future endeavors should focus on implementing standardized protocols aimed at tracking patients' treatment plans and auditing procedures to enhance multidisciplinary care of these patients.

Factors Associated with Delayed Time to Adjuvant Chemotherapy

	Odds Ratio (95% CI)	P-Value
SEPSIS		
No	Reference	
Yes	3.82 (3.65, 4.00)	<0.0001
INSURANCE STATUS		
Medicare	Reference	
Medicaid	1.38 (1.32, 1.44)	<0.0001
LENGTH OF STAY (PER 1 WEEK INCREASE)	1.18 (1.09, 1.27)	<0.0001
READMISSION WITHIN 30 DAYS		
No	Reference	
Yes	2.11(2.06, 2.16)	<0.0001
HOSPITAL TYPE		
Academic	Reference	
Non-Academic	1.31 (1.24, 1.39)	0.0009

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CHARACTERIZATION OF DIVERTICULITIS CARE IN A COMMUNITY COLORECTAL SURGERY GROUP.

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Purpose: Improving quality requires measuring outcomes. One of the most common indications for colectomy is diverticulitis. Most outcome studies of diverticulitis come from academic centers, or have small sample sizes. The purpose of this study is to look at a group of patients undergoing elective surgery for diverticulitis by a single group of Colorectal Surgeons in a community practice, and to identify variables associated with improved outcomes.

Methods: A retrospective chart review was done on 369 patients during January 2012 through December 2013 presenting to the Texas Colon and Rectal Specialists (TCRS) practice with sigmoid diverticulitis requiring primary elective resection. These patients were followed from date of surgery to 1 year post surgery. Patients with an American Society of Anesthesiologists' (ASA) Emergent Classification or a pre-op length of stay (LOS) greater than zero were excluded from this study. The variables collected included: Demographic Data: gender, age at time of surgery, hospital and surgeon. Clinical Data: ASA Score, Hinchey Classification, final surgical approach, approach conversion from initial approach, type of conversion if present, and patient inclusion in a pharmacologic enhanced recovery pathways (alvimopan, ketorolac, IV acetaminophen). The effects of these variables were assess on the following Outcome Data: Binomial Data: 30 day mortality (30DMort), 30 day return to operating room (30DROR), 30 day readmission (30DRA), and anastomotic leak (AL). Interval Data: specimen length (SL), length of stay (LOS), and number of office visits within 1 year post the date of surgery (FUP). Outcome data was statistical analysis as follows: Interval Data was analyzed using either single variable ANOVA's, multivariable ANOVA's, or independent samples t-tests as appropriate. Binomial data was analyzed using chi-square goodness of fit tests.

Results: Improved outcomes were significant when p<0.05. The following were of significance: Gender: 30DROR (p=0.03) and 30DRA (p=0.04). Surgeon: 30DRA (p=0.04), FUP (p=1.38e-11), and SL (p=0.02). Hospital: 30DMort (p=0.02), AL (p=0.04), LOS (p=0.03), and FUP (p=6.25E-0.6). ASA: LOS (p=0.001), FUP (p=0.02), and LS (p=2.96E-05). Hinchey classification: LOS (p=1E-04) and SL (p=0.03). Final surgical approach: 30DRA (p=0.003), LOS (p=4.28E-06), FUP (p=0.0008) and SL (p=0.01). Approach conversion: 30DRA (p=0.03) and SL (p=0009). ERP's as a whole: LOS (p=0.01).

Conclusions: This study has shown the need to identify variables that can improve outcomes in diverticulitis patients. It is clear that 30DROR, 30DRA, LOS, and FUP were the most affected by the demographics and clinical data. Future studies are needed to develop a standard in both assessing variables and in ERP's in order to help improve outcomes in these patients.

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REGIONAL DATABASE ANALYSIS OF OUTCOMES AFTER SIGMOID RESECTION FOR BENIGN AND MALIGNANT DISEASE.

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Purpose: Minimally invasive options for colorectal surgery have become more prevalent in practice. Protocol-driven outcomes data have been reported but there are no large comparative analyses focusing specifically on diseases of the sigmoid colon. The purpose of this study is to compare surgical outcomes of open, laparoscopic, and robotic approaches to non-emergent sigmoid resection for benign and malignant disease.

Methods: This is a retrospective analysis of hospital length of stay and 30-day outcomes using the protocol-driven, externally audited Michigan Surgical Quality Collaborative database from July 1, 2012 to April 30, 2015.

Results: A total of 4,437 patients underwent sigmoid resection in this study: 1,706 (38.4%) open, 2,378 (53.6%) laparoscopic, and 353 (8%) robotic. Hospital length of stay was significantly shorter for the robotic platform when compared to the open and laparoscopic approaches (p<0.0001). Conversion to open was significantly less for robotic than for laparoscopic surgery (8.5% vs 16.1%, p=0.0002). Surgical Site infections (p=0.005), 30-day readmissions (p=0.02), and discharges to home (p<0.0001) were significantly more favorable for the laparoscopic approach when compared to open. Thirty-day mortality and discharges to home were statistically more favorable for the laparoscopic approach when compared to the robotic approach.

Conclusions: In this large regional database analysis, laparoscopic and robotic surgeries have several outcomes advantages when compared to the traditional open approach for sigmoid resection. Increasing the utilization of minimally invasive surgery for benign and malignant sigmoid disease appears justified. Additionally, laparoscopic and robotic approaches have specific advantages when compared. Further studies are warranted to allow surgeons to better define the role of minimally invasive options in their practice, especially with increasing experience and upgrades in minimally invasive technology.

Risk and Reliability Adjusted Postoperative Outcomes by Surgical Approach

	Adjusted Values			P-Value†		
Postoperative Outcome	Laparascopic	Open	Robotic	Lap vs Robot	Lap vs Open	Open vs Robot
Hospital Length of Stay, mean days	6.5	7.6	6.2	<.0001 *	<.0001 *	<.0001 *
Any SSI, n (%)	124 (5.2)	139 (8.2)	27 (7.5)	0.2226	0.0005 *	1.0000
Any UTI, n (%)	39 (1.6)	33 (2.0)	6 (1.6)	1.0000	1.0000	1.0000
DVT, n (%)	23 (1.0)	25 (1.5)	1(0.1)	0.3240	0.3433	0.1028
Cardiac Arrest, n (%)	9 (0.4)	10 (0.6)	3 (0.9)	0.5122	0.9613	1.0000
Pneumonia, n (%)	35 (1.4)	39 (2.3)	5 (1.5)	1.0000	0.1772	1.0000
Unplanned Intubation, n (%)	47 (2.0)	41 (2.4)	9 (2.6)	1.0000	1.0000	1.0000
Acute Renal Failure, n (%)	37 (1.6)	31 (1.8)	8 (2.2)	1.0000	1.0000	1.0000
Anastomotic Leak, n (%)	44 (1.8)	37 (2.2)	8 (2.3)	1.0000	1.0000	1.0000
Readmission within 30 Days, n (%)	190 (8.0)	180 (10.6)	41 (11.6)	0.0685	0.0153 *	1.0000
Reoperation within 30 Days, n (%)	179 (7.5)	119 (7.0)	28 (7.9)	1.0000	1.0000	1.0000
Not Discharged Home, n (%)	450 (18.9)	434 (25.5)	92 (26.0)	0.0054 *	<.0001	1.0000
Death within 30 Day, n (%)	23 (1.0)	30 (1.8)	9 (2.5)	0.0317 *	0.0699	1.0000

†p-values based on Chi-Square test or Least Squares Means test, and includes Bonferroni correction for multiple comparisons.
*Significant difference, p<0.05.

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THE EFFECT OF HYPOALBUMINEMIA ON EARLY PATIENT MORBIDITY AND MORTALITY FOLLOWING ELECTIVE COLON RESECTION FOR COLON CANCER.

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Purpose: The correlation between malnutrition and increased risk of perioperative complications in cancer patients is well established. In 1999, the National Veterans' Affairs Surgical Risk Study identified hypoalbuminemia as an independent risk factor for postoperative morbidity and mortality. Since that time, few studies have investigated the effect of malnutrition on colon cancer surgery. We seek to determine the effect of hypoalbuminemia on 30-day patient morbidity and mortality following elective colon resection for colon cancer using the Targeted-Colectomy American College of Surgeons National Surgery Quality Improvement Program (ACS NSQIP).

Methods: Stage I through III elective colon resections with ileocolostomy or colocolostomy were identified within the targeted colectomy database from 2012-2013. Patients with stage IV colon cancer, preoperative chemotherapy or radiation, positive margins, and wound infection at the time of operation were excluded from analysis. Hypoalbuminemia was defined as albumin<3.5g/dL. Patients with preoperative hypoalbuminemia were compared to those with a normal preoperative albumin level on a variety of outcomes using Fisher's exact test and chi-square regression. Variables that demonstrated an association with hypoalbuminemia at p<0.10 were then included in a multivariate logistic regression model to determine if hypoalbuminemia was independently associated with postoperative morbidity and mortality. Indicators of postoperative morbidity and mortality investigated included the incidence of cardiac arrest, myocardial infarction, pneumonia, reintubation, prolonged intubation, sepsis, septic shock, wound infection (superficial, deep, organ space, and dehiscence), venous thromboembolism, return to the operating room, length of stay, and mortality. Significance was defined as p<0.05.

Results: A total of 90 patients were available for analysis within the targeted colectomy database; 74 (82.2%) patients had a normal preoperative albumin level while 16 (17.8%) had preoperative hypoalbuminemia. In univariate analysis, hypoalbuminemia was significantly associated with reintubation (p<0.001), prolonged intubation (p=0.001), and length of stay (p=0.004). The association of hypoalbuminemia with postoperative pulmonary events and length of stay remained statistically significant (p=0.03 and p=0.049, respectively) during multivariate analysis. Hypoalbuminemia had no effect on the incidence of organ space infection, including anastomotic leak, in either univariate or multivariate analysis.

Conclusions: Preoperative hypoalbuminemia is significantly associated with postoperative pulmonary complications but not organ space infection in this patient population. The role of albumin and nutrition risk assessment in this patient population requires further investigation in order to prevent delay from surgical intervention to adjuvant therapy.

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ARE PATIENTS WITH COLON CANCER SAFE IN KOREA? THE TREND OF COLON CANCER MANAGEMENT IN KOREA, 2000-2012 : SINGLE INSTITUTION RETROSPECTIVE STUDY.

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Purpose: In Republic of Korea, the incidence of colorectal cancer has rapidly increased by 5.2% over the past 10 years. But the incidence represents both colon cancer and rectal cancer. Especially, there are a few studies about colon cancer in Korea. On this background, the aim of study is to examine the changing of trend of colon cancer in Korea.

Methods: Patients with biopsy proven colon adenocarcinoma who underwent curative surgery between Jan 2000 and Dec 2012 were enrolled. The medical records of total 2606 patients were reviewed. The study period was divided into three intervals (P1: 2000-2004; P2: 2005-2008; P3: 2009-2012). Clinicopathological factors were examined included age, sex, BMI, ASA score, operation methods, surgical complication, tumor location, TNM stage, grading of tumor, lymphovascular invasion, tumor size, tumor gross morphology, preoperative CEA level, recurrence pattern, hospital stay, total treatment costs, family cancer history, adjuvant chemotherpapy regimens. We analyze survival according to periods and stage.

Results: Tumor location was changed from right side to left side. The significant difference was shown in left side increasingly according to period (291[46.8%], 577[53.7%], 492[54.1%], *p*=0.018), in contrast cancer was decreased in right side (271[43.6%], 415[38.6%], 331[36.4%], *p*=0.018). According to period, operation method was changed from open to MIS. MIS became main operation (149[24.0%], 468[43.6%], 675[74.3%], *p*<0.001). There was difference in TNM stage. Stage 1 increased (79[12.7%], 178[16.6%], 360[39.6%], *p*<0.001), but stage 3 decreased (241[38.7%], 373[34.7%], 153[16.8%], *p*<0.001). Hospital stay was shorter according to

period (19.0[15.0;23.0], 17.0[14.0;22.0], 12.0[9.0;16.0], $p<0.001$). Total cost of treatment increased from P1 to P3 ($6224.0[5336.0;7831.0], $8448.0[7105.5;10409.5], $8932.0[7814.0;10790.0], $p<0.001$). Treatment of oxaliplatin in stage 3 was increased according to period (2[0.8%], 231[61.9%], 116 [75.8%], $p<0.001$), but leucovorin in stage 3 was decreased (189[78.4%], 69[18.5%], 1[0.7%], $p<0.001$). Recurrence rate in P3 is lower than others (158[24.4%], 155[23.9%], 154[16.6%], $p<0.001$). No significant difference in disease free survival (78.8% vs 79.9% vs 85%, $p = 0.31$) was observed according to period. Otherwise, significant difference in overall survival (68.2% vs 78.9% vs 89.1%, $p = 0.036$) was observed among the period. In addition, Overall survival in P1 was poorer than the others (56.0% vs 77.2% vs 77.1%, $p = 0.006$) in stage 3.

Conclusions: Our study demonstrates the trend of colon cancer in Korea for over the past 10 years. Early diagnosis, development of surgical technique and development of newer agent led to improved survival in colon cancer.

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TOTAL MESORECTAL EXCISION: A COMPARISON OF LAPAROSCOPIC, ROBOTIC, AND TRANSANAL APPROACHES FOR THE MANAGEMENT OF CANCERS INVOLVING THE DISTAL RECTUM.

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Purpose: The reported pathologic outcomes from the ACOSOG Z6051 trial failed to establish the noninferiority of laparoscopic compared to open rectal cancer surgery. The ability to assure a known distal margin and to obtain a complete TME with negative circumferential margins remains a critical challenge in minimally invasive surgery. Robotic surgery and transanal TME (taTME) have emerged as techniques that may improve upon pathologic outcomes; however, few comparative studies exist in the literature to date. We compare outcomes using these new techniques for the management of cancers involving the distal rectum undergoing sphincter preservation surgery (SPS) after radiation therapy.

Methods: From a prospectively maintained rectal cancer database, we identified 221 consecutive rectal cancers at the 6 cm or less level from the anorectal ring treated with preoperative radiotherapy. Patients were treated with radical SPS via either a laparoscopic (Lap, n=169) or robotic (Robo, n=23) TME, or a taTME (n=29) approach. Perioperative, pathologic, and early oncologic outcomes, including local recurrence (LR) and distant metastasis (DM) were examined.

Results: Average follow-up was 57 months (Lap), 20 months (Robo), and 13 months (taTME). The majority (76%) were clinical T3 rectal cancers on presentation. 95% of patients received neoadjuvant chemoradiation. Mean EBL was 389 cc, 190 cc, and 242 cc for Lap, Robo, and taTME groups, respectively (p=NS). TME specimens were more complete (100% vs. 91.5%, p=0.02) using a Robo vs. Lap approach. CRM positivity was less using a Robo vs. Lap approach (0% vs. 6.2%, p=0.02). Distal margin positivity was less using a Robo (0%) or taTME (0%) vs. Lap (2.4%) approach (p=0.04). Interestingly, no patient with a positive distal margin (n=4) developed a LR. No difference in outcomes was observed between Robo and taTME approaches. Overall morbidity was 28.5% and mortality was 0.5% and was similar between all SPS approaches.

Conclusions: Evaluation of pathologic outcomes for distal rectal cancer demonstrated that robotic TME lead to a more complete TME with clearer circumferential and distal resection margins compared to a conventional laparoscopic approach. taTME also allowed for improved distal margins. There was no difference in morbidity, LR, or DM based on the technique. Disparities in follow up in the three groups preclude firm conclusions, but these approaches hold promise to improve the challenges of distal TME surgery. Future studies are warranted to determine if these pathologic outcomes will ultimately translate into improved oncologic outcomes.

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AN EVALUATION OF POSTOPERATIVE URINARY RETENTION IN MALE PATIENTS FOLLOWING COLON OR RECTAL RESECTION.

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Purpose: The purpose of the study was to evaluate the incidence of postoperative urinary retention (POUR) in male patients undergoing elective colon or rectal resection and to identify risk factors for POUR that could be used in the future for prophylactic intervention.

Methods: A retrospective chart review from our independent academic medical center was performed to determine the incidence and perioperative risk factors for POUR in male patients who underwent elective colon or rectal surgical resection between June 1, 2014 and June 1, 2015. Patients under the age of 55 were excluded, as were patients with a history of urinary tract or prostate cancer, prior prostate surgery, current tamsulosin use, active urinary tract infection, dialysis use, neurogenic bladder, or postoperative epidural analgesia. POUR was defined as reinsertion of an indwelling urinary catheter.

