

The American Society of  
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Annual Meeting Abstracts

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## GENERAL SURGERY RESIDENTS' FORUM

### Defining the Surgical Trainee's Learning Curve for Laparoscopic Colorectal Resection

(GSF1)

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..... Nashville, TN

**Purpose:** Laparoscopic colorectal resections (LCR) have a steep learning curve. Previous studies have measured the learning curve of fully trained surgeons who are integrating LCR into their established surgical practice. We hypothesize that the general surgical trainee's learning curve for LCR can be measured using similar outcomes.

**Methods:** A retrospective review was conducted for all LCR performed by general surgical trainees under the supervision of two fellowship trained Colon and Rectal Surgeons. Surgical trainees who performed >9 LCR were included in the analysis. The primary outcome was operative time. Secondary outcomes included conversion rate, complication rate and readmission rate. Multivariable regression was used to examine the impact of increasing surgical trainee experience on these outcomes while controlling for patient age, body mass index, attending surgeon, diagnosis, prior abdominal surgery, and type of colon resection.

**Results:** A total of 408 LCR were performed from September 2002 to June 2007. Twenty surgical trainees performed a mean of 20.4 + 6.5 LCR. There was a significant decrease in operating time for each consecutive quartile of surgical trainee experience (2.81 minutes,  $p=0.001$ ), with no significant effect on conversion rate, postoperative complications, or 30 day readmission. There were no significant differences between patients undergoing resection by the two attending surgeons with respect to conversion rate, postoperative complications, and 30 day readmission. However, there was a statistically significant difference between the two attending surgeons with respect to operative time (118 vs 151 minutes,  $p<0.001$ ). Overall, increasing surgical trainee experience resulted in an 8% decrease in average operative time.

**Conclusions:** Traditional measures of a learning curve for LCR can be used to measure the technical progress of a general surgical trainee. Trainees can demonstrate significant improvement in technical skill without increases in patient morbidity or conversion rates. When establishing a practice, general surgery graduates with LCR exposure may still be on a learning curve even after 20 LCR and may experience continued improvement.

### The Incidence of Incisional Hernia Following Elective Laparoscopic Colon Resections: It Is More Common Than You Think

(GSF2)

O. Llaguna, D. Avgerinos, J. Lugo, J. Martz, I. Leitman  
..... New York, NY

**Purpose:** The purpose of this study is to evaluate the incidence of incisional hernias following elective minimally

invasive colon resection and determine if it is lower than following traditional open colectomy.

**Methods:** The medical records of 109 consecutive patients who underwent elective minimally invasive colon resection between February 2002 and August 2007 were reviewed. Data collected included patient demographics, follow-up period, surgical approach (hand-assisted vs. laparoscopic), extent of resection, specimen extraction site, pathology, and incidence of incisional hernia. Mesenteric transection was usually performed via intra-corporeal division. The Ileocolic anastomosis was performed via extracorporeal stapling in right colectomy and via intra-corporeal stapling technique for left-sided colon resections.

**Results:** During the study period 109 patients (mean age 59 years, 53% male) underwent elective laparoscopic colon resection (10% hand-assisted and 90% laparoscopic). All specimens were extracted through the abdominal wall. Mean follow up time for the cohort was 14.1 months. Segmental resections included right colectomy (42%), sigmoid resection (35%), left colectomy (13%), anterior resection (6%), transverse (2%), and subtotal (2%). Final pathology was 52% neoplasia, 26% diverticular disease, 13% polyps, 4% inflammatory bowel disease, 4% other, and 1% angiodysplasia. Extraction sites were 38% median periumbilical, 29% left transverse, 26% paramedian, 3% Pfannenstiel, 3% right transverse, and 1% median epigastric. The incidence of incisional hernia was 16%. The incidence of incisional hernia was not dependent on the type of resection, indication for surgery or extraction site.

**Conclusions:** The incidence of incisional hernia following elective laparoscopic colon resection is similar to that reported in other series of open colectomies - 17%. The minimally invasive approach to segmental colon resection does not appear to reduce the development of incisional hernias following surgery. Reference: Winslow ER, Fleshman JW, Birnbaum EH, Brunt LM. Wound complications of laparoscopic vs open colectomy. Surg Endosc. 2002 Oct; 16(10):1420-5.

### Vitamin A Enhances the Effectiveness of Formalin 8% in Treating Hemorrhagic Radiation Proctitis

(GSF3)

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..... Southfield, MI

**Purpose:** Complications of pelvic radiotherapy for prostatic cancer are debilitating and include radiation proctitis, strictures and fistulas. Radiation proctitis occurs in 5-20%. Presenting symptoms include rectal bleeding, pain, burning and tenesmus. Treatment options include surgical excision, embolization, laser therapy and the use of local agents such as steroids, sulfasalazine, and Formalin. All these have been used with limited success. We studied the efficacy of treatment with Formalin 8% solution alone and in combination with 10,000 units of vitamin A.

**Methods:** Retrospective review was performed in all patients with clinical features of radiation proctitis presenting to our institution between 1997-2007. Treatment methods were assessed and main comparison was made between patients who received Formalin 8% alone with those who received Formalin in combination with vitamin A. Formalin 8% in a buffered solution was applied directly to the affected mucosa using a 16-inch cotton tip applicator; while 10,000 units of vitamin A were given orally on a daily basis indefinitely. Data were analyzed to compare the number of treatments, resolution of symptoms and symptom free interval.

**Results:** 87 patients with mean age of 79 (range 54-90) years were included in the study. Patients were followed for a mean of 3 (range 0.25-60) months. The time interval from radiation exposure to Formalin treatment was 10 (range 1-30) months. Overall, 11(13%) patients responded to steroids and sulfasalazine therapy. 42 (48%) patients were treated with Formalin alone and 34 (39%) were treated with Formalin combined with vitamin A. 13 (31%) patients who failed to respond to Formalin alone subsequently received combination therapy for resolution of their symptoms. The number of treatments required till resolution of symptoms with Formalin alone was 4.6 (range 1-15), as compared to 1.6 (range 1-5) when vitamin A was added.

**Conclusions:** Data showed a significant reduction in the number of treatments and time interval till resolution of symptoms when vitamin A is added. This combination represents a simple, effective, and well-tolerated method of controlling hemorrhagic radiation proctitis in comparison to more extensive procedures.

#### Efficacy of Management Algorithm for Chronic Anal Fissures

(GSF4)

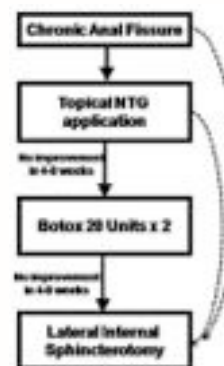
R. Sinha, A. Kaiser . . . . . Los Angeles, CA

**Purpose:** Surgery is considered most effective in the treatment of anal fissures, but carries a risk of fecal incontinence. Conservative methods are therefore offered as the first line treatment and include topical nitroglycerin (NTG), followed by injection of botulinum toxin A (BTX), hence reserving sphincterotomy for severe or refractory cases. Aim of this study was to analyze the efficacy of a treatment algorithm with stepwise escalation.

**Methods:** Patients who were treated for chronic anal fissure were retrospectively analyzed. All patients were offered all steps of the algorithm NTG → BTX → surgery, unless the severity of symptoms or patient preference demanded more aggressive treatment. Advancement occurred if a step either failed to heal the fissure or caused intolerable local or systemic symptoms. The patients were followed up in clinic and their progress monitored for symptoms.