Results: We reviewed 584 cases, with 70 patients meeting inclusion criteria. Nine patients (12.9%) experienced POUR. Patients with POUR experienced longer operating room time (364 ± 170 min vs 256 ± 101 min; P=0.048) and had a lower body mass index (24.9 ± 3.7 kg/m^2 vs 29.0 ± 5.6 kg/m^2; P=0.038). There was a trend towards higher total operating room intravenous fluids in these patients, but it did not reach statistical significance (3100 ± 1766 ml vs 2363 ± 924 ml; P=0.348). There was no difference with regards to patient age, postoperative urine output, surgical approach (minimally invasive or open), type of resection, diagnosis (benign or malignant disease) or whether the patient had prior abdominal surgery.

Conclusions: The incidence of POUR in male patients at least 55 years of age who underwent elective colon or rectal resection at our institution was 12.9%. Longer operative time and lower body mass index were associated with higher incidence of POUR. Additional risk factors were not identified, but could potentially be observed with a larger sample size.

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SHOULD ROUTINE CONCOMITANT CHOLECYSTECTOMY BE DONE IN PATIENTS UNDERGOING COLORECTAL RESECTIONS?

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Purpose: Concomitant cholecystectomy was historically performed in patients undergoing colorectal resection if gallstones were palpated or known to be present preoperatively. Now with increased rates of laparoscopic colorectal resections, it is unclear if we should proceed with gallbladder removal in asymptomatic patients and what the risk of future cholecystectomy truly is. The goals of our study are to determine the rates of cholecystectomy in patients who previously underwent colorectal resections and to identify characteristics that predispose these patients to postcolectomy cholecystectomy.

Methods: This was a retrospective case-control study conducted using the Healthcare Cost and Utilization Project State Inpatient Databases (HCUP SID) for California and Florida. Cases were selected using ICD-9-CM codes for colorectal resections in the year 2006 and propensity score matched by age, gender, race, asymptomatic cholelithiasis, and comorbidities to inpatients who did not undergo surgery to create a control group. Patients with previous cholecystectomy were excluded. The 5-year risk of subsequent cholecystectomy was compared between groups. Multivariable analysis using logistic regression was performed to examine the impact of demo-

graphics, comorbidities, and type of resection on the rate of post-colectomy cholecystectomy.

Results: 24,918 cases were identified and matched to 24,918 controls. Five-year prevalence of cholecystitis and rate of cholecystectomy were higher in the colorectal resection group compared to matched patients (1.30% vs 0.92%, p<0.001 and 2.81% vs 1.30%, p<0.001, respectively). The 5-year odds of cholecystectomy were not affected by the operative approach used during the colectomy (open vs laparoscopic: OR=0.80, p=0.116). Patient factors found to increase the 5-year odds of post colectomy cholecystectomy were asymptomatic cholelithiasis (OR=4.37, p<0.001), age <60 (<60 vs. >80: OR=2.67, p<0.001) and Hispanic race (OR=1.33, p=0.011). Operative indication and anatomic site of resection also showed significant association with 5-year odds of cholecystectomy. Malignant neoplasms increased the odds (OR=1.24 p=0.048). Also, left colon and rectal resections increased the odds when compared to right colon resections (OR=1.27, p=0.023 and OR=1.42, p=0.002 respectively).

Conclusions: Patients undergoing colorectal resections are more likely to develop acute cholecystitis as well as require a cholecystectomy in the future compared to the general population. However, this occurrence is still rare and does not support the practice of concomitant cholecystectomy for all patients. Instead, an individualized approach to performing concomitant cholecystectomy should be considered, weighing the risk factors identified in this study against those inherent to cholecystectomy.

P433

IMPROVED OUTCOMES FOLLOWING IMPLEMENTATION OF AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM ACROSS THE PROVINCE OF ONTARIO.

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Purpose: ERAS programs have been shown to improve care when implemented at single institutions. In 2012, the iERAS program was implemented province-wide in all 15 academic hospitals in Ontario. We report the outcomes after 2 years of adoption.

Methods: Patients having elective colorectal or small bowel surgery were included in the iERAS program. All patients were followed up to 30 days following surgery. An iERAS guideline which included pre-operative, intraoperative and post-operative recommendations was developed by a multidisciplinary group based on evidence and contextualized to the Ontario environment. The implementation strategy included identifying nurse, anaesthesiologist and surgeon champions at each site; supporting communities of practice locally and provincially; developing a patient education booklet, video and printed materials including standardized orders and care pathways; collecting data prospectively and sharing data to each site at 2-4 monthly intervals. As well, nurse champions participated in a monthly conference call and all champions met yearly to share best practices and discuss barriers and enablers.

Results: Between October 2012 and April 2015, 2,926 patients (1,522 males; mean age 62; mean BMI 27) were included. The diagnosis was colorectal cancer in 68.3%; 30.3% of patients had a right hemicolectomy; 24.6% had a left colon resection, 17.5% had a low anterior resection and 27.6% had another procedure. A laparoscopic assisted procedure was performed in 52.5% of patients. The compliance with guideline recommendations is shown in the attached Table. Mean post-operative pain scores were 4.3 on a 10 point scale. Median length of stay decreased from 6.5 days to 5 days while unplanned emergency room and physician visit (10%) and readmission (7%) rates were unchanged. The intraabdominal infection/anastomotic leak rate was 4.5%; reoperation rate was 3.5% and unplanned transfer to the ICU was 2.7%. Patient satisfaction was high with 91.5% stating they were satisfied or very satisfied with their care and 80.7% stating they felt they were discharged at the right time.

Conclusions: Multiple implementation strategies were used to implement an ERAS program at multiple hospitals resulting in good outcomes, decreased length of stay and high patient satisfaction.

Compliance with Guideline Recommendations

Guideline Recommendations	Compliance (in %)
Received patient education booklet*	88%*
Length of stay was discussed	95%
MBP not given in patients having a colonic procedure	82%
Pre-operative fast shortened to 2 hours and carbohydrate rich drink taken*	73%
Received gabapentin pre-operatively	53%
Received Tylenol pre-operatively	66%
IV fluids warmed intra-operatively	83%
Warming blanket used intra-operatively	98%
IV lidocaine intra-operatively*	67%
Drains not used (excluding APR and TPC)	75%
Nasogastric tube not used	96%
Dangled/walked on PO day 0*	62%
Walked on PO day 1	81%
Clear fluids offered on PO day 0	90%
Chewed gum*	79%
Foley catheter removed on PO day 1 (colon procedure) or PO day 3 (rectal procedure)	53%
Tylenol post-operatively	95%
Gabapentin post-operatively	26%
Epidural analgesia (open procedures only)	55%

*new interventions which were not used prior to implementation of the iERAS program

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THE EFFECT OF MECHANICAL BOWEL PREPARATION ON EARLY POST-OPERATIVE MORBIDITY AND MORTALITY FOLLOWING NONPELVIC COLON RESECTION WITH ANASTOMOTIC LEAK.

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Purpose: The routine use of preoperative mechanical bowel preparation (MBP) is a highly controversial topic amongst colorectal surgeons. The proposed benefits of MBP include a reduction in colonic stool burden and bacteria load while opponents of MBP cite the dangers of preoperative dehydration, electrolyte abnormalities, and impaired colonic mucosa. Nevertheless, there remains a paucity of data investigating the effect of MBP on additional patient morbidity and mortality following anastomotic leak in non-pelvic colon anastomoses. We therefore seek to determine the impact of preoperative bowel preparation on 30-day patient morbidity and mortality following anastomotic leak using the Colectomy-Targeted American College of Surgeons National Surgery Quality Improvement Program (ACS NSQIP).

Methods: All elective colon resections for colon cancer with primary anastomosis were identified within the targeted colectomy database from 2012-2013. Patients who underwent preoperative mechanical bowel preparation (MBP) and experienced a postoperative anastomotic leak were compared to those who did not undergo preoperative MBP and experienced a postoperative anastomotic leak using between group t-test, Fisher's exact test, and chi-square regression. Variables that had an association with mechanical bowel preparation at p<0.10 were then included in a multivariate logistic regression model to determine if MBP was independently associated with postoperative morbidity and mortality. Significance was defined as p<0.05.

Results: A total of 6,658 patients underwent colonic resection for colon cancer with ileocolostomy or colocolostomy from the years 2012-2013. 206 (3.1%) patients experienced an anastomotic leak. 186 of these patients were available for analysis within the targeted colectomy database; 106 (57.0%) patients underwent preoperative MBP while 80 (43.0%) patients did not. Patients who underwent preoperative MBP were more likely to receive preoperative oral antibiotics than patients who did not undergo preoperative MBP (p<0.001). Despite the increased use of oral antibiotics, MBP patients did not differ from non-MBP patients with regards to wound complications (p=0.50). In univariate analysis, MBP patients were more likely to return to the OR (p=0.03). Return to the OR was related to management of anastomotic leak in 95.7% of cases. In multivariate analysis, patients who under-

went preoperative MBP did not differ from patients who did not undergo preoperative MBP with respect to any morbidity or mortality outcomes.

Conclusions: The routine use of MBP for non-pelvic anastomoses may not improve patient outcomes. Future studies are needed to define the specific type of colon surgery that may benefit from preoperative MBP.

P435

SURGICAL MANAGEMENT OF LOWER GASTROINTESTINAL HEMORRHAGE: AN ANALYSIS OF THE ACS-NSQIP DATABASE.

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Purpose: In the past ten years, there has been little new data published regarding surgery for lower gastrointestinal hemorrhage. Despite advances in medical diagnostics, colorectal resection remains the only option when non-surgical management fails. The purpose of this study was to examine a recent cohort of patients who underwent surgery for this indication and to determine the effect of procedure type on post-operative outcomes.

Methods: We identified all patients who underwent colorectal resection for bleeding in both the American College of Surgeons National Surgery Quality Improvement Program (ACS NSQIP) Participant Use Data File (PUF) and the Procedure Targeted PUF for Colectomy for the years 2012 to 2013. We compared patients who underwent partial colectomy to those who underwent total colectomy. Univariate analyses were used to compare the demographics/co-morbidities and operative characteristics of both groups, and adjusted odds ratios (OR) and 95% confidence intervals (CI) were calculated using multivariable logistic regression.

Results: 38,486 patients underwent colorectal resections from 2012 to 2013. Of those, 427 procedures were performed for bleeding. The majority were male (57.4%) and 65 years of age or older (68.6%). About half of surgeries (49.0%) were performed emergently. Open procedures (66.9%) were more common than laparoscopic procedures. 17.8% of patients had a stoma created at the time of surgery. 85.3% (N=364) underwent a partial colectomy, and 14.7% (N=63) underwent total colectomy. Patients who had total colectomy were more likely than those with partial colectomies to have received more than 4 units of blood prior to surgery (77.8% vs 55.5%, p<0.01) and to have operative times longer than 180 minutes (42.9% vs 23.4%, p<0.01). Patients who had partial colectomy were more likely to have undergone laparoscopic procedures (35.3% vs 20.0%, p=0.02) and to have a stoma created at the time of surgery (20.6% vs 1.6%, p<0.01). On univariate analysis, total colectomy was associated with an increased risk of post-operative ileus, cardiac and renal complications, and mortality (all p<0.05), but not with surgical site infection, anastomotic leak, return to the OR, or readmissions. On multivariate analysis, total colectomy was associated with increased risk of cardiac complications (OR 5.53, 95%CI 1.3-22.8) and renal complications (OR 9.6, 95%CI 2.2-43.0), but not with ileus (p=0.21) or mortality (p=0.10).

Conclusions: The most common procedure performed for lower gastrointestinal hemorrhage in a recent national cohort was partial colectomy. Total colectomy was associated with an increased risk of cardiac and renal complications.

P436

ENHANCED RECOVERY AFTER SURGERY: IS THERE A BENEFIT IN HIGH-RISK PATIENTS?

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Purpose: Enhanced recovery after surgery (ERAS) pathways provide significant clinical benefits for patients undergoing elective colorectal surgery; however, high-risk patient populations have not been studied. We hypothesize that the use of our ERAS pathway is safe and effective even in high-risk colorectal patients.

Methods: Starting in January 2015, an ERAS protocol was implemented at a single center for patients undergoing elective colorectal surgery. Our ERAS protocol includes detailed patient education, preoperative carbohydrate drink, opioid sparing medications and techniques, including epidural catheters, early ambulation and oral intake, and medications to decrease postoperative nausea and vomiting. Patient outcomes were monitored prospectively. Length of stay, superficial surgical site infection, deep organ space infection, and readmission rates were obtained from an institutional national quality improvement database. Of this cohort, patients were then identified as high-risk (HR) if they exhibited one or more of the following characteristics: age >70 years old, ASA class 3 or 4, BMI >25, hematocrit <30%, albumin < 3.5, creatinine >1.4, current smoker, insulin dependent diabetes, chronic steroid use, or evidence of metastatic disease at time of surgery. The outcomes of high-risk patients under the ERAS pathway were compared to high-risk patients prior to implementation of the ERAS protocol (January 2013 through November 2014). Analyses were done using Welsh's T tests and Fisher's exact tests, p<0.05 was considered significant.

Results: A total of 65 HR ERAS (HRE) patients were identified, and 182 HR non-ERAS (HRNE) patients were identified. There was no difference between HRE and HRNE in age, BMI, hematocrit, albumin and pre-operative creatinine (Table 1). Additionally, there was no difference in the total number of risk factors for HRE and HRNE, 2.3 ± 1.1 and 2.5 ± 1.1 respectively (p=0.40). HRE patients had significantly shorter length of stay, 4.4 ± 2.5 days, compared to HRNE patients, 6.6 ± 5.9 days (p<0.001). Readmission rates were 9.2% for the HRE group compared to 17% in the HRNE group (p=0.16). There were no superficial site infections among the HRE group, compared to 13 (7.1%) in the HRNE group (p=0.02). Organ space infections were reduced from 13.2% in the HRNE group to 3.1% in the HRE group, a total reduction of 10.1% (p=0.02).

Conclusions: In conclusion, our ERAS protocol appears to be effective in high-risk colorectal patients in decreasing length of stay as well as superficial and organ space infections.

Mean (standard deviation) of high risk factors by ERAS group

	Non-ERAS	ERAS	FDR Adjusted P-value
Age	58.9 (16.5)	53.3 (15.6)	0.26
BMI	28.5 (6.6)	28.4 (7.0)	>0.99
Hematocrit	38.17 (4.62)	38.37 (6.19)	>0.99
Albumin	3.55 (0.52)	3.54 (0.56)	>0.99
Creatinine	0.95 (0.34)	0.88 (0.25)	0.33

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EPIDEMIOLOGY AND MORBIDITY OF CONCOMITANT CLOSTRIDUM DIFFICLE COLITIS AND DIVERTICULITUS INFECTION.

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Purpose: *Clostridium difficile* colitis (CDC) infection and diverticulitis (DV) are both amongst the top reasons for hospital admissions in the United States. Each disease entity has been extensively studied independently; however, there is a paucity of data on concomitant CDC and DV infection. The objective of this study was to determine the epidemiology of patients at risk for developing CDC and DV infection and their hospital outcomes.

Methods: Patient data was collected from April 2014 to July 2015 using the ICD-9 codes 008.45 CDC and 562.11 DV at a tertiary hospital system. Demographic data and multiple comorbidities were formulated independently for CDC and DV, as well as concomitant infection. Outcomes evaluated include intensive care unit admission, ventilator use, acute renal failure, cardiac arrest, and septic shock. Analysis was performed using R 3.2.1 computer system (R Core Team). Categorical variables were tabulated using chi-square tests. For non-comorbid variables the analysis of variance test was used, and for comorbid variables the Kruskal-Wallis test was used. Significance was set at $p \leq 0.05$.

Results: Overall 3849 patients were identified. Of these, 1250 had CDC infection (32.5%), 2566 had DV (66.7%), and 33 had concomitant CDC and DV infection (0.8%) in the 15 month period analyzed. Female patients had a significantly higher percentage of concomitant infection, 78.8% vs CDC 61% and DV 59%, $p<0.036$. Patients who were diabetic with chronic complications had a significantly higher rate of concomitant infection, 23.1% vs CDC 16.9 % and DV 2.8%, $p<0.001$. Patients with concomitant infection had significantly higher rates of peripheral vascular disease, chronic pulmonary disease, and renal disease, all $p<0.001$. Overall intensive care unit admission was higher amongst the concomitant group, 33% vs CDC 27.4% and DV 6%, $p<0.001$. Patients with concomitant infection also developed higher rates of acute respiratory failure, ventilator use, and cardiac arrest, all $p<0.001$.

Conclusions: This is the largest study to date assessing concomitant CDC and DV infections. Overall, a very small percentage of patients acquire concomitant infections; however it resulted in significant morbidity and higher rates of intensive care unit admission and end-organ damage than CDC and DV infections independently.

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LAPAROSCOPIC COLECTOMY IN OBESE PATIENTS RESULTS IN SUPERIOR OUTCOMES COMPARED TO THE HAND-ASSISTED LAPAROSCOPIC TECHNIQUE.

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Purpose: Recent NSQIP-based evidence indicates laparoscopic colectomy (LC) has better outcomes than hand-assisted laparoscopic colectomy (HALC) in the general population. Previous comparative studies from high volume, specialized centers demonstrated that the hand-assisted technique offers distinct advantages in the obese population and that it is utilized more often in this subset of patients. The aim of this study was to perform a comparison of HALC and LC on obese patients using the NSQIP dataset. Our hypothesis was outcomes of HALC are favorable to LC in obese patients.

Methods: The American College of Surgeons National Surgical Quality Improvement Project (ACS-NSQIP) public use file and targeted colectomy dataset for 2012-2013 were utilized. The study sample included all patients recorded in the colectomy datasets and all data variables included in both the colectomy and public use data files. Only patients who were defined as obese (BMI>30) with a laparoscopic or hand-assisted operation were included. Patient, operation, and outcome variables were compared for HALC and LC for the obese population as well as BMI subgroup classifications within the obese group. Bivariate analysis compared the populations, followed by multivariate regression to determine if technique was predictive of certain complications.

Results: A total of 5,635 obese (BMI>30) patients met study criteria. More HALC patients were obese compared with the LC cohort (36%, n=2,607 versus 32%, n=3,028, p<0.001). Patients who underwent HALC were more likely to be severely obese (BMI>35, 9% vs 7%, p<0.001) and morbidly obese (BMI>40, 5% vs 4%, p<0.001). Indication for surgery was more commonly diverticular disease (32% of HALC, 29% of LC) and rectal neoplasm (8% of HALC, 6% of LC, p<0.001). Calculated risk of morbidity (12% vs 12%) and mortality (0.21% and 0.19%) were significantly different despite minimal differences. Low anterior resections and total abdominal colectomy were more commonly performed using the HALC technique (30% vs 24% and 4% vs 3%, p<0.001). Multivariate regression analysis indicated that overall postoperative complications, infectious complications, and ileus were increased in the HALC cohort. (Table) Length of stay was also increased in the HALC group (6.1 vs 5.5 days, p<0.001).

Conclusions: In contrast to previous studies that have shown improved outcomes in obese patients who underwent HALC, our results indicate traditional LC is superior. In this study, the HALC technique was an independent predictor of post-operative complications. In obese patients who are candidates for a minimally invasive colectomy, preference should be given to traditional laparoscopy over the hand-assist technique.

Table 1

Technique %(n)	HALC 31.6 (3,028)	LC 35.9 (2,607)	Bivariate p	Multivariate OR
Morbidity %(n)	24.9 (649)	20.5 (620)	<0.001	1.19 (1.03-1.38)
Infectious Complications %(n)	11.1 (288)	8.4 (255)	<0.001	1.32 (1.10-1.46)
Ileus %(n)	9.6 (250)	7.4 (224)	0.003	1.26 (1.04-1.52)

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PREVALENCE, RISK FACTORS, AND TRENDS OF PERIPHERAL NERVE INJURY DURING COLORECTAL SURGERY: ANALYSIS OF THE NATIONAL SURGICAL QUALITY IMPROVEMENT PROGRAM (NSQIP) DATABASE.

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Purpose: To identify the prevalence, risk factors and trends of peripheral nerve injury during colorectal procedures.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database was surveyed for colorectal procedures between 2005 and 2013. The rate of peripheral nerve injury (PNI) was calculated for the overall study period and per 10,000 procedures per year to identify the trends over the study period. Risk factors for postoperative peripheral nerve injury (PNI) were identified using univariate and multivariate logistic regression analysis.

Results: A total of 186,936 colorectal cases were identified between 2005 and 2013. 27% of the cases were performed laparoscopically. PNI occurred in 122 cases (6.5 PNI/10,000 colorectal procedures). The rate of PNI declined over the study period from 25 PNI/10,000 procedures in 2006 to less than one PNI/10,000 procedures in 2013 (p<0.001). Laparoscopic procedures were associated with 5 PNI per 10,000 procedures, compared to 7 PNI per 10,000 open colorectal procedures (p=0.043). Patients with peripheral nerve injury were younger (mean+/-standard deviation; 54.02 yr +/-15.41 vs. 61.56 yr +/-15.95, P<0.001), more likely to be obese (BMI ≥30; 43% vs.31%, P=0.003) and more likely to have received radiotherapy preoperatively (12.3% vs. 4.7%, P<0.001). Peripheral nerve injury was also associated with longer operative time (277.16 min+/-169.7 vs. 176.69 min +/-104.8, P<0.001) and procedures performed in lithotomy position (left side colectomy/sigmoidectomy/rectal procedures) (63% vs. 51%, P=0.028). In multivariate logistic regression analysis, increased operative time (in 10-minute increments) was associated with increased risk of PNI (OR=1.04, 95% CI 1.03-1.04), while increase in age (in 10-year increment) was associated with a protective effect (OR=0.80, 95% CI 0.71-0.90). Patients within the fourth quartile of operative time had four times the risk of PNI compared to those in the first quartile (OR=4.02, 95% CI 2.25-7.20). The same finding was true for procedure-specific operative time. Obesity, preoperative radiotherapy and lithotomy position were associated with PNI in univariate, but not in multivariate analysis.

Conclusions: PNI is uncommon (0.065%) and its rate declined significantly over the study period to less than 1 case per 10,000 procedures in recent years. Prolonged operative time and younger age were associated with increased rate of peripheral nerve injury after colorectal procedures. Instituting and documenting measures to prevent PNI is imperative in all cases; however special attention to this complication is necessary when surgeons contemplate long colorectal procedures.

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DESPITE DIFFERENCES IN PATIENT CHARACTERISTICS THE TARGETED COLECTOMY MODULE OF THE NATIONAL SURGERY QUALITY IMPROVEMENT PROJECT PROVIDES GENERALIZABLE DATA.

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Purpose: The National Surgery Quality Improvement Project (NSQIP) is a powerful tool for the study of risk adjusted surgical outcomes with contributions from a diverse range of participating institutions. The targeted colectomy module of the NSQIP collects additional data germane to the practice of colorectal surgery from a self-selected group of NSQIP participants. The extent to which targeted module participant centers represent a select group of high volume referral centers with different patients, case complexity and outcomes is unknown. We aim to compare patient and procedure related parameters for patients undergoing colectomy in targeted versus non-targeted institutions.

Methods: All patients undergoing colectomy for any indication in the NSQIP database from 2012 to 2013 were identified. Those cases with supplementary targeted data were considered the targeted group. Preoperative, intraoperative and postoperative variables were compared between the targeted and non-targeted groups. Comparisons were made using two-sided t-test or chi-square test as appropriate. Multivariable logistic regression was used to determine independent effect of targeted status on mortality and overall morbidity.

Results: We identified 71,400 colon resections of which 38,486 (54%) were targeted. The proportion of targeted cases increased from 52% to 56% from 2012 to 2013 (p<0.001). Non-targeted patients were older (63.2 vs. 61.8 years, p<0.001) and more likely diabetic (17% vs. 15%, p<0.001). Targeted cases were more likely to be elective (70% vs. 66%, p<0.001). Case complexity as measured by relative value units (RVU) did not differ between groups (26.4 vs. 26.4, p=0.541). Among elective cases, targeted procedures were more likely to utilize a laparoscopic approach (elective: 49% vs. 46%, p<0.001). When stratified by elective case status, no differences were seen between groups with respect to mortality, reoperation, readmission or overall morbidity (Table 1). On multivariable analysis, targeted case status was not associated with differences in patient mortality (elective: p=0.319, non-elective: 0.087) or morbidity (elective: p=0.495, non-elective: 0.069).

Conclusions: The targeted colectomy module of the NSQIP has been widely adopted among NSQIP institutions comprising over half of all colectomies performed during the study period. While statistically significant differences in patient characteristics exist between the targeted and non-targeted cohorts, targeted case status was not associated with patient outcomes for either elective or non-elective cases. Data generated from research using targeted module cases appear to be broadly generalizable to the practice of colon surgery.

Complications Following Colectomy in Targeted versus Non-Targeted Cases

	All	Targeted	Non-Targeted	p-Value
Elective				
Mortality; N (%)	481 (1)	247 (1)	234 (1)	0.080
Reoperation; N (%)	2213 (5)	1197 (4)	1016 (5)	0.237
Readmission; N (%)	4638 (10)	2554 (10)	2084 (10)	0.721
Any complication; N (%)	10733 (22)	5950 (22)	4783 (22)	0.783
Non-Elective				
Mortality; N (%)	2086 (9)	1045 (9)	1041 (9)	0.421
Reoperation; N (%)	1944 (9)	1024 (9)	920 (8)	0.117
Readmission; N (%)	2753 (12)	1401 (12)	1352 (12)	0.951
Any complication; N (%)	11222 (50)	5742 (50)	5480 (50)	0.522

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INCISIONAL NEGATIVE PRESSURE WOUND THERAPY REDUCES SURGICAL SITE INFECTIONS IN COMPLEX COLORECTAL SURGERY PATIENTS.

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Purpose: To assess the clinical effectiveness of incisional negative pressure wound therapy (NPWT) in the prevention of surgical site infections (SSIs) in patients undergoing complex, reoperative colorectal surgery at higher risk for SSIs.

Methods: SSI prevention bundle was implemented and showed reduction in overall SSI rates in most colorectal surgery patients. Although adaptation of this prevention bundle, there was no significant reduction in superficial SSIs in the group of patients undergoing complex reoperative colorectal surgery. Thus, patients undergoing complex reoperative colorectal surgery were selected from a prospectively maintained database and received application of the Prevena™ incision management system (KCI, San Antonio, TX), in addition to SSI bundle. This involved application of a wound vacuum sponge over a standard wound closure (skin closure with staples), prior to ostomy maturation. This dressing was maintained for 7 ± 2 days postoperatively, and wounds were assessed at postoperative day 7 and 30 for the development of SSIs.

Results: One hundred one patients were treated with SSI bundle and standard gauze dressings, and 55 consecutive complex colorectal reoperative patients were treated with SSI bundle and NPWT. The groups were similar in terms of American Society of Anesthesiology (ASA) score, diabetes, BMI, and smoking status (table). Patients treated with NPWT had a significantly higher surgical wound classification and were more likely to have undergone surgery for complex inflammatory bowel disease (IBD) and reoperative pelvic pouch surgery. The use of NPWT significantly reduced the incidence of superficial SSIs (1.8 % vs. 11.9%, p=0.03).

Conclusions: In patients undergoing complex, reoperative colorectal surgery, the use of NPWT shows promise in reducing rates of superficial SSIs.

Baseline patients' characteristics and postoperative outcomes.

Variable	NPWT (N=55)	No NPWT (N=101)	Total (N=156)	p-value
Diagnosis				0.001
IBD	38(69.1)	35(34.7)	73(46.8)	
Colorectal cancer	5(9.1)	11(10.9)	16(10.3)	
Other	12(21.8)	55(54.5)	67(42.9)	
Procedure				0.001
Reoperative pelvic pouch surgery	37(67.3)	32(32.0)	69(44.5)	
Segmental bowel resection	7(12.7)	49(49.0)	56(36.1)	
Abdominoperineal resection	2(3.6)	4(4.0)	6(3.9)	
Exploratory laparotomy w ileostomy creation	9(16.4)	15(15.0)	24(15.5)	
Wound Classification				0.001
II	1(1.9)	27(27.0)	28(18.3)	
III	23(43.4)	41(41.0)	64(41.8)	
IV	29(54.7)	32(32.0)	61(39.9)	
Smoking	13(25.0)	24(24.0)	37(24.3)	0.89
Diabetes mellitus	2(3.6)	5(5.0)	7(4.5)	0.99
ASA classification				0.62
2	13(30.2)	38(38.8)	51(36.2)	
3	28(65.1)	56(57.1)	84(59.6)	
4	2(4.7)	4(4.1)	6(4.3)	
BMI, kg/m2	24.4±0.8	26.1±0.6	25.5±0.5	0.25
Overall SSI				
Superficial	1(1.8)	12(11.9)	13(8.3)	0.03
Deep	1(1.8)	1(0.99)	2(1.3)	0.99
Organ Space	5(9.1)	8(7.9)	13(8.3)	0.80

P442

PATIENT SATISFACTION AND QUALITY OF LIFE AFTER SACRAL NERVE STIMULATOR PLACEMENT FOR FECAL INCONTINENCE.

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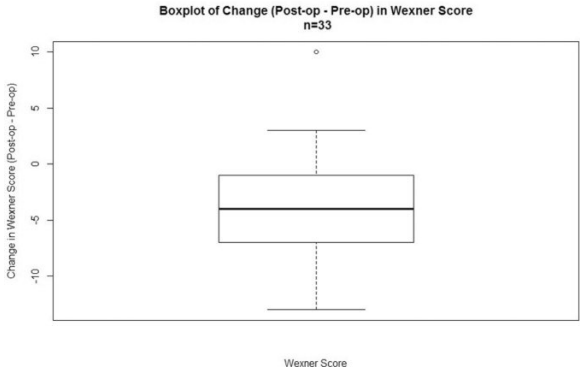
Purpose: Our primary focus is to evaluate the effect of sacral nerve stimulation (SNS) in patients with fecal incontinence. We aim to evaluate quality of life, resolution of symptoms, and overall satisfaction with the device.

Methods: Demographic data were obtained in a retrospective manner for all patients who underwent SNS device placement for fecal incontinence by three colon and rectal surgeons in a community setting. Phone surveys were then employed to ascertain patient's current quality of life. We employed the Wexner scale, the Fecal Incontinence Quality of Life (FIQOL) questionnaire, and a standardized overall satisfaction scale to assess patient's outcomes after Interstim placement.

Results: A total of 53 patients met our inclusion criteria. 48 (90.6%) of patients were female. Mean age was 62.6 years old. Mean BMI was 28.7. The average length of symptoms prior to treatment was 54.8 months (Range 2 to 360 months). 5 patients (9%) did not have a response to stage 1 of SNS implantation and had their leads removed. 11 patients (20.7%) required removal of their devices after completion of the second stage of implantation. 37 patients (69.8%) responded to our phone survey. Mean follow-up time was 52 months. The mean pre-op Wexner score was 14.6. The mean post-op Wexner score was 10.1, with an average decrease of 4.2 (95% CI 2.3-6.0, p-value <0.001) (Figure 1). Overall, 28 patients (80%) saw a decrease in their Wexner score post-op. Average overall satisfaction with the Interstim device was 2.9 on a scale of 1 to 5, with 1 indicating not at all satisfied and 5 indicating total satisfaction. Utilizing the FIQOL, mean Lifestyle question score was 2.4 (Scale of 1 to 4, with higher numbers indicating increased quality of life). The remaining mean scores were 2.1, 2.7, and 2.2 for the Coping, Depression, and Embarrassment scales, respectively.

Conclusions: The sacral nerve stimulation device was associated with a significant decrease in symptoms of fecal incontinence as determined by the Wexner scale score in a majority of patients. Despite this, many patients still had limitations on their daily activities due to residual symptoms of fecal incontinence. This was reflected in the respective scores pertaining to lifestyle, coping, depression, and embarrassment per the FIQOL. A significant portion of our patients eventually underwent removal of their device for various reasons. The overall satisfaction with the SNS device was lower than we had anticipated. In many cases, the patients initially had good responses to SNS which, per the patients, waned over time. Sacral nerve stimulation is an option for treatment of fecal incontinence, although the long-term efficacy needs to be further studied.



P443

BIOFEEDBACK FOR CONSTIPATION: STRAINING TO PREDICT SUCCESS.