**Results:** 128 patients were included in the study. The mean duration of symptoms was 9.3 months, mean follow-up 10 months. 83 patients were initially started on conservative measures and NTG, 18 on BTX, and 26 went straight to surgical management. 1 patient opted against any treatment. Of the 83 patients (64.8% of the total) undergoing conservative therapy and topical NTG, persistent symptoms required advancement to BTX in 20 patients (24.1% of subset) and surgery in 10 patients (12.0% of subset). Of the 38 (18 primary + 20 secondary) patients (29.7% of the total) receiving BTX, only 9 (23.7% of subset) required to be advanced to surgery. Of the 128 patients, 35 (27.3%) ended up with surgery (26 primary + 9 secondary). 1 patient (2.9%) did not heal, 1 patient developed an abscess, 14 patients had prolonged wound healing; but after healing, none of these patients showed a recurrence.

**Conclusions:** Our study shows that the algorithm is an effective way of managing patients with chronic anal fissure as the majority respond to conservative management. Only 26% require surgery which is effective but also carries a temporary morbidity.



## RESEARCH FORUM

### Toll Like Receptor 9 Agonist, CpG ODN, Inhibits Metastatic Colon Adenocarcinoma in a Murine Hepatic Tumor Model

(RF1)

I. Kim, X. Yan, C. Shantha Kumara HM, R. Baxter, A. Ahmed, C. Cordon-Cardo, R. Whelan . . . New York, NY

**Purpose:** There is evidence that CpG Oligodeoxynucleotide (CpG) 1826, a Toll Like receptor (TLR) 9 agonist, inhibits subcutaneous and metastatic tumor growth in several murine tumor lines by augmenting Th1 immunity. Its impact on metastatic colon tumors is unknown. This study's purpose was to determine CpG's effect on colon tumor growth in a portal vein induced hepatic tumor model.

**Methods:** There were 2 studies (40 Balb/C mice); Study A assessed CpG 50ug/dose and Study B 100ug/dose. There were separate control groups. All mice received a portal vein injection of  $2 \times 10^4$  CT 26 colon tumor cells. For both studies the mice were divided into 2 groups, and given intraperitoneal (IP) injections of CpG 1826 (50 or 100ug dose) or PBS; 14 daily injections were given. On day 21 the mice were sacrificed, livers and spleens excised and weighed and the tumor nodules counted and histologically assessed.

**Results:** Study A; the mean number of hepatic tumor nodules (mets) was significantly lower for the 50 ug CpG group ( $1.9 \pm 1.8$  mets/mouse) than for the control mice ( $7.8 \pm 5.9$  mets,  $p=0.0003$ ). Study B (100ug dose); the mean nodule count was again lower in the CpG group ( $0.18 \pm 0.4$  mets/mouse) vs control ( $7.6 \pm 4.5$  mets,  $p=0.0001$ ). No mets were noted in 9/11 CpG 100 ug mice (vs 2/11 for CpG 50 ug and 0/19 control mice). Of note, the CpG groups' mean liver weights (CpG 100ug,  $2.41 \pm 0.27$  gm; CpG 50ug,  $1.76 \pm 0.38$  gm) were much higher than the control groups (A,  $1.33 \pm 0.34$ ; B,  $1.35 \pm 0.24$   $p<0.01$  for both). Also, the CpG spleens were heavier than the control groups' ( $p<0.005$  for both A and B). Histologically, a high mitotic rate was noted in all control tumors whereas the CpG groups' liver nodules contained mostly histiocytes and lymphocytes which is likely related to the CpG.

**Conclusions:** IP injection of CpG 1826 for 14 days inhibited hepatic metastatic tumor development. CpG was also associated with increased liver and spleen weights that were not due to tumor burden. CpG was associated with increased lymphocytic and histiocytic infiltrates in tumor nodules. Further studies are needed to evaluate the use of CpG in the perioperative setting.

### Is The Lymphocytic Response an Independent Predictor for Survival in Patients with Colorectal Cancer?

(RF2)

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. . . . . Nedlands, WA, Australia; Subiaco, WA, Australia

**Purpose:** It has been proposed that the immune response

plays an important role in the aetiology, pathogenesis and prognosis of many cancers. The aim of this study was to determine if the concentration of various subsets of lymphocytes within the cancer core was an independent predictor for survival in patients with colorectal neoplasia.

**Methods:** A tissue microarray of 1046 consecutive patients with stage II and III colorectal cancer (mean follow-up 59.6 months) was examined by immuno-histochemical methods for the presence of CD8+, CD45RO+ and CD4+CD25+ T (TREG) cells. Individual slides were scanned using a high resolution scanner (Scanscope). Image analysis software (Aperio TMA Lab v 8.0) was utilised to determine positive cell counts per square millimetre of cancer. The data was analysed by Cox regression, and included stage (AJCC), age, sex, location, chemotherapy and grade in the analysis.

**Results:** An increased density of CD8+ T cells within the cancer core was a significant independent predictor for improved cancer specific survival (High CD8+ count vs Low, HR 0.657,  $p=0.005$ , 95%CI 0.490 - 0.880). The seven year cancer specific survival for patients with a high CD8+ count was 69.4% (95% CI 63.9% - 74.4%) versus 53.3% (95%CI, 46.6% - 57.7%) for those with a low CD8+ count.

**Conclusions:** An increasing density of CD8+ T cells is associated with an improved survival in patients with Colorectal Cancer. FUTURE DIRECTIONS: T REG cells are thought to induce tumour tolerance and be associated with decreased survival. This is the first time that TREG cells have been quantified on such a large tissue microarray with available clinicopathologic, molecular and survival data. Future treatment modalities may involve the down regulation of this particular cell type.

### Loss of Microsatellite Stability is Key in Formation of Serrated Polyps and Cancers

(RF3)

C. Messick, J. Church, M. Kalady. . . . . Cleveland, OH

**Purpose:** Colorectal cancers arise via genetic and molecular changes that cause mucosal instability and subsequent premalignant polyps which transform into malignancy. Different neoplastic mechanisms such as chromosomal instability, mutator, and methylator pathways have been described, although the precursor polyps occurring in each pathway have not been well described. This study analyzes colorectal polyps associated with different molecular classifications of tumors in an effort to better understand colorectal carcinogenesis.

**Methods:** Colorectal cancers from a prospectively maintained frozen tissue bank were analyzed for microsatellite stability and for methylation as defined by the CpG island methylator phenotype (CIMP). Tumors were grouped according to their molecular characteristics as follows: 1. microsatellite stable or low instability (MSS) and CIMP-negative (CIMP-N); 2. MSS and CIMP-high (CIMP-H); 3. microsatellite instability high (MSI-H) and CIMP-H.

Corresponding patient demographics, preoperative colonoscopy information, polyp characteristics, operative reports, and pathology reports were reviewed.

**Results:** 107 patients were included: 65 MSS/CIMP-N, 20 MSS/CIMP-H, and 22 MSI-H/CIMP-H. Results are shown in the table. The groups were similar demographically. Among groups, the proportion of patients with synchronous polyps, median number of polyps, median polyp size, and polyp location was similar. However, histology of associated polyps varied according to tumor classification. Patients with MSS tumors (CIMP-H or CIMP-N) had a greater proportion of adenomas than patients with MSI-H/CIMP-H tumors, who had a higher percentage of serrated polyps ( $P=0.03$ , see table).

**Conclusions:** Patients with MSI-H/CIMP-H cancers phenotypically demonstrate a higher percentage of serrated polyps compared to MSS cancers. Loss of microsatellite stability is a key event in mucosal transformation to serrated polyps and cancers. This information should be considered during colonoscopic evaluation and management of colorectal cancers.

#### Bradykinin-Induced COX-2 Expression is Mediated by PKD in Colonic Myofibroblasts

(RF4)

J. Yoo, C. Chung, E. Rozengurt . . . . . Los Angeles, CA

**Purpose:** Chronic ulcerative colitis is associated with an increased risk of colorectal cancer. Colonic myofibroblasts, a subpopulation of cells within the gastrointestinal (GI) tract that are an important source of COX-2, have been implicated in tumor growth. Increased numbers of myofibroblasts, in parallel with elevated levels of COX-2, have been identified in areas of intestinal inflammation and neoplasia. However, the cell signaling pathways that regulate COX-2 expression in myofibroblasts have not been well studied. PKD, the founding member of a new family of protein kinases that includes PKD2 and PKD3, has been linked to transcription factors that regulate tumor-promoting

processes, but its role in myofibroblast cell signaling and COX-2 expression has not been explored.

**Methods:** Human diploid 18Co cells were grown to confluence on 35x10mm cell culture dishes and used from passages 8-14. 18Co cells were treated with bradykinin (BK) and with various inhibitors. COX-2 expression was assessed by Western Blot analysis.

**Results:** The inflammatory mediator bradykinin (100nM) stimulated PKD activation and induced the expression of COX-2 after 2 hours of treatment. This effect was dose- and time-dependent with peak activation at 6 hours followed by a steady decline over 24 hours. Bradykinin-mediated COX-2 expression was completely inhibited by the p38 MAPK inhibitor SB202190 (10 $\mu$ M), as well as by Go6976 (10 $\mu$ M), an inhibitor of PKD. Bradykinin-mediated COX-2 expression was also inhibited by the bradykinin B2 receptor antagonist HOE140 (5 $\mu$ M).

**Conclusions:** Bradykinin stimulates PKD activation and COX-2 expression in a human myofibroblast cell line. Bradykinin-mediated COX-2 expression involves the bradykinin B2 receptor and the p38 MAPK signaling pathway. Inhibition by the PKD inhibitor Go6976 suggests a role of PKD in bradykinin-mediated COX-2 expression. The inflammatory microenvironment that characterizes ulcerative colitis may activate a unique signaling cascade that promotes tumor growth.

#### A New Murine Model for Colon Cancer Using Non-Operative Transanal Rectal Injection

(RF5)

L. Norcross, M. Donigan, J. Aversa, J. Colon, J. Smith, R. Madero, S. Li, P. Williamson, S. DeJesus, A. Ferrara, J. Gallagher, C. Baker . . . . . Orlando, FL

**Purpose:** Currently, the most accurate orthotopic representation of human colon cancer is a cecal injection. However this requires a surgical incision and therefore limits the ability to accurately measure immune responses to any subsequent colon resections. Therefore, in order to study the immunological response following large bowel resection on mice with colon cancer, the traditional cecal injection model must be modified. In this study we

RF3

	MSS/CIMP-N	MSS/CIMP-H	MSI-H/CIMP-H
N	65	20	22
Median Age at Resection	67 (31-83)	75 (41-91)	74 (64-89)
Gender (Male/Female)	35 / 30	9 / 11	9 / 13
Polyp Characteristics			
Total	105	35	26
Median Size (cm)	0.8 (0.2-8.0)	0.5 (0.2-3.0)	0.4 (0.1-3.5)
Right	52	17	14
Left	53	18	12
Adenomas	75	26	14
Serrated Polyps	24	9	12



designed an alternative orthotopic model for primary colon cancer by using a trans-anal approach.

**Methods:** Anesthetized Balb/c mice were injected with 25,000 murine colon cancer CT26 cells using a 30-gauge syringe, submucosally into the distal, posterior rectum. Care was taken not to pass transmurally into the pelvic cavity. Seven mice were injected using operating loupes with 10x magnification and sacrificed on post-injection day 17. An additional 10 mice were injected using 100 x magnifications and sacrificed on day 20. The rectum, rectal wall and lungs were photographed, measured, and processed for histology and reviewed by a pathologist.

**Results:** Three of seven mice in the initial study had notable, large tumor originating from the rectal wall, all showing poorly differentiated adenocarcinoma. In the second group, eight out of ten mice had gross tumor originating from the rectal wall. Four of these mice had abnormal lung tissue, suggesting metastasis. Slides from the second group of mice are under review. A 10x magnification resulted in a 43% tumor growth. In contrast and an 80% tumor growth rate was observed with 100x magnification. The overall success rate of tumor growth was 65% using the trans-anal, submucosal tumor injection model.

**Conclusions:** Trans-anal injection of colon cancer cells offers an alternative non-operative orthotopic murine model for colon cancer. By using an orthotopic model that does not require abdominal surgery for implantation, more aspects of inflammation and immune response can be evaluated without the influence of a previous abdominal surgery.

#### Comparison between Human Colon Tumors and Coordinately Established Primary Cell Lines

(RF6)

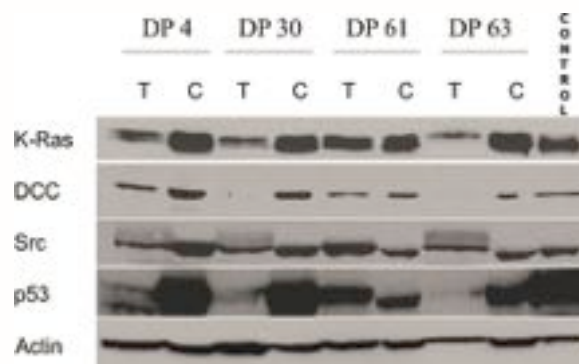
D. Pastor, T. Olson, W. Koltun, L. Harris, C. Kline, R. Irby, L. Poritz . . . . . Hershey, PA

**Purpose:** Cultured cell lines have played an integral role in the study of tumor biology for over a century. The purpose of this study is to evaluate colon cancer cell lines with respect to the parent tumor and assess whether these cells are an accurate and reliable representation of the cancers from which they are derived.

**Methods:** Fresh colon cancer tissue was obtained from operative specimens, minced, digested, and cultured. Immunofluorescence and Western blots for cytokeratin were performed to confirm that resultant cells were epithelial. Tumorigenicity of cell lines was assessed by subcutaneous injection ( $2 \times 10^6$  cells) into athymic mice and calculation of tumor volume after 3 weeks. Invasive ability of our cell lines was tested with the MATRIGEL<sup>TM</sup> invasion assay. Invasion of cells was assessed at 24, 36, or 48 hours and compared to commercially available cell lines. Western blots were performed on proteins from cell line lysates and respective tissue homogenates. Blots were probed for tumor markers with primary antibodies specific for K-Ras, p53, DCC, APC, and Src.

**Results:** Four cell lines (DP 4, 30, 61, and 63) have been generated from patients with colon cancer and confirmed to be epithelial and tumorigenic (mean tumor volume 158.46 mm<sup>3</sup>). All cell lines invaded into the MATRIGEL<sup>TM</sup> starting as early as 24 hours. K-Ras, p53, DCC, APC, and Src expression by Western blot were markedly different between the cell lines and respective tissue samples (see figure).