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Purpose: Management of chronic constipation poses significant challenges to colorectal surgeons. Anorectal Biofeedback Therapy (BFT) uses variable combinations of intra-anal electromyography (EMG), anorectal manometry, and operant conditioning to improve patients' defecation mechanics. BFT is often an effective first line treatment in patients with constipation due to pelvic floor dysfunction. However, BFT is a time and labor-intensive process and data identifying which patients are most likely to benefit are limited. Therefore, we aimed to identify patients based on demographic, baseline clinical, and results of diagnostic studies that were most likely to have symptom improvement from BFT.

Methods: Patients who underwent BFT at our institution between 2007 and 2015 were identified for chart review based on billing data. Inclusion criteria were adults who underwent BFT for a diagnosis of outlet obstruction constipation. BFT therapy consisted of an initial visit with a colorectal surgeon, baseline manometric and EMG studies, and at least one BFT therapy session. We compared demographic, clinical, and diagnostic test results including balloon expulsion, trans-rectal ultrasound, intra-anal EMG, rectal sensitivity, and rectal pressures. Not all patients underwent all diagnostic studies. Success was defined as subjective improvement described by the patient in a follow-up office visit. Categorical variables were compared using chi-squared analysis.

Results: Sixty-one patients with an average age of 56 years underwent BFT, with a median time to follow-up of 5 months (defined as date of final BFT session to last documented office note from any provider addressing constipation). Forty-six (75%) patients were female, 7 (14%) had diabetes, 27 (66%) females had a history of obstetric trauma during childbirth, the average gravida was 2.1 and average para 2.1. Forty-three (56%) were taking psychiatric medications and 15 (27%) were on chronic narcotics. Eighteen patients (30%) reported subjective improvement in constipation symptoms, 24 patients (39%) reported no improvement or worsening of symptoms, and 19 patients (31%) did not follow-up. Median length of follow-up was 4.5 months for patients for patients that that succeeded and 8 months for patients that failed. There was no correlation between any medical comorbidities or findings on balloon expulsion, trans-rectal ultrasound, intra-anal EMG, or anorectal manometry (rectal sensitivity and squeeze pressure) on the outcome of BFT (**Table 1**).

Conclusions: BFT has been well described in the literature as a successful treatment for outlet obstruction constipation; however, identifying which patients are most likely to benefit from this time and labor intensive process is difficult. In this study we were unable to identify any patient or diagnostic factors that correlate with success. Larger prospective studies are required to identify which patients have the greatest chance of success with BFT.

Table 1: Demographic and diagnostic studies of patients undergoing biofeedback therapy

	Success	**Failure**	*p-value*
Sex			0.33
Male	2	8	
Female	14	18	
Diabetes			0.64
No	14	24	
Yes	1	3	
Psychiatric Medication			0.91
No	6	8	
Yes	10	18	
Narcotic Use			0.89
No	11	16	
Yes	5	8	
Obstetric Trauma			0.92
No	5	11	
Yes	7	11	
Balloon Expulsion			0.74
Able to Expel	7	13	
Unable to Expel	8	12	
Trans Rectal Ultrasound			0.97
Normal Sphincter	1	3	
Sphincter Hypertrophy	12	18	
Trans Anal EMG			0.37
Normal	1	0	
Abnormal EMG	7	6	
Rectal Sensitivity			0.15
Normal	2	10	
Hyposensitive	13	15	
Rectal Squeeze Pressure			0.95
Normal	7	9	
Low Squeeze Pressure	9	15	

Demographic and diagnostic studies of patients undergoing biofeedback therapy

P444

CORRELATING INCONTINENCE SCORES TO PATIENT'S PERCEPTION OF SUCCESSFUL SURGICAL OUTCOME AFTER A SPHINCETEROPLASTY.

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Purpose: Fecal incontinence(FI) scoring tools are used to evaluate the degree, frequency and severity of fecal accidents. The Cleveland Clinic fecal incontinence score (Wexner) and the fecal incontinence severity index (FISI) are validated questionnaires used in clinical settings. Wexner scores>9 (ranging from 0-no incontinence to 20 severe incontinence) and FISI scores>11 (ranging from 0-61 severe incontinence) are associated with bothersome fecal accidents. These scores can be used to measure patients symptoms prior to and after intervention. It is unclear what changes in these scores correlate to a positive change in patient's symptoms and a good functional outcome. Currently, sponsored clinical research use an improvement in symptoms of 50% or more in a study population as an end-point. Our study aims to determine the **minimum change** needed on the Wexner and FISI scores to reflect a successful outcome in a population of patients who have undergone a sphincteroplasty. .

Methods: After IRB approval, patients who underwent a sphincteroplasty between 2009-12 and who had preoperative Wexner and FISI scores recorded in the EMR were included. We excluded patients who had multiple repairs or those who received subsequent operative treatment for FI. Patients were interviewed via a telephone call and a recent FISI/Wexner score was obtained along with a Patient Global Impression of Change score (PGIC) which evaluates change rated on a scale from 1-7 (1=no change 7=a great deal better). For correlating the change in scores with the PGIC score we combined patients into 3 groups. The first group had little or no change (Not better/no change) the second were somewhat better (combination of a little better,somewhat better and moderately better) and the last group reported a good outcome (combination of better and a great deal better)

Results: 32/61 (52%) of patients could be contacted via a telephone call. 29 were female with a mean age of 52.6 years. The mean follow up was 50 months (29-65). The mean preoperative Wexner score was 12.6 and FISI score was 32.2 and the mean postoperative scores were Wexner 7.9 and FISI 20.1. 24/32 patients were happy with the result and would recommend it to others, The change in the scores from baseline for the "no change" group (n=7) was an **increase** by 5.1 on the Wexner and 14.3 on the FISI scale, while the "little better" (n=6) group had a **decrease** of 2 on the Wexner and 9.7 on FISI, and the group that was "better" had a **decrease** of 9.1 on the Wexner and 22.6 on the FISI scores.(Figure)

Conclusions: In patients who have undergone a sphincteroplasty a **decrease of 9 points** on the Wexner score and **22 points on the FISI** score from baseline reflects a successful functional outcome from the **patient's perspective**. Severity scores such as these are more likely to be integrated into clinical care and research trials if changes in the values are understood by clinicians.

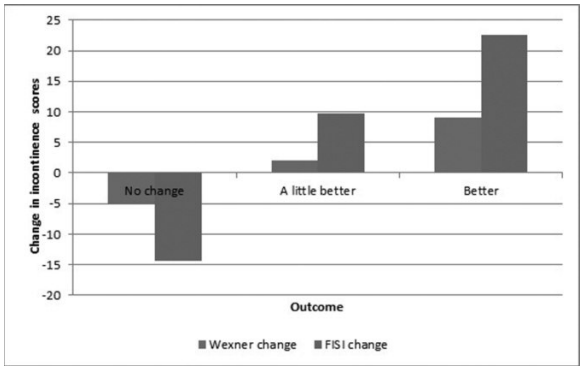

Figure. Changes in postoperative Wexner and FISI scores from baseline categorized by PGIC scores.

P445

ASSESSMENT OF DEFECATION DISORDERS WITH DEFECOGRAPHY, ULTRASOUND, AND MANOMETRY IN PATIENTS WITH RECTOCELE.

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Purpose: To identify if anatomic and physiologic findings correlate with severity of symptoms identified by the Altomare obstructive defecation syndrome score and fecal incontinence severity index.

Methods: Patients with rectoceles were evaluated with the Altomare obstructive defecation syndrome score, fecal incontinence severity index and defecography (n = 108), ultrasound (n = 82), and manometry (n = 79) prior to surgical repair.

Results: Size of the rectocele and width of the rectovaginal septum did not correlate with the Altomare obstructive defecation syndrome score (p = 0.608 and p = 0.58, respectively). Size of the rectocele and width of the perineal body did not correlate with fecal incontinence severity index score (p = 0.42 and p = 0.177, respectively). In 82 patients with anal incontinence, disrupted sphincter status (n = 38) correlated with a higher mean fecal incontinence severity index (29 vs. 20; p = 0.003) but did not influence the Altomare obstructive defecation score (10 vs 11; p = 0.257). In 59 patients with fecal incontinence (liquid or solid stool) undergoing ultrasound and manometry, disrupted sphincter status (n = 31) had a lower mean anal resting pressure (24 vs. 42; p = 0.001) but other manometry parameters evaluated were not affected.

Conclusions: In patients with rectoceles, anatomic and physiologic studies correlated poorly with the Altomare obstructive defecation syndrome score and fecal incontinence severity index.

P446

EVALUATION OF TRENDS IN THE USE OF INTERSTIM™ FOR FECAL INCONTINENCE, FROM THE NEW YORK STATE EXPERIENCE.

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Purpose: Fecal incontinence represents a large source of morbidity, is often under-diagnosed, and is a challenging clinical problem to manage. Sacral nerve stimulation with Interstim™ was approved by the FDA in 2011 for the treatment of fecal incontinence. While validated by several industry sponsored trials, little is known about its use or perioperative outcomes in real world settings. We sought to characterize the New York State (NYS) experience with Interstim™ since approval 2.3 years ago.

Methods: We used the NYS Department of Health SPARCS database to identify patients with a diagnosis of fecal incontinence who underwent Interstim™ testing or placement between 2011-2013 using ICD-9-CM diagnosis codes and CPT codes. We also identified patients who underwent sphincteroplasty during the same time period for comparison. We analyzed trends in procedure volume, rate of permanent implantation, patient demographics, provider specialty and setting, and long-term rates of revision or removal.

Results: 250 patients underwent an Interstim™ procedure in NYS from 2011-2013. 87 separate patients underwent sphincteroplasty during the same time period, however due to small sample size and limits on data publication by SPARCS they were not included in further analysis. 41 patients underwent Stage I without concurrent or subsequent Stage II, resulting in a 16.4% trial period failure rate. The remaining 209 patients (83.6%) were included for analysis. The mean age of our cohort was 64.3 years (±13.9). The number of procedures increased from 2011 – 2013 (25, 63, 121, p=0.08). The majority of patients were white (80.4%), female (88.5%), and had either Medicare (49.5%) or commercial insurance (39.9%). 72.8% of patients had 1 or fewer co-morbidities with the most common being Hypertension (41.1%), Cardiopulmonary Disease (17.7%), Diabetes Mellitus (13.9%), and Depression (8.6%). There were 15 patients (7.2%) who had removal or revision of Interstim™ with median time to removal/revi-

sion of 98 days (interquartile range=42-164 days). There were less than 10 patients who had a reported infectious complication. There were 32 distinct providers including general surgeons, colorectal surgeons, urologists, and urogynecologists; 53% of providers were board certified in colorectal surgery. 52% of procedures were performed in hospital settings that were either urban or metropolitan, with the remainder (48%) performed in rural settings.

Conclusions: Since FDA approval, in the fall of 2011, there has been an increasing volume of Interstim™ procedures for fecal incontinence in New York State. The patient demographics, complications, and trial period failure rate seem comparable to randomized studies. Board certified colorectal surgeons, however performed only half of procedures.

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THE USEFULNESS OF DYNAMIC TRANSLABIAL ULTRASOUND VS. ECODEFECOGRAPFY COMBINED WITH ENDOVAGINAL APPROACH TO ASSESS THE PELVIC FLOOR DYSFUNCTIONS. WHAT'S THE EFFECTIVENESS OF BOTH TECHNIQUES?

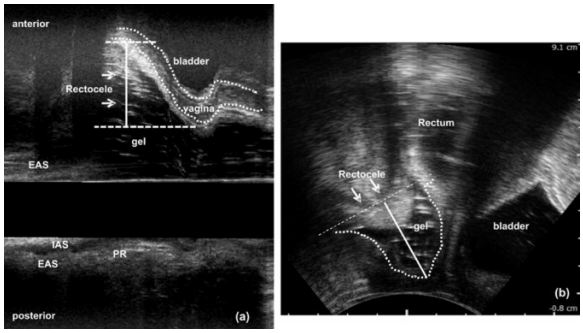
S. M. Murad-Regadas, S. A. Karbage, F. Regadas, L. S. Bezerra, A. Vilarinho, L. B. Borges, F. S. Regadas Filho and K. Lustosa *Surgery, School of Medicine of the Federal University of Ceara-Brazil, Fortaleza, Brazil.*

Purpose: The aim of this study was to evaluate the usefulness of dynamic translabial ultrasound(TL) in the assessment of the pelvic floor dysfunctions(PFD), comparing its results with echodefecography combined with endovaginal approach-EDF(dynamic 3D anorectal and endovaginal ultrasound).

Methods: 42 women with PFD, mean age 56y, underwent TL and EDF to identify the sphincter and levator ani(LA) defects; non-relaxation or paradoxal contraction of the puborectal-PR muscle(anismus) measuring the anorectal angle; rectocele and depth; intussusception, entero-sigmoidocele, perineal decent-PD (measured by the displacement of PR on EDF and the displacement of the anorectal junction position-ARJ relative to the symphysis pubis-SP line by TL and cistocele(measured by a prolapse of the bladder or bladder neck below the PR (>0,5cm) by EDF and below the SP line by TL) measured at rest and during straining or Valsalva manuever.

Results: All of them complained of obstructed defecation symptoms, 16 complained of fecal incontinence(FI) symptoms and 17 urinary incontinence(UI). Overall, 29 had had vaginal deliveries, 6 had undergone cesarian sections and 7 nuliparous. The defects were identified in 7 patients(2 partial external anal sphincter(EAS), 2 combined partial EAS plus internal anal sphincter(IAS) and associated with partial unilateral LA muscles defects and 3 LA defects with intact sphincter on EDF). Of them, 5 complained of FI symptoms. The Lee Kappa Index for anismus and normal relaxation was substancial(K=0.68). The anismus was identified in 18 patients and normal relaxation in 17 with both techniques. Rectocele was identified in 27 and 25 patients by EDF and TL, respectively, with perfect agreement(k=0.89). The two techniques demonstrated identical findings in 15 patients without rectocele, and in 2, 5, and 17 with grade I, II, and III rectoceles, respectively. By TL, the depth was >2.0cm for grade III, from 1.1-2.0cm for grade II and ≤1,0cm for grade I. 2 cases of grade I on EDF, were not identify by TL. Intussusception was identified in 17 patients by EDF and confirmed in 3 by TL with fair agreement(K=0.20). Entero-sigmoicele was identified in one patient in both technique. On EDF, perineal descent >2,5cm was detected in 10 patients and there is no correlation with displacement of ARJ on TL neither with the position of ARJ below SP during straining. Cistocele was identified in 20 patients by EDF and confirmed in 18 by TL with perfect agreement(K=0.68). Of them, 11 complained of UI.

Conclusions: The two modalities may be used as a method to assess PFD. The EDF showed advantage to assess the anal sphincter and LA muscles and identify the defects. It was demonstrated a good correlation between both techniques and it was established range values for rectocele depth using TL ultrasound.



Rectocele (grade III) (a) -Echodefecography / (b) - Translabial ultrasound

P448

DAY-CASE ROBOTIC-ASSISTED VENTRAL RECTOPEXY IS MORE EXPENSIVE AND TIME CONSUMING THAN DAY-CASE LAPAROSCOPIC VENTRAL RECTOPEXY.

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Purpose: Ventral rectopexy to the promontory has become one of the most advocated surgical treatments for patients with full-thickness rectal prolapse and deep enterocele. Despite its challenges, laparoscopic ventral rectopexy with or without robotic assistance for selected patients can be performed with relatively minimal patient trauma thus creating the potential for same-day discharge. The aim of this prospective case-controlled study was to assess the feasibility, safety, and cost of day-case robotic-assisted laparoscopic ventral rectopexy compared with a routine day-case laparoscopic ventral rectopexy.

Methods: Between February 28th 2014 and February 3rd 2015, 19 consecutive patients underwent day-case laparoscopic ventral rectopexy for total rectal prolapse or deep enteroceleenterocoele in our institution. Patients were selected for day-case surgery on the basis of motivation, favourable social circumstances, and general fitness. One out of two patients underwent the robotic-assisted procedure (n=9). Demographics, technical results and costs were compared between both groups.

Results: Patients from both groups were comparable in terms of demographics and technical results. Patients operated on with the robot had significantly less pain (p=0.045). Robotic-assisted laparoscopic rectopexy showed longer median operative time (94 min vs 52.5 min, p<0.001) and higher costs (9,088 vs 3,729 euros per procedure, p<0.001) than laparoscopic rectopexy. There was no difference in term of postoperative complications or hospital admission. Most frequent cause of day-case surgery failure was pain and urinary retention.

Conclusions: Day-case robotic-assisted laparoscopic ventral rectopexy is feasible and safe, but results in increased operative time and higher costs than classical laparoscopic ventral rectopexy for full-thickness rectal prolapse and enteroceleenterocoele. We found no arguments to support the routine use of robotic assistance in rectopexy operations.

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ROBOTIC VS. LAPAROSCOPIC VENTRAL RECTOPEXIES: WHAT'S THE BIG DIFFERENCE?

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Purpose: Ventral mesh rectopexy is increasingly being used to treat both full thickness rectal prolapse and obstructed defecation syndrome associated with internal prolapse and rectocele. This approach avoids posterolateral dissection and denervation, which can result in postoperative constipation. Although adoption of this procedure has been slow in the United States, there is increasing interest in the robotic platform for this

and other similar types of pelvic surgery. Therefore, the aim of this study is to compare our results of ventral rectopexy performed laparoscopically versus robotically.

Methods: This is a retrospective review of prospectively collected ventral rectopexy data performed laparoscopically and robotically by a single surgeon. The procedures were performed for full thickness rectal prolapse and obstructed defecation. Patient demographics, perioperative variables and short-term postoperative outcomes were compared between the two approaches using chi-square and Mann-Whitney U tests.

Results: Although there were more ventral rectopexies done via a laparoscopic approach (20 vs. 9), there was no difference between the 2 groups in terms of median age (56 vs.53, p=0.98), BMI (25 vs. 27, p=0.47), indication (35% vs. 44%, full thickness prolapse, p=0.69), ASA score (p>0.99), estimated blood loss (25 vs. 50mL, p=0.25), or median length of stay (1 (range 1-15) vs. 1 (range 1-6), p=0.84). Overall, median pain scores and narcotic requirements did not differ between the groups during the first 36 hours postoperatively. Differences were apparent in disposable operating room costs, which averaged about $1650 more for robotic cases (p<0.001) and a slightly longer median operating time (166 vs. 201 minutes, p=0.07).

Conclusions: In this analysis of minimally invasive approaches for ventral rectopexy, there was no difference in measured perioperative variables between robotic and laparoscopic approaches except for cost and operative time. Large scale, multiple surgeon data will be required to fully understand the preferred role of robotics in ventral rectopexy.

P450

WHICH PATIENTS WITH OBSTRUCTED DEFECATION SYNDROME BENEFIT FROM VENTRAL RECTOPEXY?

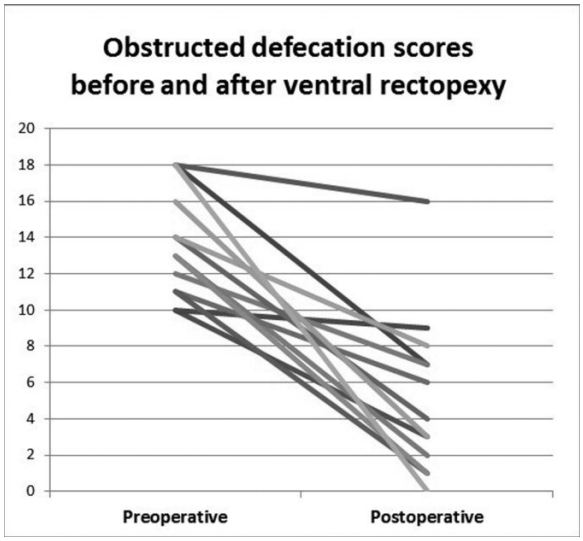
E. Hayakawa, J. Ogilvie and T. Shaker *General Surgery, GRMEP, Grand Rapids, MI.*

Purpose: Obstructed defecation is a debilitating disease that affects many Americans' quality of life. About 2 to 27% of people in the United States suffer from constipation with the majority having obstructed defecation syndrome. The role of ventral rectopexy as a treatment for obstructed defecation remains unclear in part due to the heterogeneous pathologies associated with defecation disorders. In order to aid in future operative patient selection, this study reviews preoperative symptoms and attempts to correlate them with postoperative outcomes among those who have undergone ventral rectopexy.

Methods: This is a retrospective review of prospectively collected data of all patients who underwent ventral rectopexy for obstructed defecation performed by a single surgeon. Demographic information, Altomare obstructed defecation scores, and radiographic findings were assessed.

Results: Ventral rectopexy was performed in 13 women with a median age of 59 (40-79) and BMI 28.6 kg/m2 (18.3-34.3). Median obstructed defecation scores were 13 (10-18). Preoperative defecography showed all cases had a rectocele, with the majority (10) measuring 2-5cm. 4 patients were documented to have enteroceles. Postoperatively 11 out of 13 were completely satisfied after a median follow-up of 1.5 months. While there was significant improvement in overall defecation scores (13.7 vs. 5.2, p=0.001, *figure* 1) the three components that were most dramatically different were digitation (3.4 vs. 0.53 p=0.002), feeling of incomplete emptying (3.1 vs. 1.4 p=0.012) and straining (2.5 vs. 0.5 p=0.004). Laxative use and stool consistency were unchanged from preoperative assessment.

Conclusions: Based on the current study, certain components of obstructed defecation (digitation, incomplete emptying and straining) show marked improvement after ventral rectopexy. Although promising in the short term, longer follow-up will be required to understand the durability of ventral rectopexy for obstructed defecation syndrome.



P451

PRELIMINARY STUDY OF FUNCTIONAL OUTCOMES AFTER LAPAROSCOPIC SUTURE RECTOPEXY FOR RECTAL PROLAPSE: IS MORE DATA NECESSARY?

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Purpose: Laparoscopic suture rectopexy (LSR) for rectal prolapse provides the advantages of a minimally invasive surgery with low recurrence rates. However, functional outcomes after LSR have not yet been shown. The aim of this study was to clarify short-term functional outcomes after LSR for rectal prolapse.

Methods: Between January and December 2014, patients who had scheduled LSR (no mesh) for rectal prolapse were recruited for a prospective study. Fecal incontinence was assessed using the Wexner score (WS), the Fecal Incontinence Severity Index (FISI), and the Fecal Incontinence Quality of Life (FIQL) assessment pre- and post-operatively. Fecal incontinence was assessed using the Wexner score (WS), the Fecal Incontinence Severity Index (FISI), and the Fecal Incontinence Quality of Life (FIQL) pre- and post-operatively. Constipation was also assessed using the Constipation Scoring System (CSS) and the Patient Assessment of Constipation Quality of Life (PAC-QOL). Anal manometry and defecography were performed pre- and postoperatively as well.

Results: Ultimately, 20 patients were included in this prospective study after completing all the questionnaires and physiological tests. There was one male and 19 females with a mean age of 72.1 (range: 30-89). The average operating time was 129.3 minutes (range: 94-198) with no conversion to open surgery. No significant postoperative complication was encountered. Regarding fecal incontinence, the WS and FISI significantly improved after surgery (10.6 to 4.4, p<0.05, 22.0 to 7.0, p<0.05, respectively). All four categories of the FIQL also improved (p<0.05). Regarding constipation, the CSS significantly improved (6.5 to 2.7, p<0.05). Three out of 4 categories of PAC-QOL, all except physical discomfort, improved significantly. Maximum resting pressure and maximum squeeze pressure did not change significantly. Defecography showed no internal or external rectal prolapse after surgery. Recurrence of rectal prolapse was observed in one patient (5.0%) during the short follow-up period.

Conclusions: This study showed that LSR may provide significant symptomatic and QOL improvement of fecal incontinence as well as symptomatic improvement of constipation after LSR. Further study evaluating long-term functional outcomes is necessary.

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THE EFFECT OF VAGINAL DELIVERY ON THE ANATOMY AND FUNCTION OF THE PELVIC FLOOR AND ANAL CANAL MUSCLES. IS THERE ANY CORRELATION BETWEEN SUCH ABNORMALITIES AND FECAL INCONTINENCE SYMPTOMS?

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Purpose: The vaginal delivery is the most frequent risk factor for anatomic and innervations damages of the pelvic floor and anal canal muscles. So the aim of this study was to demonstrate the anatomic and functional abnormalities of anal canal and pelvic floor in women with previous vaginal delivery and correlating with the symptoms of fecal incontinence(FI).

Methods: A prospective study evaluating 130 women with previous vaginal delivery(VD) assessed by Cleveland Clinic Fecal Incontinence score(CCFIS), anorectal/endovaginal 3D ultrasound and anal manometry. The patients were distributed in 2 groups according to occurrence of anal sphincter and/or pubovisceral muscles-PMV(including puborretal+pucoccigeo muscles) defect: GI-women with muscles defect and GII- without defect. The length of the anterior external anal sphincter(EAS), anterior and posterior internal anal sphincters(IAS) and posterior EAS-puborectal muscles, *gap* (distance from the proximal edge of the anterior EAS to the anorectal junction), the area of the levator hiatus(LH) and anal pressures were measured and correlate with the presence and severity of FI symptoms. The data were analyzed with Student's t test and Spearman rank correlation coefficients(ρ). Intraclass Correlation Coefficients(ICC) were used.

Results: GI included 89/68% women, mean age 62y and GII included 41/32%, mean age 55y. FI symptoms were significantly more frequent in GI than GII as well as the median CCFIS was significant higher in GI. In GI, 47/53% had sphincter muscles defect and PVM intact (31 had EAS defect and 16 had combined EAS/IAS) and 42/47% had PVM and/sphincter muscles defect (12 had isolated PMV defect, 12 had PMV+EAS and 18 with PMV+EAS+IAS). The median CCFIS was significant high in women with combined PVM defect than those with PVM intact. The length of the anterior and posterior sphincter muscles were significantly short and the *gap* was longer in GI than GII. The LH area was significantly larger during the Valsalva maneuver in GI than GII. The resting and squeeze anal pressures by anal manometry were significantly low in GI than GII (Table) .The mean ICC ranged from 0.825 to 0.978 for 3D-US measurements.

Conclusions: The study data demonstrate that 68% of women with previous VD had at least one defect (anal sphincter or PVM) and in half of them had combined defect. There were correlations between anatomic abnormalities including the anal sphincter and/or PVM muscle defects with clinical findings like FI and severity of symptoms as well as decrease in the anal function. Additionally, the VD increases the asymmetry of anal canal and pelvic floor and were found shorter length of the anal sphincter muscles in anterior and posterior quadrants as well all the enlargement of LH area in women with defect and incontinence symptoms.

Data of women with previous vaginal delivery

Data	Women with sphincter and/or pubovisceral muscles Defects GI = 89 (68%)	Women witht sphincter and/or pubovisceral muscles Intact GI = 40 (32%)	p
Clinical factors			
Fecal Incontinence (yes)	81 (91%)	17 (41%)	0.001
CCFIS median (range)	5 (2-13)	0 (0-7)	0.001
3D US findings			
Anterior EAS length (mean)	1.0 cm	1.7 cm	0.001
Anterior IAS length (mean)	1.6 cm	2.4 cm	0.001
Posterior EAS-PR length (mean)	3.2 cm	3.5 cm	0.006
Posterior IAS length (mean)	3.0 cm	3.3 cm	0.007
Gap (mean)	2.6 cm	2.3 cm	0.003
LH area (Valsalva) (mean)	22 cm	13 cm	0.009
Anal Manometry			
Resting Pressures (mean)	33 mmHg	46 mmHg	0.004
Squeezing Pressures (mean)	129 mmHg	86 mmHg	0.005

P453

PUDENDAL NERVE TERMINAL MOTOR LATENCY TESTING DOES NOT PROVIDE USEFUL INFORMATION IN GUIDING THERAPY FOR FECAL INCONTINENCE.

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Purpose: Pudendal nerve terminal motor latency (PNTML) testing is a standard recommendation for the evaluation of fecal incontinence (FI). Its role in guiding therapy for FI has been previously questioned. We evaluated the relationship between PNTML and objective measurements of anorectal dysfunction using anorectal manometry, and PNTML and patient-reported FI severity (FISI) and FI related quality of life (FIQOL) measures at initial presentation to a Pelvic Floor Disorders Center.

Methods: This is a retrospective analysis of a prospectively collected database that included patients who underwent PNTML evaluation for the complaint of FI between 2007 and 2015. The database collected subjective data from initial appointment surveys and clinical data. Wilcoxon-Mann-Whitney test was used to assess the relationship between anorectal manometry and PNTML, and the relationship between FISI/FIQOL scores and PNTML (PNTML: normal versus delayed).

Results: A total of 269 patients underwent PNTML testing, and 91.1% were females (N=245) (median age 62.2 years, Inter-Quartile Range (IQR) = 51.2–70.0). Normal PNTML was seen in 234 (87.0%) patients. 11.5% (N=31) of patients reported having at least one of the following symptoms or diagnoses in addition to fecal incontinence: pain with sexual intercourse (4.5%), pelvic pain (7.8%), bladder pain (4.8%), or urinary incontinence with sexual intercourse (3.7%). 90 (33.5%) patients had a prior vaginal delivery, and 12 (4.5%) had a prior Cesarean section. Anorectal manometry (N=268) showed median mean resting anal pressure of 40.5 mm Hg (IQR=29.5–57.8; normal range (NR) 40–70), median maximum resting anal pressure of 60.0 mm Hg (IQR=46.0–78.0; NR 50–80), and median maximum anal squeeze pressure of 99.5 mm Hg (IQR=74.5–134.5; NR 30–110). Delayed PNTML was only significantly associated with median maximum anal squeeze pressure (p=0.04, Table). A subset of 99 patients completed questionnaires pertaining to either FISI and/or FIQOL parameters. Of these, 85 patients reported a median FISI score of 31 (IQR=23–41), which is considered to be in the severe range for FI severity. Among patients that answered all 4 FIQOL parameters (N=85), the cumulative median FIQOL score was 9.3 (IQR=7.2–11.1; normal score = 16). Delayed PNTML was not associated with a decrease in median FISI or FIQOL scores (Table).

Conclusions: Despite severe FI by physiologic and self-reported parameters, 234 (234/269, 87.0%) patients had a normal PNTML. Furthermore, PNTML was only associated with median maximum anal squeeze pressure, and it was not associated with patient-reported severity of symptoms of FI,

changes in quality of life attributable to FI, median mean resting anal pressure or median maximum resting anal pressure. PNTML testing may not be relevant to current therapeutic algorithms for FI and its routine use should be questioned**.**

Differences in anorectal manometry measurements, median patient-reported fecal incontinence severity (FISI) score, and median fecal incontinence quality of life scales (FIQOL) in patients with a normal versus delayed pudendal nerve terminal motor latency (PNTML)

	Normal PNTML	Delayed PNTML	P-value*
Median Mean Resting Anal Pressure, mm Hg	40.3 (IQR=29.5-57.8; N=234)	43.5 (IQR=27.0-57.5; N=34)	0.65
Median Maximum Resting Anal Pressure, mm Hg	59.5 (IQR=46.0-78.0; N=234)	61.5 (IQR=46.0-74.0; N=34)	0.50
Median Maximum Anal Squeeze Pressure, mm Hg	100.5 (IQR=77.0-139.0; N=234)	88.0 (IQR=67.0-114.0; N=34)	0.04
Median FISI	31 (IQR=23-42; N=81)	30 (IQR=24-40; N=14)	0.95
Median FIQOL-1	3.2 (IQR=2.4-3.6; N=81)	3.1 (IQR=2.0-3.4; N=12)	0.36
Median FIQOL-2	1.9 (IQR=1.4-2.6; N=81)	1.8 (IQR=1.2-2.3; N=12)	0.33
Median FIQOL-3	2.5 (IQR=2.0-3.0; N=79)	2.2 (IQR=1.8-3.1; N=11)	0.75
Median FIQOL-4	2.0 (IQR=1.3-2.7; N=76)	1.7 (IQR=1.7-2.0; N=11)	0.43

*Wilcoxon-Mann-Whitney test

P454

IS RADIOGRAPHIC FINDING OF ENTEROCELE IN PATIENTS WITH OBSTRUCTED DEFECATION SYNDROME CLINICALLY SIGNIFICANT?

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Purpose: Obstructed defaecation syndrome (ODS) represents a very common clinical problem and is mainly caused by ventral rectocele and rectal intussusception. An enterocele, decribed as a prolapse of the small intestine into the pelvis is also frequently seen in patients suffering from ODS. However, it is unclear if an enterocele alone causes symptoms like ODS or merely is seen as an epiphenomenon without clinical impact.