**Conclusions:** We have developed adenocarcinoma cell lines from colon cancer tissues that exhibit epithelial cell markers, invasion, and tumorigenicity. These cell lines differ from their respective parent tumor tissue in the expression of key tumor markers. Therefore, data acquired through the use of cell culture may not be a reliable representation of tumor activity in vivo. Changes in immortalized cell lines may confound our understanding of the mechanisms of carcinogenesis and metastases and elucidate why in vitro therapies do not always work in vivo.



Western blot of tumor proteins in primary cell lines (C) and respective tumor tissue (T).

#### Selenium Binding Protein Gene Expression is Down-Regulated in Recurrent Early Stage Rectal Cancer

(RF7)

J. Sanchez, K. DeJulius, C. Messick, M. Kalady . . . . . Cleveland, OH

**Purpose:** Markers predicting recurrent or metastatic rectal cancer could better define prognosis and influence treatment plans. Selenium binding protein (SBP-1) has been implicated in protein trafficking and its decreased expression has been associated with unfavorable prognosis in both ovarian and lung cancers. Although dietary selenium has been epidemiologically shown to be protective against the development of colorectal cancer, the role of SBP-1 expression in rectal cancer has not been evaluated. This study examined the SBP-1 gene expression patterns for non-recurrent and recurrent early stage rectal cancers to determine its potential as a marker for prognosis.

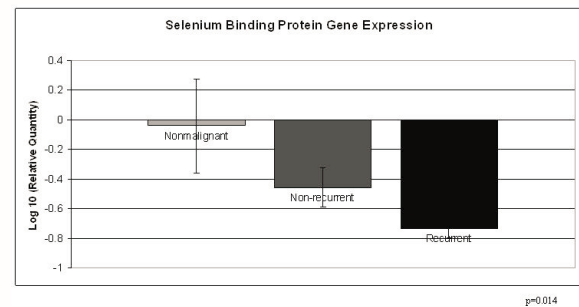
**Methods:** Patients with stage I and II rectal cancer treated by surgery alone were queried from an IRB-approved database. Patient demographics, tumor characteristics, and

clinical follow-up including tumor recurrence were recorded. RNA from frozen tumor and nonmalignant rectal mucosa was isolated and used to measure SBP-1 expression using quantitative real-time PCR. Expression of SBP-1 in normal rectal mucosa samples was used as a baseline and compared to differential expression in non-recurrent and recurrent rectal cancer specimens.

**Results:** 32 non-recurrent and 23 distally recurrent early stage rectal cancers were examined. Patient age, gender, and tumor differentiation were similar among the groups ( $p=0.691$ ,  $0.766$ ,  $0.838$  respectively). Rectal cancers had statistically significant decreased expression of SBP-1 compared to normal mucosa. The down-regulation is more prominent in recurrent cancers and statistically different than expression in non-recurrent cancers ( $p=0.014$ , see figure).

**Conclusions:** Rectal cancers exhibit a down-regulation of SBP-1 compared to normal mucosa. This loss of expression

is exaggerated between recurrent and non-recurrent cancers. Determining tumor SBP-1 expression in biopsies or resected specimens may be useful in evaluating prognosis for rectal cancer patients.



## PODIUM ABSTRACTS

### Long-Term Results after 16 years Experience with Laparoscopic Restorative Proctectomy

(1)

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**Purpose:** Laparoscopic colonic resection is now a technique that is becoming more popular with the increase of skills of surgeons and the improvement of the resources and equipment available. Laparoscopic colonic resection was first introduced in our institution in 1991. We have been cautious in introducing laparoscopic restorative proctectomy prior to 2002. We review and present our experience with laparoscopic assisted resection of rectal cancers.

**Methods:** A review of a prospective database of all laparoscopic colorectal cases was performed. All stages were included.

**Results:** From a total of over 2500 laparoscopic colorectal cases performed, 177 patients were identified who were treated by three of the co-authors over period of 16 years. Only 11 of these patients were operated on prior to 2002. Preoperative chemoradiotherapy was given to those with bulky T3, T4 and N1 tumours as assessed by endorectal ultrasound or MRI. There were 47 patients with TNM Stage I, 68 patients with Stage II, 41 with Stage III, and 20 with Stage IV. Median followup was 26 months (range 1-188 months). 111 were males. Median length of stay was 5 days (range 2 – 70 days). All patients had the abdominal portion of their procedure done laparoscopically. 96 patients had the total mesenteric excision and low rectal division performed laparoscopically, with the remainder having the TME and/or division performed open with a pfannenstiel or lower midline incision. Only one patient had an unplanned conversion to open surgery. Overall, there was a leak rate of 3.4%, and an additional 6 patients developed a pelvic abscess. One patient had an early bowel obstruction requiring laparoscopy during the initial admission. There were no intraoperative or postoperative deaths. To date distal recurrence has occurred in 6.2%, with one patient also having local disease. One patient had local recurrence only. Six patients died of their disease. Of these 6 patients the mean survival was 52 months (range 12 – 180 months)

**Conclusions:** In experienced hands, laparoscopic assisted resection of rectal carcinomas is safe and feasible, with acceptable morbidity and mortality. Oncological outcomes were not compromised by the laparoscopic rectal dissection.

### Long-Term Morbidity and Oncological Outcomes of Laparoscopic Anterior Resection for Upper Rectal Cancer: 10-year Results of a Prospective Randomized Trial

(2)

S. Ng, K. Leung, J. Lee, W. Leung, D. Ng, R. Yiu, J. Li, S. Hon.  
..... Hong Kong, China

**Purpose:** Laparoscopic surgery for colon cancer has been shown to have better short-term clinical outcomes and sim-

ilar oncological clearance when compared to open surgery, but data on rectal cancer are scarce. We have previously reported the 5-year results of a randomised trial comparing laparoscopic and open resection for cancer of the upper rectum, rectosigmoid junction, and sigmoid colon. The aim of this follow-up study was to report on the long-term morbidity and 10-year oncological outcomes among the subgroup of patients with upper rectal cancer.

**Methods:** From September, 1993 to October, 2002, 153 patients with upper rectal cancer were randomised to receive either laparoscopic (n=76) or open (n=77) anterior resection. Five patients were excluded from analysis of long-term outcomes because of perioperative mortality. Patients were last followed-up in June, 2007. Long-term morbidity, survival, and disease-free interval were prospectively recorded. Data were analysed by intention-to-treat.

**Results:** The demographic data of the two groups were comparable. More patients in the open group developed adhesive intestinal obstruction requiring hospitalisation (13 vs. 2,  $P=0.005$ ) and intervention (5 vs. 0,  $P=0.058$ ). The overall long-term morbidity rate was also significantly higher in the open group (24.3% vs. 10.8%,  $P=0.031$ ). After curative resection, the probabilities of cancer-specific survival at 10 years of the laparoscopic and open groups were 82.6% (SE 5.4%) and 76.2% (SE 7.2%) respectively ( $P=0.623$ ). The overall recurrence rates of the laparoscopic and open groups were similar (16.9% vs. 17.9%,  $P=0.887$ ), and their probabilities of being disease free at 10 years were 82.6% (SE 5%) and 80.2% (SE 5.2%) respectively ( $P=0.729$ ).

**Conclusions:** Laparoscopic anterior resection for upper rectal cancer is associated with fewer long-term complications and similar 10-year oncological outcomes when compared to open surgery.

### Robotic-assisted Low Anterior Resection of Rectal Cancer: Short-Term Outcome of Prospective Randomized Trial

(3)

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..... Seoul, South Korea

**Purpose:** Laparoscopic colorectal resection has become popularized. The recently developed da Vinci® Surgical System (Intuitive Surgical, Sunnyvale, CA, USA) promises to facilitate endoscopic surgery and overcome its disadvantages. Therefore, the aim of this study is to compare the short-term results between robotic-assisted low anterior resection(R-LAR), using the da Vinci® Surgical System, and conventional laparoscopic low anterior resection(L-LAR) in rectal cancer patients.

**Methods:** 113 patients were randomly assigned to receive R-LAR (n=56) or L-LAR (n=57) between April 2006 and September 2007. Patient characteristics, perioperative clinical results, complications, and pathologic details were compared between groups. Moreover, macroscopic grading of the specimen was evaluated.



**Results:** Patient characteristics were not significantly different between groups. The mean operation time was  $190.1 \pm 45.0$  minutes in R-LAR group and 181.1 minutes in L-LAR group ( $P=0.003$ ). The conversion rate was 0.0% in R-LAR groups and 10.5% in L-LAR group ( $P=0.013$ ). Complication rate was 7.1% in R-LAR group and 21.6% in L-LAR group ( $P=0.055$ ). The average length of stay was  $5.7 \pm 1.1$  days in the R-LAR group and  $7.6 \pm 3.0$  days in the L-LAR group ( $P<0.001$ ). The specimen quality was acceptable in both groups. However, mesorectal grade was complete ( $n=52$ ), nearly complete ( $n=4$ ) in the R-LAR group and complete ( $n=43$ ), nearly complete ( $n=13$ ), incomplete ( $n=1$ ) in the L-LAR group ( $P=0.037$ ).

**Conclusions:** R-LAR was performed safely and effectively, using the da Vinci® Surgical System. Use of the system resulted in acceptable perioperative outcomes comparing with L-LAR.

#### Long-Term Outcomes of Patients Undergoing Laparoscopic Surgery for Rectal Cancer

(4)

O. Oliveira, T. Sonoda, S. Pandey, K. Trencheva, S. Lee, J. Milsom . . . . . New York, NY

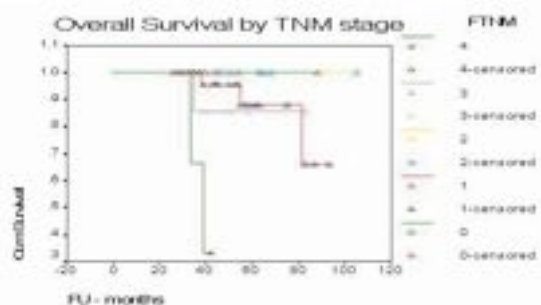
**Purpose:** Rectal cancer survival remains a challenge for colorectal surgeons. Laparoscopic approach for rectal cancer surgery remains controversial owing to technical difficulties and concern regarding positive circumferential margins. The aim of our study was to analyze local recurrence, specimen margins and survival rate of patients undergoing laparoscopic (LAP) surgery for rectal cancer by an experienced team of colon and rectal surgeons

**Methods:** Using prospective colorectal database, 117 consecutive patients (pts) were identified with rectal cancer from 1999 to 2007. LAP and hand assisted laparoscopic (HAL) surgery were used for rectal resection in 92.3%. Follow up data were collected from review of medical records as well as telephone calls to all available pts. The Kaplan Meier method was used to analyze the actuarial survival rate.

**Results:** 108 consecutive pts (55F/62M) underwent LAP or HAL surgery for rectal cancer. Median age was 60.5 years (range 23 – 91). 19 pts had upper rectal cancer, 52 had mid rectal cancer and 46 had low rectal cancer. All pts with mid and low rectal cancers underwent total mesorectal excision. Pure LAP proctectomy was performed in 49 pts, while HAL proctectomy was performed in 59; there was one conversion in each group. No positive margins were reported on pathology. Neo-adjuvant therapy was given to 56 pts with stage II, III, and IV disease, with a 21.4% complete response rate. Of this cohort, 76 pts have been followed for greater than 24 months. The mean follow-up in this group was 48.3 months. The local recurrence rate was 4.25%. The overall survival rate was .6608 (See graphic)

**Conclusions:** LAP surgery for rectal cancer, in experienced hands, has a favorable outcome with low local recurrence

rates, low circumferential margin positivity, and excellent overall survival that compare with data from open surgery.



#### Overall and Disease-free Survival for Stage III Colon Cancer Patients is Independent of the Total Number of Lymph Nodes Retrieved

(5)

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**Purpose:** Increasing the number of lymph nodes retrieved has been implicated with improved survival for patients with colon cancer. This finding is related to many factors, one being stage migration. Our aim therefore was to eliminate this confounder and determine if increasing node number in known stage III colon cancer resulted in improved oncologic outcomes.

**Methods:** A prospectively collected database on all patients with stage III colon cancer from 1996-2001 was analyzed. Outcomes, after surgery with or without adjuvant therapy (disease free survival and overall survival) were evaluated in three categories: the entire cohort, patients with N1 disease, and patients with N2 disease. These categories were then classified into subgroups by the number of nodes ( $\leq 12$  >) retrieved per surgical specimen. The outcomes were analyzed using survival analysis.

**Results:** Data from 330 patients from 1996-2001 with a median follow-up of 62 months with stage III colon cancer were analyzed. Five year overall and disease free survival was 64.8% and 85.3% respectively. Adjuvant 5 FU based chemotherapy statistically improved overall and cause specific survival for patients with stage III disease (73% versus 36 %)  $p<0.05$ . A positive correlation between number of positive lymph nodes and overall survival was found ( $p<0.05$ ). However, the total number of lymph nodes ( $\leq 12$  or  $>12$ ) removed carried no correlation with neither, overall ( $p=0.11$ ), cause-specific survival ( $p=0.12$ ) nor with disease free survival ( $p=0.18$ ). No significant association was observed between the number ( $>12$ , or  $\leq 12$ ) of lymph nodes removed and receiving chemotherapy in either patients with N1 (248 patients) and N2 (80 patients) disease. ( $N1$   $p=0.11$  and  $N2$   $p=1.00$ ).

**Conclusions:** Accurate staging of patients with colon cancer requires an appropriate operation as well as a concerted

pathological effort to identify lymph nodes in the surgical specimen. The above results demonstrate that the number of lymph nodes analyzed for stage III colon cancer is not a prognostic variable on overall or disease free survival.

#### Impact of Extended Lymph Node Dissection for Rectal Cancer: Its Safety and Long Term Oncologic Outcomes

(6)

B. Min, N. Kim, K. Lee, H. Hur, J. Kim, S. Baik, S. Sohn, C. Cho ..... Seoul, South Korea

**Purpose:** To review the long-term oncologic outcomes of extended lymph node dissection for rectal cancer as well as its safety and feasibility in terms of operation-related morbidity and mortality.

**Methods:** From a prospective database, 275 patients who had received TME and extended lymph node dissection paraaortic and/or lateral pelvic lymph node dissection were retrieved. Clinical characteristics, short-term operative outcomes and long-term oncologic outcomes were reviewed. We also compared the oncologic outcomes with those of the patients who underwent synchronous resection of liver metastasis (Liv+) during the same period. The median follow-up period was 54 months.