Methods: All patients with ODS who underwent Transtar procedure due to rectocele or intussusception between January 2009 and June 2015 were evaluated. Special emphasis was paid to patients with preoperative pelvicographic documentation of the underlying disorder and evidence of an enterocele.

Results: Overall 89 patients underwent a Transtar operation within 6 years. Preoperative pelvicography was performed in 76 patients. In 20 patients a concomittent enterocele was detected. In 10 of the 20 patients with enterocele and Transtar surgery an additional postoperative pelvicography showed an expected result regarding the underlying disorder (rectocele and /or intussusception). In addition, the preexisting enterocele was no longer detectable.

Conclusions: Transtar procedure appears to have a beneficial impact on enterocele in patients with ODS. Further investigation is needed to determine the significance of an enterocele in this clinical setting.

P456

EVALUATING THE IMPACT FROM NUMBER OF VAGINAL DELIVERIES ON THE DEGREE OF FECAL INCONTINENCE AND PELVIC FLOOR STUDY OUTCOMES.

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Purpose: Fecal incontinence (FI) is a common yet underreported occurrence, affecting approximately 1 out of 5 women. While several factors including parity, smoking, obesity, age, gender, sphincter trauma and decreased physical activity have been identified as potential causes of FI, there is inadequate data evaluating the impact of the number of vaginal deliveries on the degree of FI and associated pelvic floor study outcomes. The purpose of our study is to investigate whether an increase in the number of vaginal deliveries adversely impacts the degree of FI in women and impacts pelvic floor study outcomes in a manner that supports increased FI.

Methods: A retrospective review (from 2012 - August 2015) of our database identified 620 women who presented with FI at a single institution with 6 colorectal surgeons. Patients included in the study had at least one vaginal delivery, underwent pelvic floor studies, and did not receive any treatment for FI prior to their pelvic floor studies. Patients with anal trauma, anal or colon surgeries were excluded from the study to eliminate the effect of these variables on the degree of FI (determined using the Wexner score) and pelvic floor study outcomes (longitudinal sphincter profile, high pressure zone anal canal length, rectal sensation, defecation profile and EMG analysis). The Kruscal-Wallis test was used to determine statistically significant differences in the above mentioned metrics between groups of patients, who were categorized by the number of vaginal deliveries.

Results: 112 women were included in the study. Patients were categorized in 6 groups based on number of vaginal deliveries, which ranged from 1 to 6. Patients presented for evaluation of FI at a median age of 65 years (range: 26 - 89 years). Mean BMI for all patients was 27.8 kg/m^2 (SD: 5.9 kg/m^2). No statistically significant difference was noted in BMI between the patient groups (p-value: 0.26). Mean FI scores for patients with 1, 2, 3, 4, 5 and 6 vaginal deliveries were 11.6, 12.2, 12.2, 13.2, 13.4 and 11.3, respectively, with no statistically significant difference between the groups (p-value: 0.66). Means of pelvic floor study outcomes for each group are summarized in Table 1, again with no statistically significant difference for any of the outcomes between the groups.

Conclusions: This study demonstrates that the number of vaginal deliveries does not impact the degree of FI or any of the pelvic floor study outcomes analyzed, eliminating a high number of vaginal deliveries as a source of increased FI.

Impact of number of vaginal deliveries on mean pelvic floor study outcomes

	Longitudinal sphincter profile				High pressure zone anal canal length (cm)		Rectal sensation			Defecation profile			EMG analysis using peri-anal sensors	
# vaginal deliveries (# patients)	Pressure (mm Hg)		Asymmetry (%)				Sensory threshold (ml air)	Urge to evacuate (ml air)	Max volume (ml air)	Electrical activity (uV)			Grade (0 - 4)	Short peaks flick score (uV)	Ten second contract test (uV)
	Rest	Squeeze	Rest	Squeeze	Rest	Squeeze				Rest	Squeeze	Strain			
Normal range	50 - 70	100 - 180	25 - 30	25 - 30	2 - 3	2 - 3	10 - 30	20 - 60	100 - 240					10 - 20	10
1 (19)	23.2	35.3	45.3	43.6	1.9	2.1	63.9	97.6	134.7	2.7	8.2	3.9	2	8.1	5.1
2 (46)	21.2	32.0	52.3	40.4	2.4	2.5	46.2	77.2	119.5	2.5	9.5	4.5	2	9.8	7.5
3 (26)	17.1	27.7	41.7	39.9	2.7	2.6	49.1	88.0	121.7	1.8	8.5	4.0	2	8.8	6.7
4 (10)	20.8	24.5	49.3	43.3	2.2	2.3	50.6	82.2	112.2	3.2	12.0	5.3	2	12.0	10.3
5 (8)	21.7	36.3	42.8	36.6	2.4	3.4	38.7	73.8	121.9	3.0	10.0	4.6	2	9.1	7.0
6 (3)	39.7	57.6	31.8	26.6	3.2	3.4	56.7	95.0	156.7	1.6	5.1	3.0	2	7.1	3.1
All patients (112)	21.0	31.9	47.1	40.4	2.4	2.5	50.2	83.8	123.2	2.5	9.2	4.3	2	9.3	7.0
p-value	0.36	0.13	0.22	0.25	0.12	0.06	0.28	0.57	0.53	0.68	0.70	0.79		0.88	0.63

P457

MULTI-DISCIPLINARY APPROACH TO COMPLEX PELVIC FLOOR DISEASE: INDICATIONS AND APPROACHES.

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Purpose: Over a quarter of adult women report one or more pelvic floor disorders (PFD). With mulitple organ systems sometimes involved, a team-based approach is often needed. Our institution has responded by developing a pelvic floor program that provides a multidisciplinary approach to

addressing complex PFD. Treatment modalities include behavioral and lifestyle modifications, supervised exercise programs, electrical stimulation, biofeedback, and surgery. For patients who undergo combined surgery for PFD, the reported outcome data is limited. The purpose of this study was to analyze the indications and outcomes of collaborative surgery for patients with complex PFD.

Methods: A retrospective analysis of patients who underwent collaborative surgery for pelvic floor disorders involving multiple systems from 2009-2015 at our institution was performed. Demographic, cost, peri-, and postoperative data were reviewed.

Results: During the study period, 21 patients underwent collaborative surgery by a colorectal surgeon and urogynecologist. 14 patients had concurrent uterovaginal and rectal prolapse, 5 had rectovaginal fistulas, 1 had dysfunctional uterine bleeding and a rectocele, and 1 had concurrent rectal cancer and uterine prolapse. For the pelvic organ prolapse (POP) patients, there were a variety of approaches and procedures, differing widely in cost, length of stay, and OR time. Two of the procedures were open, 6 were laparoscopic/robotic, and 8 had a perineal approach. Average OR cost and direct costs were highest for the laparoscopic/robotic group, and the perineal approach group had the highest contribution margin (see table 1). Analyzing both the POP and rectovaginal fistula patients, all were female with mean age of 68, and median ASA classification of 3. Mean OR time was 269 minues, average estimated blood loss was 149ml. Mean length of stay was 3.7 days. Median follow-up was two years. Median and mean Clavien-Dindo classification was one. Only one patient had recurrence of their fistula.

Conclusions: Collaborative surgery for pelvic floor disorders is safe effective, and convenient, offering patients a one-time operation. A larger series of cases is needed in order to adequately determine post-operative outcomes, and cost effectiveness.

Patient Demographics, Complications, and Cost Data for Complex Pelvic Organ Prolapse (POP) Procedures

Procedure Approach	Age	# of Comorbid Conditions	ASA (median)	OR Time (mins)	LOS	% Patients with a Complication	OR Cost*	Direct Cost*	% Direct Cost from OR Cost*	Contribution Margin*
Open (n=2)	64	2	2	342	3	0%	$2,923.17	$9,812.07	29.79%	$3,445.49
Robotic / Laparoscopic (n=6)	61	6	3	439.8	5	67%	$7,165.27	$17,174.29	41.72%	-$1,908.51
Perineal (n=8)	74	3.4	3	220.8	2.75	38%	$1,804.22	$9,984.62	18.07%	$8,067.17
All Combined POP Procedures (n=16)	67.9	4.2	3	296.81	3.63	43.75%	$3,957.14	$12,567.67	31.49%	$3,599.34

*Cost Data n's =2, 4, 5, 11 respectively

P458

FECAL INCONTINENCE ON FACEBOOK, GOOGLE, AND TWITTER.

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Purpose: Social media has become an important platform for information communication. We investigated its use for exchanging information relating to faecal incontinence.

Methods: We searched "fecal incontinence" and "faecal incontinence" in Facebook, Twitter and Google. All tweets over a period of one year (October 2014-October 2015), all pages on Facebook, and the first 50 entries of Google search results were analysed. The results were classified into five groups: advertisements for commercial incontinence products, patients support groups and communication between patients, complementary and alternative medicine, humorous and healthcare information. The last group was further divided into four sub-groups: generic hospital/clinic information, information from scientific journals/books, communication between healthcare professionals and information provided by healthcare professionals to patients.

Results: There were 16 pages on Facebook: 4 were blank or had information on urinary incontinence. Of the remaining 12 pages, 5 (41%) pages were advertising commercial incontinence products, 4 (33%) pages were dedicated to patients support groups and 3 (25%) pages provided healthcare information. There were 1021 tweets. Nearly half of the tweets (504, 49%) provided healthcare information; of these 216 (42.8%) were tweeted by healthcare professionals to patients, 131 tweets (25.9%) were between healthcare professionals, 104 tweets (20.6%) were from medical journals or scientific books, and 53 tweets (10.5%) were from hospitals or clinics which contained generic information about events and meetings. The second commonest type of tweets were advertising commercial incontinence products (266 tweets, 26%). Patients used tweets to exchange information and advice between themselves (216 tweets, 21.5%). 31 (3.1%) tweets were humorous or of a sexual nature. Only a few tweets, 4 (0.4%) were made by promoters of alternative medicine (aloe vera, herbs, body exercises). In contrast, Google had a higher proportion of healthcare information with 37 entries (74%), 12 (24%) were commercial advertisements for incontinence products, and 1 (2%) was about an alternative medicine treatment.

Conclusions: Social media and internet appears to be also a platform for patients who want to learn about their condition and share information with each other. Although Facebook is a widely used social media, there was not much information relating to fecal incontinence. In contrast Twitter is actively used by both healthcare professionals and patients to exchange information. This may be due to the more spontaneous and short nature of tweeting. For healthcare professionals seeking information on fecal incontinence, Google offered more focused entries on healthcare information. In the abundance of information, patients may struggle to differentiate valid and useful groups/websites/tweets.

P459

SHORT-TERM OUTCOME OF PERCUTANEOUS TIBIAL NERVE STIMULATION IN THE TREAMENT OF PATIENTS WITH LOW ANTERIOR RESECTION SYNDROME EVALUATED BY THE LARS AND THE TAPE SCORE.

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Purpose: Low anterior resection (LAR) syndrome severely affects the quality of life of many patients following rectal cancer (RC) surgery with symptoms of fecal incontinence (FI), obstructed defecation (OD) and sensory pelvic dysfunctions. The severity of the LAR syndrome is usually evaluated by the LAR-score (range values 20-42. Nevertheless pelvic surgery for rectal cancer can also cause urinary and sexual dysfunctions. The TAPE-score (range values 0-100) is a new validated index which address the overall pelvic floor function including the urinary and sexual ones. Percutaneous tibial nerve stimulation is a minimally invasive technique which has been demonstrated to be able help some patients with fecal and urinary incontinence, but has never been tested in patients with LAR syndrome. Aim of the study is to test the efficacy of PTNS in these patients and to compare the reliability of these 2 scores in the evaluation of the outcome

Methods: 18 patients (male/female ratio 1, mean age 67, operated for RC between 2011 and 2014) complaining of LARs were submitted to PTNS (12 applications of 30 min each in 2 months). The LARs score and the TAPE-score questionnaires were administered before and after 3 months from the treatment. Data were analyzed by the paired Wilcoxon rank sum test. Five patients also complained of urinary incontinence and no-one was sexually active postoperatively.

Results: All the patients completed the scheduled treatment and attended the follow-up evaluation at 3 months. Nine patients (50%) reported a significative subjective improvement of the fecal incontinence, and 3 (17%) had an improvement of urinary incontinence after PTNS. Median LAR-score decreased significantly from 31.5 (IQ ranges 29-37) to 22.5 (IQ ranges, p=0.004), while the TAPE-score improved significantly from

a median value of 53.9 (IQ ranges 48-59.4) to 55.5 (IQ ranges 49.8-66.6. p= 0.0007).

Conclusions: PTNS is effective in the treatment of selected patients with LARS in the short-term, but can also help some patients with associated urinary incontinence. LARS and TAPE scores are equally reliable in the evaluation of LAR syndrome severty, however, the adoption of the TAPE-score should be preferred in case of concomitant urinary ad/or sexual problems unaddressed by the LAR-score.

P460

CLINICAL REVIEW OF THE TST-STARR PLUS PROCEDURE FOR RECTAL PROLAPSE.

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Purpose: To evaluate the therapeutic efficacy of the TST-STARR plus procedure for adults with rectal prolapse.

Methods: A series of 14 patients with full-thickness rectal prolapse treated by the TST-STARR plus procedure are reviewed between February 2014 and August 2015.The average prolapse length of all patients was 3.7(range 1.55)cm.The clinical outcomes were analyzed retrospectively.

Results: Operations were successfully performed in these 14 cases.The mean operation time was 28 (range 25-45) minutes.The mean estimated blood loss during operation was 8.5 (range 3-15) ml.The mean length of hospital stay was 8.0 days postoperative.The follow up time ranged from 2 to 20 months with a median of 10.6 months.There were no recurrence during the follow up. All patients were accompanied by varing degree of anal incontinence preoperative. 10 of 14 patients with incontinence were relieved postprocedure, and in which the Wexner incontinence score significantly decreased(median, 3.0 vs.14.1*P*<0.01);the Wexner anal incontinence scores had no change in other 4 patients. No serious complications happended.

Conclusions: The TST-STARR plus procedure for mild rectal prolapse(the prolapse length less than 5cm) is effective,safe procedure with minimal invasion,less complications,and low reccurence.Therefore it may be considered the preferred method in treatment of mild rectal prolapse.

P461

PROGNOSTIC AND PREDICTIVE VALUE OF INTERSTITIAL CAJAL CELL IN OBSTRUCTED DEFECATION SYNDROME.

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Purpose: Patients with obstructed defecation syndrome (ODS) may be treated by stapled transanal rectal resection (STARR), but different complications and recurrence rates have been reported. The present study was designed to evaluate stapled transanal rectal resection results and outcome predictive factors.

Methods: Full-thickness rectal samples were obtained from 20 patients undergoing STARR for ODS associated with rectal intussusception and/or rectocele. Samples were analyzed by immunohistochemistry for interstitial cells of Cajal (ICC). Data were compared with those obtained in 10 controls. In addition, clinical and functional data of this 20 ODS patients were analyzed.

Results: ICC were significantly decreased in patients in the submucosal surface (P<0.001) and the myenteric area (P<0.001) compared with the control group. Preoperative evaluation of patient comfort revealed a mean Symptoms Severity Scores (SSS) of 16 (range, 11-20) while the SSS at 12 months postoperatively was 6 (range, 5-11) (*P*=0.001). The average preoperative Longo ODS score was 26 (range, 17-30) with a postoperative score as 7.5 (range, 5-12) (*P*=0.001). In addition, comparison of preoperative and postoperative Cleveland Incontinence Score (CIS) revealed no significant changes [CIS_{pre} *vs.* CIS_{post}: 2 (range, 0~3) *vs*. 1 (range, 0~2), *P*=0.090]. At a median follow-up of 13 (range, 9-32) months, 65 percent of the patients operated the STARR procedure had subjective improvement. At univariate analysis, results were worse in those with decreased ICC number (P<0.001).

Conclusions: Stapled transanal rectal resection achieved acceptable results at the cost of relatively higher recurrence rate. Patients with decreased ICC number in the rectal specimen showed an unfavorable outcome. This, together with the complications observed in patients referred after stapled transanal rectal resection, suggests that this procedure should be performed by colorectal surgeons and in carefully selected patients. This study demonstrated that preoperative histological study of full-thickness rectal sample may predict the functional outcomes after STARR.

P462

DISTENSIBILITY OF THE ANAL CANAL DURING SACRAL NERVE STIMULATION FOR IDIOPATHIC FECAL INCONTINENCE: A STUDY WITH THE FUNCTIONAL LUMEN IMAGING PROBE.

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Purpose: Sacral nerve stimulation is a well-established treatment for fecal incontinence but its mode of action remains obscure. Anal sphincter function is usually evaluated with manometry but resistance to distension may be a more appropriate parameter than pressure. Using the functional lumen imaging probe, which allows detailed description of distension properties of the anal canal, we have previously shown reduced anal resistance to distention in patients with idiopathic fecal incontinent. Our objective in this study was to characterize the impact of sacral nerve stimulation on distension properties of the anal canal in patients with idiopathic fecal incontinence.

Methods: We studied 11 women (median age 63 (44-79) years) with idiopathic fecal incontinence at baseline and during sacral nerve stimulation. The configuration of the anal canal was examined with the functional lumen imaging probe at rest and during squeeze; and the distensibility of the anal canal was investigated during the probe inflation.

Results: All patients were successfully treated with sacral nerve stimulation and the mean Wexner incontinence Score was reduced from 14.4 ± 3.5 to 6.6 ± 4.8 (p < 0.001). The pressure needed to open the narrowest point of the anal canal during distension increased from 14.5 (±12.2) mmHg at baseline to 20.5 (±13.3) mmHg during sacral nerve stimulation (p< 0.01) and the pressure-strain elastic modulus increased non significantly from 2.2 (±0.5) to 2.9 (±1.6) kPa, indicating increased stiffness of the anal canal.

Conclusions: Our data suggests that SNS for idiopathic FI enhances the resistance of the anal canal to distension.

P463

IMPROVEMENT OF THE EXTERNAL ANAL SPHINCTER FUNCTION IN FEMALE FECAL INCONTINENT PATIENTS FOLLOWING GATEKEEPER IMPLANTATION.

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Purpose: Gatekeeper (GK) has been recently introduced in the clinical practice as a safe and effective approach to treat fecal incontinence (FI). This minimally invasive surgical procedure provides the implant of self-expandable prostheses into the intersphincteric space of the upper-middle anal canal, with a consecutive, but to the date not fully explained, effect on sphinteric function. Aim of this study was to understand the GK mechanism of action by determining the change in contractility of external anal sphincter (EAS), expressed as muscle tension (*Tm*).

Methods: *Tm* is expressed (in millinewtons per cm^2) by the formula: $Tm=P \times rm/tm$ (Rajasekaran MR et al. Am J Physiol Gastrointest Liver Physiol. 2008), where *P* is the intraluminal resting pressure, *rm* the inner radius of EAS, and *tm* the EAS thickness. Anorectal Manometry (ARM) provided *P* while 3D Endoanal Ultrasound (EAUS) provided *rm* and *tm*. *Tm* was calculated before and after GK implantation and compared, together with clinical data, in terms of number of FI episodes per week and FI scores.

Results: Between October 2011 and May 2015, a continuous group of 17 female FI patients (median age of 68 [57-80] years) were treated with implantation of 6 GK prostheses and were enrolled in the present study. Median follow up (Fu) was 12 [3-30] months. Following GK implant, compared to baseline, it was observed an increased median *P* (52.8 [6.6-142.1] vs 58.4 [20.9-166.8] mmHg, p=0,5) and median *rm* (12.3 [10.9-15.3] vs 16.1 [12.8-20.3] mm, p<0.0001), while a decreased median and *tm* (4.0 [3.2-5.4] vs 3.3 [2.2-4.7] mm, p<0.0001), with a consequent increased median *Tm* (124.9 [20.1-389.1] vs 207.1 [104.1-969.4], p<0.003). Compared to baseline, GK implantation determined a significant decrease in median number of FI episodes per week to flatus (14.0 [0.0-35.0] vs 3.0 [0.0-35.0], p=0.014), liquid stools (0.5 [0-3.0] vs 0.0 [0.0-1.0], p=0.008), solid stools (0.5 [0.0-8.0] vs 0.0 [0.0-0.3], p=0.003), soiling (4.0 [0.0-21.0] vs 0.0 [0.0-7.0], p=0.014), and median Wexner, Vaizey and AMS scores (11 [1-16] vs 3 [0-10], 15 [1-19] vs 6 [0-14], 82 [28-119] vs 41 [0-88] respectively, p<0.0001 in all comparisons). Full continence was referred by 3 pts (17.6%), and a reduction of ≥75% in weekly episodes of FI by 12 pts (70.6%).

Conclusions: GK implantation confirms to be an effective treatment in FI patients. Its mechanism of action is probably determined by an improvement of the EAS contractility. The presence of GK prosthesis in the intersphincteric space produces an increment in *rm*, which, for the length-tension relationship, is followed by an increase of *Tm*, with a consequent improvement of EAS function. Studies with a larger number of patients are needed to confirm this hypothesis.

P464

MINIMALLY INVASIVE RECTOPEXY: EXPERIENCE WITH TITANIUM FIXATION.

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Purpose: To report patient outcomes after fully laparoscopic (FL)/robotic-assisted (RA) rectopexy utilizing a titanium fixation device (ProTack™). Although reported to be a permanent fixation method that provides greater long-term fixation, as compared to absorbable tacks, postoperative pain is a primary concern documented in the literature. Despite this, titanium fixation is still a widely applied technique in minimally invasive rectopexy.

Methods: Chart review of consecutive cases of FL/RA (all without mesh) rectopexy with titanium fixation between 2009 -2015. Main outcome measures included successful completion of the surgery without injury to the rectum or adjacent structures, associated morbidity and mortality, and pain management at 4 weeks after surgery. Patients underwent follow-up (F/U) at 2 and 4 weeks.

Results: 33 patients underwent minimally invasive rectopexy with titanium fixation (F:M ratio 7:1, mean age 58 years). Of these, 28 were FL, 5 were RA, and 4 had concurrent sigmoidectomy (table). Median operative time (OT) was 91 minutes. Mean number of titanium tacks deployed was 5. A vessel sealing device was utilized in 24 patients. Of the cases without concurrent sigmoidectomy, 25 were completed in less than 90 minutes. There were no reported injuries to surrounding structures and blood loss was minimal. 1 colectomy patient had colonic ischemia noted intra-operatively requiring anastomotic revision. No leaks were observed. Morbidity included: 2/33 ileus, 1/33 severe postoperative pain, 1/33 pancreatitis, 1/33 urinary retention. Median length of stay (LOS) was 48 hours and 27/33 were discharged within 72hs after return of bowel function, diet advancement, and ambulation. There were no mortalities. Postoperative F/U: 25/33 at 4-weeks, 6/33 at 2-weeks only, and 2/33 no F/U. Median F/U was 12 weeks. Pain management modalities utilized at the 4-week F/U visit: opiates -1/31, NSAIDs -4/31, and no pain medications –26/31. All patients that F/U at 2-weeks and reported the absence of pain were considered free of pain at 4 weeks. Results of patients that did not F/U were not included for analysis. At a F/U of 16 months, a female patient who had rectal prolapse for 25 years reported recurrence after a FL procedure that utilized 5 tacks (OT 112 min, postoperative ileus, and LOS of 7 days). Another patient developed pancreatitis during the postoperative period and remained on opiates at 4-weeks. There were no other complications.

Conclusions: Out of 33 cases, 125 titanium tacks were deployed. There was 1 reported recurrence. FL/RA rectopexy with titanium fixation is a safe and effective alternative to posterior rectopexy with and without mesh utilization. Postoperative pain resolved in most cases within 4 weeks.

Median OR time (minutes)	FL	RA
Resection	135	302
No Resection	79	107

P465

BIOFEEDBACK THERAPY IN FECAL INCONTINENCE; WHAT PREDICTS RESPONSE? HOW LONG SHOULD TREATMENT BE?

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Purpose: Biofeedback (BF) effectively treats many patients with fecal incontinence (FI); however, little is clear regarding prediction of response to treatment or optimal duration of therapy. We sought to identify potential predictors of response and minimum number of sessions required to achieve meaningful response.

Methods: A retrospective review of our pelvic floor database from September 2010 to August 2015 included 202 patients who completed BF therapy as first intervention for FI. Demographic and clinical information, manometric data, and Cleveland Clinic Incontinence scores (CCIS) pre and post therapy were documented. Patients with rectal prolapse, sphincter operations or coloanal anastomosis, or lacking post-therapy CCIS were excluded from analysis (N=145). Patients were grouped in three categories by initial CCIS: 1-7 mild (4 patients; 7%), 8-14 moderate (44 patients; 83%) and 15-20 severe incontinence (9 patients; 17%).

Results: In the group of 57 patients (mean CCIS 11.4), there were 49 females (86%; mean age 64.1) and 8 males (14%; mean age 68.6). Aside from gender, analysis of clinical, demographic and manometric variables showed no predictive value for response. Males showed a mean percent improvement of 65.09 while females had a mean improvement of 45.37 (p-value=.0046; effect size=0.78). This should be interpreted cautiously considering the small number of males in the cohort. While a trend toward lower urge to evacuate and lower maximal tolerated volume was seen when comparing mild/moderate to severe groups, this did not reach statistical significance. CCIS improved from 16.4 to 9.3 in the severe incontinence group with a mean 3.1 sessions; from 10.8 to 5.7 in moderate incontinence with a mean 3.3 sessions; and from 6.2 to 3.2 in mild incontinence with a mean 2.8 sessions. Improvement in CCIS was significant with the entire cohort assessed (P=.0001; effect size of 1.07), though not when groups were compared. When all three groups were individually assessed for response, similar results were found (-45.4% mild; -49.4% moderate; and -43.1% severe), suggesting that BF was similarly effective regardless of severity of incontinence. Importantly, no patients in this cohort required further intervention for fecal incontinence in the study period.

Conclusions: In this small cohort, severity of FI and manometric parameters at presentation were not reliable predictors of response. An average of 3 sessions of BF produced significant improvement in CCIS scores regardless of FI severity at presentation. No patient required further intervention for incontinence during the study period of 60 months. While our data, and others, seem to indicate that maximal benefit of BF is reached at an average of 3 sessions, further studies with larger samples and longer follow up

are needed to determine if response is dependent on duration of therapy in patients with worse FI.

P466

PREDICTIVE FACTORS OF LYMPH NODE METASTASIS IN SUBMUCOSAL INVASIVE COLORECTAL CARCINOMA.

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Purpose: The incidence of lymph node metastasis of submucosal invasive colorectal carcinoma(sm cancer) with a depth of submucosal invasion of 1000 μm or more has been reported about 10%. In other words, over 90% of sm cancer does not need radical lymphadectomy based on current criteria. However, it is well known that no single histopathological feature of sm cancer can reliably predict the risk of lymph node metastasis. Our aim is to evaluate the predictive factors of lymph node metastasis in relation to various clinicopathologic findings in patients with sm sancer.

Methods: Patients with biopsy proven submucosal invasive colorectal carcinoma who underwent curative surgery after endoscopic resection between Jan 2008 and Dec 2012 were enrolled. The medical records of total 492 patients were reviewed. Clinicopathological factors were analyzed to determine predictive factors related to lymph node metastasis. For the multivariate analysis, the logistic regression model was used with the odds-ratio as a measure of association. The cut-off values for the depth of submucosal invasion were analyzed using a Receiver Operating Characteristic (ROC) curve and area under the curve (AUC).

Results: The median age was 60 years (range: 59 - 71 years). There were 294 males (59.7%) and 198 females (40.3%). Tumor locations were the colon in 272 patients (55.2%), and the rectum in 220 patients (44.8%). There were 55 patients (11.2%) with lymph node metastasis and 437 patients (88.8%) without lymph node metastasis. In the univariate analysis, the depth of submucosal invasion (OR: 9.38), well differentiated carcinoma (OR: 4.02), venous invasion (OR: 3.16), lymphatic invasion (OR: 3.06) and Kudo's classification (OR: 6.27) were found to be significant predictive factors of lymph node metastasis. The multivariate analysis revealing the depth of submucosal invasion (p = 0.001, OR: 7.18, 95% CI: 2.34 – 22.11) and well differentiated carcinoma (p = 0.01, OR: 2.68, 95% CI: 1.27 – 5.67) were found to be a significant, independent predictive factors of lymph node metastasis. AUC was the largest when the depth of submucosal invasion was 1900μm and was 0.69. Therefore, the depth of submucosal invasion of 1900μm was fixed as the cut-off value.

Conclusions: Our study demonstrates that the depth of submucosal invasion (≤1900μm) and grading of the tumor were the factors associated with lymph node metastasis in patients with sm cancer. So it is considered that the refinement of the depth of submucosal invasion of 1900μm in our study will be worthy. These predictors can be useful to determine to undergo surgery or not after endoscopic resection.

P467

SURGICAL TRENDS AND OPERATIVE OUTCOMES OF RECTAL PROLAPSE IN A LARGE NEW YORK STATE DATABASE.

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Purpose: There is no clear consensus on the optimal surgical approach for rectal prolapse. An abdominal approach is traditionally associated with lower recurrence rate albeit higher morbidity when compared to a perineal approach. Laparoscopic treatment is more recent. Little is known about practices and trends over the past decade. Our aim was to characterize trends in surgical approach including abdominal, perineal and laparoscopic techniques as well as to compare short-term outcomes.

Methods: The New York State Department of Health SPARCS database was used to capture all patients undergoing surgical repair for rectal prolapse from 2004-2013. Patients were identified using ICD-9 diagnosis and procedure codes. We compared short-term (30d) outcomes between patients undergoing abdominal rectopexy and perineal rectopexy. We also compared open abdominal rectopexy to laparoscopic rectopexy.

Results: 3,189 patients were identified in the study period, 1,706(53%) of whom underwent a perineal approach. Of the 1,483(47%) who underwent an abdominal approach, 326(22%) were laparoscopic. The percent of laparoscopic cases increased from 9% in 2004 to 37% in 2013. The percent of all abdominal cases increased from 44% in 2004 to 55% in 2013. The mean age of patients in the abdominal group was significantly lower than the perineal group (61y vs.72y,p<0.001). A higher percentage of cases performed in the perineal group were for emergency admissions (26% vs. 16%,p<0.001). Similarly, patients in the perineal group had significantly higher rates of coronary artery disease (13% vs. 6%,p<0.001), hypertension (49% vs. 34%,p<0.001), congestive heart failure (7% vs. 3%,p<0.001), and renal failure (4% vs. 3%,p=0.02). When compared to an open abdominal approach, patients in the laparoscopic approach were younger (63y vs. 55y,p<0.001), had lower rates of emergency admission status (17% vs. 9%,p<0.001), and fewer co-morbidities including hypertension (37% vs. 24%,p<0.001) and diabetes (9% vs. 4%,p=0.006). They did however have higher rates of obesity (2% vs. 5%,p=0.002). Crude rates of major events and discharge home during index hospitalization were similar for the perineal and abdominal groups. There was however a higher rate of procedural complications (7% vs. 2%,p<0.001) and longer length of stay (LOS) (5d vs. 3d,p<0.001) in the abdominal group. When compared to open abdominal approach, the laparoscopic group had no difference in crude rates of major events or procedural complications. There was however a shorter LOS (5d vs 4d,p<0.001) and higher rate of discharge home (80% vs. 64%,p<0.001).

Conclusions: Abdominal approach for rectopexy is becoming more popular, likely related to adoption of laparoscopy. Perineal approach seems more popular in older, sicker patients with comparable crude rates of major events, need for reoperation, and discharge home. Laparoscopy usage is increasing but requires further investigation.

P468

PERINEAL PROCTECTOMY: THE SEARCH FOR RISK FACTORS THAT PREDICT RECURRENCE.

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Purpose: Perineal proctectomy is a common approach for surgical correction of full thickness rectal prolapse, particularly in the aged population. Despite recurrence rates up to 20%, there is no consensus regarding risk factors that predict outcome. Given our large experience we sought to review our outcomes with the aim of identifying factors related to recurrence.

Methods: A single-institution, multi-surgeon, retrospective review of adult patients undergoing perineal proctectomyas a first time operation was performed (2001-2013). Demographic and clinical data were obtained, including age, sex, body mass index (BMI), recurrence and complications. Univariate and multivariate analyses were performed, with significance assessed at $p < 0.05$ (IBM SPSS Statistics v. 22, Armonk, NY).