**Results:** One hundred nineteen patients received both paraaortic and lateral pelvic node dissection, 133 received paraaortic node dissection only and 23 received lateral pelvic node dissection only. Perioperative mortality occurred in 4 patients (1.5%) and morbidity in 58 patients (21.1%). Pathology revealed metastatic paraaortic lymph nodes in 54 patients (PA+), and metastatic lateral pelvic nodes in 36 patients (LP+), while in 103 patients metastasis was confined to only regional nodes (RE+). Both cancer-specific survival (CSS) and disease-free survival (DFS) were significantly different among groups (Table 1) (CSS:  $p < 0.001$ ; DFS:  $p < 0.001$ ) and uni- and multivariate analyses for prognostic factors revealed that the location of metastatic node was the strongest factor (CSS:  $p < 0.001$ ; OR 7.036; 95%CI 3.536-14.003; DFS:  $p < 0.001$ ; OR 5.289; 95%CI 2.674-10.462). CSS and DFS of LP+ patients showed no significant differences (Table 1) (CSS:  $p = 0.055$ ; DFS:  $p = 0.851$ ). However, CSS and DFS of PA+ patients were worse than those of Liv+ patients (CSS:  $P = 0.025$ ; DFS:  $p < 0.001$ ).

**Conclusions:** Although potentially curative removal of metastatic lymph nodes were performed, the lymph node

metastasis to lateral pelvic wall or paraaortic area was found to be related to poor prognosis, similar or even worse than that of the patients with liver metastasis. Thus, though extended lymph node dissection could be performed with acceptable perioperative morbidity and mortality, its efficacy in terms of oncologic outcomes remains not recommendable.

#### Impact of Pelvic Sidewall Dissection in Lower Rectal Cancer

(7)

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**Purpose:** It is known that the lateral pelvic lymphatic flow in addition to that along superior rectal artery exists in the rectum below the peritoneal reflection. However, the effectiveness of pelvis sidewall dissection (PSD) is still unclear. The goal of this multicenter study was to clarify the efficacy of pelvic sidewall dissection for local recurrence and survival.

**Methods:** The data of consecutive 1272 patients with tumor specific mesorectal excision (TSME) for lower rectal cancer in 12 institutions between 1991 and 1998 were reviewed. The relation between lymph node involvement and various parameters were analyzed by chi-square test and logistic regression analysis. The rates of local recurrence in patients with PSD were compared with those without PSD according to the number of risk factors of lateral pelvic lymph node metastasis (LPLM). The prognostic factors were also analyzed by Cox proportional hazards model.

**Results:** The rates of perirectal lymph node metastasis (PNM) were 8.1%, 24.3%, 53.1%, and 56.9% in T1, T2, T3, and T4, respectively ( $p < 0.0001$ ). Of the 1272 patients, 784 underwent TSME combined with PSD. Among them, 117 patients had LPLM. The rates of LPLM were 5.4%, 8.2%, 16.5%, and 37.2% in T1, T2, T3, and T4, respectively ( $p < 0.0001$ ). A multivariate analysis revealed that the risk factors for LPLM were female gender, histology of rectal cancer, and PNM. There were no differences in the rates of local recurrence between PSD group and non-PSD group according to the number of risk factors for LPLM. Eighty-nine out of 117 patients with LPLM had no local recurrence. Cox proportional hazards model revealed that the

**S6 Oncologic outcomes of each group**

	pN0	RE1+	RE2+	LP+	PA+	Liv+
5-year CSS	87.4%	70.3%	54.0%	39.7%	20.6%	36.3%
5-year DFS	80.2%	65.1%	37.2%	26.3%	15.1%	27.1%

RE1+, only regional node metastasis  $\leq 3$ ; RE2+, only regional node metastasis  $\geq 4$ ; LP+, regional and/or lateral pelvic node metastasis without paraaortic node metastasis; PA+, paraaortic node metastasis; Liv+, synchronous liver metastases curatively removed; CSS, cancer-specific survival; DFS, disease-free survival.

poor prognostic factors were age (62 or older), histology other than well or moderately differentiated carcinoma, T-factor (T3 or T4), PNM, and the absence of PSD.

**Conclusions:** PSD improved overall survival in patients with lower rectal cancer. The number of risk factors of LPLM may not be selection criteria of PSD for lower rectal cancer. A randomized controlled study is ongoing to clarify whether PSD really has an effect on both local recurrence and survival in patients with lower rectal cancer.

#### **Lymph Node Harvest after Proctectomy for Invasive Rectal Adenocarcinoma following Neoadjuvant Therapy: Does the Same Standard Apply?**

(8)

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 ..... Weston, FL

**Purpose:** Lymph node harvest for invasive colorectal carcinoma is of critical clinical significance and high lymph node yield usually indicates adequate tumor clearance and may improve survival. However, recent reports indicate that neoadjuvant therapy significantly reduces the lymph node harvest. The aim of this study was to interpret the lymph node harvest in this setting based on the primary tumor response.

**Methods:** All patients who underwent proctectomy(R0 resection) utilizing the total mesorectum excision(TME) were included. The neoadjuvant therapy consisted of a total dose of 50.4Gy(45Gy to 65Gy) of radiation and 5-Fu based chemotherapy. The surgical procedure was performed after an interval of 3 weeks to 3 months. The tumor regression grade(TRG) was identified by reviewing postoperative pathological slides(TRG1-5: TRG1 = complete pathological response and TRG5 = no response). Results were expressed as mean  $\pm$  SEM. A  $p < 0.05$  was considered significant.

**Results:** From 1998 to 2007, 237 patients were identified including 157 cases in the neoadjuvant therapy group and 80 cases in the non neoadjuvant therapy group. Patients who received neoadjuvant therapy were divided into two groups based on the TRG of primary tumor: good responder group(TRG1-2, n=91) and poor responder group(TRG3-5, n=66). Patients receiving neoadjuvant therapy were more likely to be younger( $p < 0.001$ ), male ( $P = 0.040$ ) and undergo APR procedure( $P = 0.007$ ). The neoadjuvant therapy reduced the lymph nodes number significantly( $15.4 \pm 1.0$  vs  $20.6 \pm 1.9$ ,  $P = 0.008$ ). Moreover, patients in the good responder group had less lymph nodes than the poor responder group( $13.1 \pm 1.1$  vs  $18.6 \pm 1.7$ ,  $P = 0.006$ ). There was significant difference in harvest number between good responder group and non-neoadjuvant group( $13.1 \pm 1.1$  vs  $20.6 \pm 1.9$ ,  $P = 0.001$ ). However, there was no significant difference between poor responder group and non neoadjuvant group( $18.6 \pm 1.7$  vs.  $20.6 \pm 1.9$ ,  $P = 0.439$ ).

**Conclusions:** The same standard of lymph nodes harvest(12 lymph nodes) should be applied for the poor responder cases. However, a new standard may be necessary to define the adequate number of lymph nodes for good responders.

#### **Bowel Function is Worse after Restorative Procedure with Preoperative Long Course Radiation**

(9)

S. Shedda, I. Lavery  
 ..... Melbourne, VIC, Australia; Cleveland, OH

**Purpose:** It has been previously assumed that any effect of radiation on bowel function would not be relevant if the therapy was delivered preoperatively. However, there is increasing evidence that preoperative short course radiation of the pelvis for rectal cancer affects the function of the neo rectum. This study investigates the impact that long course radiation had on bowel function, sexual function and quality of life.