Results: We identified 198 patients who met our inclusion criteria. The majority of patients were female (90%) with a mean age 75 (+/- 15.8 SD) and BMI of 24 (+/- 5.8 SD). There were 32 patients (16%) who had a recurrence of disease, and four patients who had a re-recurrence. The median follow-up time was 3.3 years (range: 0 – 11.2 years). There were no significant differences between patients who had a recurrence and those who did not with regards to age, BMI, specimen length, CharIson index, ASA, gender and complications. A Cox proportional hazards regression analysis was performed, using recurrence free survival over time as the dependent

variable, and age, BMI, specimen length, Charlson index, and gender as the independent variables. Only the Charlson index was a significant predictor, with a hazard ratio of 1.30 (95% CI: 1.08 – 1.55).

Conclusions: In our study population, only the Charlson comorbidity index was identified to be a significant predictor of recurrence free survival. Despite being a preferred operation in patients with significant co-morbidities, perineal proctectomy in this high-risk cohort may be associated with an increased recurrence rate.

P469

IMPACT OF CLINICAL DIAGNOSIS AND FECAL INCONTINENCE SYMPTOMS ON QUALITY OF LIFE.

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Purpose: This study aims to identify the relationship between the severity of Fecal Incontinence (FI) symptoms and the effect on quality of life (QoL) based on clinical diagnosis of patients presenting to a colorectal surgery clinic.

Methods: This was a prospective assessment of 500 consecutive new patients presenting to a colorectal surgery clinic. All patients completed the Cleveland Clinic Florida Fecal Incontinence (CCFI) Scale and the Fecal Incontinence Quality of Life Scale (FIQL). FIQL scores were calculated for subscales of lifestyle, coping, depression, and embarrassment. Final diagnoses were grouped into categories of benign anorectal (BA), benign colon (BC), malignant (M), Inflammatory Bowel Disease (IBD), and primary FI (PFI). The correlation between CCFI score and FIQL endpoints were analyzed according to final diagnosis. Multivariate logistic regression with COX proportional hazards was used to identify predictors of poor FIQL (FIQL <3). Independent variables in the logistic regression model for each FIQL category included those with significance of $p<0.05$ in the univariate models. These variables included age, gender, CCFI, BA, IBD, and PFI.

Results: Median patient age was 51 years (SD: 18.4 years; range:11-96 years) and 60.4% were female. Sixty-seven percent of patients had a CCFI score of 1-20. A CCFI score of 5-20 was present in 38.5% of patients. However, PFI composed only 10.2% of the patient chief complaints. Median CCFI score was highest with PFI (12) compared to BA (2), M (3.95), BC (4), and IBD (6) diagnoses ($p<0.001$). CCFI scores were 10-20 for 13% of BA, 17% of M, 8% of BC, 30% of IBD, and 64% of PFI. Although FIQL scores were lowest for PFI ($p<0.001$), the correlation between CCFI and FIQL remained significant for all diagnoses (Table 1) regardless of median CCFI score. Logistic regression showed that higher CCFI (OR 1.3, $p<0.001$), female gender (OR 0.4, $p<0.03$), and IBD (OR 4.3, $p<0.05$) predicted lower lifestyle FIQL. Lower coping FIQL was predicted by greater CCFI (OR 1.3, $p<0.001$). Depression FIQL was predicted by CCFI (OR 1.25, $p<0.001$), female gender (OR 0.5, $p<0.05$), and diagnosis of PFI (OR 2.6, $p<0.04$). Embarrassment FIQL was predicted by higher CCFI (OR 1.38, $p<0.001$) and diagnosis of PF (OR 5.2, $p<0.001$).

Conclusions: Approximately wo-thirds of new patients presenting to a colorectal surgery clinic have CCFI scores higher than 0, although only 10% have PFI as a final diagnosis. Many patients with high CCFI scores have a primary diagnosis other than PFI. Female gender particularly affects lifestyle and depression FIQL. A final diagnosis of PFI is associated with increased depression and embarrassment- this effect is independent of CCFI score. A diagnosis of IBD predicts poor lifestyle FIQL. Stratification of the differential impact of CCFI on FIQL by gender and diagnosis can help to better understand the burden of fecal incontinence.

	BA	M	BC	IBD	PF
Age*	48.3	60.8	61	37	60
N	332	36	56	23	53
CCFI*	2	3.95	4	6	12
CCFI 10 or greater	13%	17%	8%	30%	64%
FIQL					
-Lifestyle*	4	3.95	4	3.5	3.2
-Coping*	4	3.78	4	3.2	1.9
-Depression*	4	4	4	4	3
-Embarrassment*	4	4	4	4	2.3
CCFI/Lifestyle Correlation	-.55*	-0.66 *	-0.58*	-0.67*	-0.49*
CCFI/Coping Correlation	-0.67 *	-0.63*	-0.66*	-0.59*	-0.61*
CCFI/Depression Correlation	-0.5*	-0.56*	-0.54*	-0.57*	-0.41*
CCFI/Embarrassment Correlation	-0.67*	-0.59*	-0.64*	-0.62*	-0.62*

* Significant Less than 0.01. BA=Benign Anorectal, M=Malignant, BC=Benign Colon, IBD=Inflammatory Bowel Disease, PF=Primary Fecal Incontinence

CCFI and FIQL Correlation Based on Diagnosis

Abstract Session: Video Abstracts

WV1

PERINEAL ANATOMY FOR COLORECTAL SURGEONS.

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Purpose: To demonstrate the essential anatomical landmarks and the correct surgical planes during sphincteroplasty, levatorplasty and interspincteric resection.

Methods: Surgical dissections were carried on fresh male and female cadavers in the anatomy laboratory. Dissections were carried out in accordance to understand the anatomy of the perineum, anal sphincter complex, pelvic floor and the interspincteric dissection plane. The dissections were recorded in a stepwise fashion with audio and video clips.

Results: This video outlines the six key surgical steps of a comprehensive perineal anatomy: (1) surgical incision that permits access to perineum and the pelvic floor, (2) dissection of the rectovaginal space up to the level of the cervix, (3) plication of the levator ani muscles, (4) anatomical landmarks for the internal and external anal sphincters, (5) pudental canal, nerves and vessels, (6) intersphincteric resection plane for low lying rectal carcinoma.

Conclusions: This video provide essential anatomical landmarks that are required by the colorectal surgeons performing perineal surgery.

WV2

A NOVEL SINGLE STAGE SPHINCTER-SAVING INTERSPHINCTERIC APPROACH FOR MANAGEMENT OF DEEP POSTANAL ABSCESS.

C. B. Tsang *Surgery, National University of Singapore, Singapore, Singapore.*

Purpose: The aim of this video is to demonstrate a novel sphincter saving intersphincteric approach to drainage and management of deep postanal abscess. This is as opposed to the conventional method of transrectal drainage and placement of setons which will require two or more staged procedures and complicated wound care.

Methods: With the patient in the prone jack-knife position and with the buttocks taped apart, the patient is cleaned and prepped and 0.5% Bupivacaine infiltrated perianally. An incision is made posteriorly just posterior to the intersphincteric groove. Lonestar retractor applied. Dissection cephalad along intersphincteric space. Abscess cavity entered and drained. Soft latex drains placed in cavity and anchored to intersphincteric incision wound. Anal sphincters and skin approximated using absorbable sutures.

Results: The abscess is successfully drained in the video illustrated and wounds completely healed six weeks after surgery

Conclusions: This is a novel convenient, easy to perform, single stage, sphincter saving approach to the management of deep post anal abscess.

WV3

TRANSANAL MUCOSECTOMY REVISITED.

J. P. Kaminski, K. Zaghiyan and P. Fleshner *Division of Colon and Rectal Surgery, Cedars-Sinai Medical Center, Los Angeles, CA.*

Purpose: Mucosectomy is an integral part of a colorectal surgeon's armamentarium. Aim: to demonstrate the technique of transanal mucosectomy in the setting of ulcerative colitis.

Methods: The video shows a detailed technique of transanal mucosectomy for a 53 year old male with ulcerative colitis.

Results: The video demonstrates the important steps in performing a successful transanal mucosectomy.

Conclusions: The transanal mucosectomy is an important tool for the colon and rectal surgeon for a number of indications and procedures.

WV4

TRANSANAL COMPLETION PROCTECTOMY AFTER TOTAL COLECTOMY AND ILEAL POUCH-ANAL ANASTOMOSIS FOR ULCERATIVE COLITIS: A CODIFIED SINGLE STAPLED TECHNIQUE.

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Purpose: Minimally invasive surgery has proved its efficacy for the surgical treatment of ulcerative colitis (UC). The recent evolution in single port (SP) surgery together with transanal rectal surgery could further facilitate minimally invasive surgery in UC patients. This video describes a technical modification of single stapled anastomoses in patients undergoing transanal completion proctectomy and ileal pouch-anal anastomosis (ta-IPAA) for UC.

Methods: A step-by-step approach of the ta-IPAA in UC is described and presented in a video.

Results: A transanal completion proctectomy and IPAA with SP laparoscopy at the ileostomy site is performed. After detachment of the ileostomy, a single port device is placed through the ileostomy site and further mobilization of the mesenteric root is done. A stapled J-pouch is then fashioned by extracting the terminal ileum through the ileostomy site. An 18 french catheter is fixed on the anvil of the circular stapler. This catheter will facilitate approximation of the pouch towards the rectal cuff. The patient is positioned in modified lithotomy and adequate anal exposure is obtained. A purse string is placed at the anorectal junction, followed by a circular incision just underneath this purse string. Another single port device is placed transanally and a close rectal dissection is performed. After opening the peritoneum anteriorly, the rectum is flipped over into the peritoneal cavity and complete mobilization is continued. The specimen is extracted through the anus and the 18 french catheter is grasped and pulled through the anus in order to perform a single stapled anastomosis. A mushroom catheter is placed into the pouch for decompression, while a low suction drain is placed presacrally and extracted through the single incision site.

Conclusions: A technical modification of the single stapled anastomosis facilitates the formation of the ta-IPAA, further reducing invasiveness in UC patients.

WV5

AUTONOMIC NERVE STRUCTURES DURING LAPAROSCOPIC TME IN OBESE.

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Purpose: The autonomic nervous structures are often exposed to injury during TME. We present a case of an obese female who underwent laparoscopic TME with special emphasis on identification of the nerve structures.

Methods: A classic laparoscopic TME technique was used. Special emphasis was given to demonstrate the well-known structures including: IMA plexus, superior hypogastric plexus, hypogastric nerves and pelvic plexus. In addition, almost never recognized sacral splanchnic nerves originating from the sympathetic trunci were demonstrated.

Results: All details of the operation are shown. Anatomical landmarks are shown. All relevant nerve structures were demonstrated and preserved.

Conclusions: Laparoscopic TME allows for superb identification of all autonomic nervous structures, including the obese patients

WV6

THE ANATOMICAL LANDMARKS FOR RADICAL PELVIC SURGERY.

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Purpose: To demonstrate the essential anatomical landmarks and the correct surgical planes during radical pelvic surgery.

Methods: Dissections were carried out in accordance with both the TME and pelvic exenteration technique down to the pelvic floor on male and female cadaver.

Results: All essential anatomical landmarks namely autonomic nerves, mesorectal dissection planes, pelvic fascias, pelvic side wall and the pelvic floor muscles are visualised according to the surgical technique for radical pelvic surgery.

Conclusions: In order to achieve better oncological outcomes and to minimise the risk of local recurrence, the knowledge of the anatomical landmarks and the surgical planes are crucial for colorectal surgeons.

WV7

ROBOTIC COMPLETE MESOCOLIC EXCISION FOR RIGHT COLON CANCER.

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Purpose: Complete mesocolic excision (CME) without any defects in the peritoneal envelope along with central vascular ligation results in a survival advantage in colon cancer. There has been an increasing interest in utilization of robotics in colorectal surgery over the past decade. Robotic (da Vinci Surgical System, Intuitive Surgical, Sunnyvale, CA, USA) surgery has several benefits in respect of the laparoscopic approach such as the three-dimensional vision and enhanced dexterity. Herein, we present our case of robotic CME for right colon cancer.

Methods: A 82-year old male patient, with adenocarcinoma in the right flexura of the colon underwent robotic right colectomy with CME. Four 8-mm robotic trocars and one 5-mm trocar for bed-side surgeon were used during the procedure. The dissection started at the ileocolic vessels after identifying the superior mesenteric vein (SMV). The ileocolic vessels were clipped and transected at their origin. The dissection continued medially along the SMV staying between the embryological planes just anterior to the right Toldt's, Gerota's fascia, and duodenum. Mesenteric dissection was extended up to the root of the right colic artery and the middle colic artery.

The right colic artery and middle colic artery was transected between clips near the superior mesenteric artery. Following mobilization of the right colon laterally, the terminal ileum was prepared and transected with an endoscopic linear staple. After completion of the medial dissection, the lateral attachments of the colon were cut and complete mobilization of right colon was achieved. The lesser sac entered and then the gastrocolic ligament divided with taking gastroepiploic vessels. After checking vascularization of colon with indocyanine green (ICG) the transverse colon was prepared and transected with endoscopic linear staple. A side-to-side ileotransversostomy anastomosis with linear staple was performed. The defects of staple entry sites on small and large bowels were closed with V-lock suture .The specimen was extracted in a 15-mm endobagthrough a suprapubic incision by enlarging of the suprapubic trocar site.

Results: The docking and operative times were 5 min and 240 min, respectively. The blood loss was 20 ml. Histopathological examination revealed a T3 adenocarcinoma. The metastatic/harvested lymph node ratio was 0/59. There was no peri/postoperative complications. The patient was discharged after five days uneventfully.

Conclusions: The robotic right colectomy with CME was feasible and safe providing oncologically convenient specimen.

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LAPAROSCOPIC TATME: A MAGNIFYING GLASS TO PRESERVE PELVIC NERVES.

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Purpose: Rectal resection with Total Mesorectal Excision (TME) is associated with a significantly high risk of urinary and sexual dysfunction. About 25% of patients experience urinary and sexual symptoms of any degree, while the rate increases to 52% after neoadjuvant radiation therapy. It has been shown that functional impairment is secondary to iatrogenic nerve injuries, both from surgery and radiation therapy. Seven stations have been identified where nerve injuries are most likely occur. Standard laparoscopy-magnified images failed to improve rate of functional deficit. Laparoscopic transanal TME (TaTME) allows, instead, a precise dissection of the lower third of the rectum with an accurate visualization of pelvic nerves, theoretically reducing the risk of iatrogenic injuries.

Methods: This is a 61 year-old male with adenocarcinoma of the rectum located at 6 cm from the anal verge. MRI showed a T2 versus T3 mid-rectal cancer with no threatened margins. Therefore primary surgery (taTME) was scheduled after a multidisciplinary discussion. This case will help to demonstrate all the important steps that need to be followed in order to avoid nerve injury.

Results: Seven stations have been shown where nerve injuries are most likely occur (starting from below): Transanal procedure **Urogenital bundle at the level of both the prostate and the seminal vesicle**: anterior and lateral to the prostate and again at the level of the seminal vesicles, the urogenital bundle originating from S2-3-4 and running anteriorly along the side of the prostate can be recognized. **Parasympathetic splanchnic nerves**: Moving the dissection laterally, care needs to be taken to avoid injury to the Pelvic Splanchnic nerves, these are 3 to 6 nerves arising from S2-3-4 as shown. Injury of the parasympathetic Splachnic nerves may result in sexual and urinary dysfunction. Laparoscopic procedure: **Superior hypograstric plexus** After scoring the peritoneum on the medial aspect of the mesosigmoid. Care needs to be taken in order to identify and preserve the sympathetic Superior Hypogastric Plexus, running in front of the aortic bifurcation. **Hypogastric nerves** This plexus further divides into the hypogastric nerves at the pelvic brim and can be identified bilaterally, 1-2 cm parallel and medial to the ureters along the posterior and superior aspect of the mesorectum **Inferior hypogastric plexus** Dissection along the areolar tissue of the mesorectal fascia posteriorly and laterally allows the surgeon to preserve, at this level, the inferior hypogastric plexus **Inferior mesenteric plexus** The dissection proceeds then cephalad towards the Inferior mesenteric artery. At this level the inferior mesenteric plexus lays over the aorta and it should be then recognized and preserved deeper to the dissection plane.

Conclusions: This video summarizes all seven stations where nerve injuries can occur during laparoscopic taTME allowing their identification and preservation.

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