**Methods:** A prospectively collected single institution database was queried for patients who had a restorative procedure for low rectal cancer and had information available for analysis.

**Results:** There were 270 patients overall with a predominance of males at 71.5% and 28.5% were female. The mean age was 57.8 years in the pre operative group and 62 years in the no radiation patients. ( $p = 0.003$ ) In the preoperative radiation group there were more males at 78.6%. The preoperative radiation group were more likely to have a handsewn anastomosis (27.2 vs. 12.5%,  $p = 0.004$ ) though the level of the anastomosis was 1.77cm in preoperative group and 2.24 cm in the no radiation group ( $p = 0.23$ ) At baseline there was no significant difference in sexual function, bowel function or in the level of incontinence though the pre operative radiation group did report more urgency. ( $p = 0.004$ ) Nocturnal bowel function was significantly worse in the group who had radiation at 3 years ( $p = 0.05$ ). Similarly, incontinence was worse in the preoperative radiation group. Gas incontinence was worse at 3 years ( $p = 0.05$ ) as was liquid incontinence ( $p < 0.001$ ) and solid incontinence ( $p = 0.002$ ). Urgency was worse for the first three years in the group with pre operative radiation ( $p = 0.004$ ). Pad use was greater in the pre operative group for the first 3 years ( $p = 0.015$ ). Quality of life (SF-36) in the pre operative group at baseline was lower MCS 48.4 in comparison to the no radiation group of 52.4 ( $p = 0.002$ ). This level of difference was maintained for the 5 years. PCS was not different.

**Conclusions:** In patients with a restorative procedure, bowel function is significantly worse in those who have had pre operative radiation for the first 3 years.

**Long Term Survival after Surgery for T1 Rectal Cancer**

(10)

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**Purpose:** Transanal excision (TAE) of T1 rectal cancer has been associated with higher risk of local recurrence compared to radical resection. However, a survival advantage for radical resection has not been demonstrated.

**Methods:** Data were extracted from a prospective database and the medical records of patients treated at a single cancer center from 1987 to 2005. Patients who underwent TAE, low anterior resection (LAR), or abdominal perineal resection (APR) for T1 rectal cancer were included. Patients receiving preoperative chemotherapy or radiation or with tumors above 12cm from the anal verge were excluded. The cohort was divided into TAE and radical resection (RR).

**Results:** The final cohort (n=283) was composed of 17 APRs, 129 LARs, and 137 TAEs. The TAE group was notable for an older mean patient age (64 v 59 years,  $p=0.001$ ), shorter mean distance from anal verge (6 v 7.9cm,  $p<0.0001$ ), and smaller mean tumor size (2.2 v 3.1cm,  $p<0.0001$ ). Lymphovascular invasion (11 v 18%,  $p=0.1$ ) and poor differentiation (4 v 6%,  $p=0.5$ ) were similarly prevalent in TAE and RR groups. 20% of RR specimens had lymph node metastasis. Median follow-up for survivors was 5.7 years. Local recurrence (LR) occurred in a higher proportion of TAE patients (12.4 v 2.7%,  $p=0.002$ ). The hazard ratio for local recurrence after TAE was 5.6 (95%CI, 1.9-16.8). Disease specific survival was inferior for TAE patients (85 v 95% at 6 years,  $p=0.03$ , HR2.5 [1.04-5.8]).

**Conclusions:** Radical resection of T1 rectal cancer is associated with improved long term cancer survival.

**UK Audit of Transanal Endoscopic Microsurgery for Rectal Cancer**

(11)

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**Purpose:** Transanal endoscopic microsurgery (TEM) is a minimally invasive alternative to radical rectal resection for the treatment of early cancer. Patients benefit from rapid recovery, excellent function and stoma avoidance. Disease control remains uncertain.

**Methods:** Since 1993 we have prospectively collated TEM data from 21 centers. Patient demographics, tumor characteristics, details of surgery, complications, pathological staging, further treatment, recurrence and survival have been recorded for 424 cases of rectal cancer (median follow up 36 mo). Univariate and multivariate analyses were used to determine variables associated with R1 margin (<1mm) and local recurrence.

**Results:** R1 margin (<1mm) was reported for 11.1% pT1

(28/253), 22.5% pT2 (31/138) and 42.4% pT3 (14/33). Odds of R1 increased with partial thickness rectal wall excision, pT stage (Logistic regression  $p<0.001$ ) and a belief that the tumor was benign ( $p<0.05$ ). Pre-operatively 45% of pT1 and 31% of pT2 tumors were considered benign. Full thickness excision of tumors considered malignant yielded R1 rates of 4.3% pT1 (6/141) and 18.9% pT2 (18/95). Local recurrence was recorded in 60 cases (median 13 mo). Risk of local recurrence at 5 years was 18.6% pT1, 29.3% pT2 and 46.7% pT3 (Kaplan Meier). LyV+ and tumor diameter >2cm were independently associated with local recurrence (Cox regression  $p<0.05$ ). Where TEM was followed by radical TME surgery, odds of recurrence reduced 13 fold ( $p=0.01$ , 95% CI 1.79-103.03). Post-operative radiotherapy did not alter odds of recurrence. FAVORABLE tumors were defined as <2cm diameter, well or mod differentiated, LyV- and R0. Risk of local recurrence at 36 months for FAVORABLE pT1 - 5.5%, pT2 9.4%. UNFAVORABLE pT1 - 17.7%, pT2 - 29.1% (Cox regression model).

**Conclusions:** Pre-operative staging methods lack precision leading to high R1 where partial thickness excision is used. Early TME surgery based upon adverse histopathology following TEM appears safe for pT1 and pT2 tumors (no documented recurrence to date). Patient selection for TEM is frequently governed by fitness for radical surgery rather than tumour biology. High local recurrence rates reflect this fact. TEM produces much better outcomes when applied to biologically favorable tumors.

**Observation or Surgery in Patients with Rectal Cancer: What is the Preferred Treatment for Clinical Complete Responders to Neoadjuvant Therapy?**

(12)

H. Neuman, J. Guillem, E. Elkin, K. Goodman, P. Paty, M. Weiser, W. Wong, L. Temple . . . . . New York, NY

**Purpose:** A clinical complete response (cCR) to neo-adjuvant therapy occurs in a subset of patients with locally advanced rectal cancer. The role of surgery in patients with a cCR after neoadjuvant therapy is debated and few studies help clarify the issue. Therefore, the objective of the study was to evaluate the relative benefits of observation vs surgery in rectal cancer patients with a cCR after neoadjuvant therapy, using decision analysis.

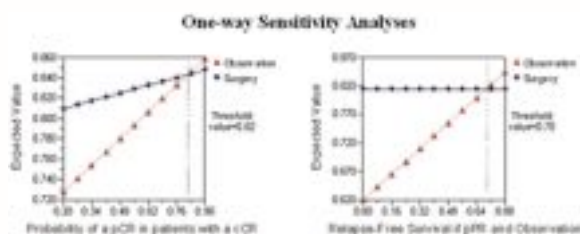
**Methods:** We constructed a decision-analytic model comparing the outcomes of observation vs surgical resection in a patient with a cCR after neoadjuvant therapy. The decision was modeled for expected utility at 5 years. The model accounted for the positive predictive value of distinguishing complete and incomplete pathologic responders amongst patients with cCR, peri-operative mortality, risk of local and/or distant relapse, viability of salvage surgery after relapse, and utilities for each state. Probability estimations and utility values were derived from the literature when possible; others were reached by expert consensus. One-and



two-way sensitivity analyses were performed.

**Results:** In the base case analysis, the expected utility of surgery (EU=0.82) was higher than that of observation (EU=0.75). The model demonstrated that, if the likelihood of identifying pathologic complete responders from those with cCR pre-operatively was greater than 82%, observation became favorable. Observation also became favorable if the relapse-free survival of patients in the observation group who had less than a complete pathologic response was  $\geq 70\%$  (Figure). Within the plausible ranges, however, all one- and two-way sensitivity analyses demonstrated that surgery remained the preferred option.

**Conclusions:** Our model outlines the issues associated with observation vs surgery in patients with locally advanced rectal cancer who achieve a cCR after neoadjuvant therapy, and demonstrates the benefit of surgery. Before adopting observation as the preferred management for patients with a cCR, our ability to identify those patients with a pathologic complete response who have a low likelihood of recurrence must significantly improve.



### Laparoscopic Peritoneal Lavage for Generalized Peritonitis Due to Perforated Diverticulitis - A Feasible Alternative

(13)

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**Purpose:** The standard approach to generalised peritonitis due to perforated diverticulitis involves open surgery and diversion of faecal content. The feasibility of laparoscopic peritoneal lavage was assessed in this study.

**Methods:** A prospective multi-institutional study of 100 patients was undertaken. All consenting patients with perforated diverticulitis causing generalised peritonitis underwent attempted laparoscopic peritoneal lavage. The degree of peritonitis, according to the Hinchey grading system, was recorded. Primary end points were operative success and resolution of symptoms.

**Results:** 100 patients with a median age of 62.5 years (range 39-94), a male to female ratio of 2:1 and a median ASA of 3 (range 3-5) were included. Patients with grade IV diverticulitis (n=8) were converted to an open Hartmann's procedure. The remaining 92 patients were managed by laparoscopic lavage with a morbidity and mortality of 4.3 % and 3.3 % respectively. Two patients required post operative intervention for a pelvic abscess. Only 2 patients represent-

ed with diverticulitis with a median follow up of 36 months (range 12-84 months).

**Conclusions:** Laparoscopic management of perforated diverticulitis with generalised peritonitis is feasible with low recurrence risk in the short term.

### Emergency Laparoscopic Surgery for Complicated Diverticular Disease

(14)

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..... Bristol, United Kingdom

**Purpose:** The aim of this study was to analyse the outcome of emergency laparoscopic surgical management of complicated diverticular disease.

**Methods:** A prospectively collected electronic database of all colorectal laparoscopic procedures between April 2001 and September 2007 has been used to identify outcomes in patients presenting with complicated diverticular disease.

**Results:** 66 patients (28 male), median age 69yrs (23-95), ASA grade II (12), III (38), IV (16) have undergone emergency surgery for complicated diverticulitis - Hinchey grades I (27), II (29), III (7) and diverticular bleeding (3) over a 6 1/2 year period: 43 high anterior resections, 17 Hartmann's resections and 7 low anterior resections. Diverticular fistulas were seen in 16 patients: colovaginal (7), colovesical (2), colo-fallopian (4), entero-colic (3). The median operation time was 110 minutes (45 - 195 mins). There was one conversion to open surgery. Postoperative analgesia was provided by intravenous Paracetamol in 33 patients (50%), patient-controlled analgesia (PCA) 24, oral Paracetamol and Oramorph (8) and epidural opioid infusion (1). The median time to normal diet was 24 hrs (4hrs - 6 days) and median hospital stay 5 days (2-30). There were 2 deaths (3.3%); anastomotic leak, ventricular fibrillation (VF) cardiac arrest. Other complications included: wound infection 8 (12%), anastomotic leak 4 (8%), port-site hernia 1 and one case of Clostridium difficile colitis requiring colectomy. There were 5 (7.5%) returns to theatre and 2 readmissions (3%).

**Conclusions:** Laparoscopic resectional surgery in complicated diverticular disease is a feasible, safe and a largely predictable operation that allows for early hospital discharge and in our opinion improved patient care. We are encouraged to continue to offer our patients the option of an emergency laparoscopic resection.

### Experience of 500 Consecutive Cases Justifies Laparoscopic Resection of Diverticulitis

(15)

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..... Brisbane, QLD, Australia

**Purpose:** To examine morbidity, mortality, conversion



rates and disease recurrence following laparoscopic resection of complicated and uncomplicated diverticulitis. In contrast to colorectal cancer, there are few large studies of laparoscopic or open resection for diverticulitis.

**Methods:** This study represents a retrospective analysis of a prospectively collected database of all laparoscopic resections for uncomplicated and complicated diverticulitis from a single centre.

**Results:** 500 (305 female) patients were identified (median age 58; range 26-89). Recurrent diverticulitis was the most common indication for surgery (77%), followed by perforation (10%), fistulation (9%) and stricture (3%). Median operating time was 120 minutes (range 45-285) and median length of hospital stay was 4 (2-33) days. There was 1 (0.2%) 30-day and in-hospital death. Conversion to an open operation was performed in 14 (2.8%) cases. Dense adhesions were the most common cause for conversion (6 patients). Amongst patients with complicated diverticulitis, the conversion rate was 5.3%, whilst for those with uncomplicated disease, it was 2.1% ( $p=ns$ ). The conversion rate has come down from 8% for the first 100 cases, to 1.5% for the last 400 cases ( $p=0.002$ ). Median operating time has reduced from 180 (60-310) minutes to 120 (55-285) minutes ( $p=0.01$ ). Median follow-up was 82 (3-190) months. To our knowledge, there have been no cases of recurrent diverticulitis, though a small number of patients have had ongoing dysfunctional symptoms in the absence of diverticulitis.

**Conclusions:** Laparoscopic resection of uncomplicated and complicated diverticular disease is both feasible and safe. Whilst conversion rates and operation duration have reduced in this unit with experience, the results also show that very good outcomes can be achieved even during a unit's early experience. Adherence to surgical principles including routine mobilisation of the splenic flexure and anastomosis onto the rectum distally may explain the absence of disease recurrence in our experience.

#### Long Term Results with the Bioprosthetic Anal Fistula Plug (AFP)

(16)

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**Purpose:** This study was undertaken to determine the long term results with the AFP and to determine factors predictive of failure.

**Methods:** With IRB approval, the data for all patients (pts) enrolled in a prospective AFP database between 5/05-1/07 was collected. Indications for use of the AFP were a transsphincteric or anovaginal fistula with a tract greater than 1 cm in length. Long term followup was obtained by telephone interview (35 pts) or clinic visit (22 pts).

**Results:** There were 57 pts with 55 transsphincteric and 8 anovaginal fistulas managed with 77 AFP. A posterior fistula was present in 12 pts and 37 (65%) were male. An initial draining seton had been placed in 50 pts (88%). A his-

tory of Crohn's disease and cigarette smoking were present in 12 (21%) and 30 (53%) pts respectively. All fistulas were healed in 45 pts (79%) after the initial AFP. An additional 14 AFP were placed in 12 pts with either a recurrent or persistent fistula with 3 pts (25%) healed. Overall, fistula healing was achieved in 48 patients (84%). AFP failure was attributed to technical issues (1 pt), primary plug failure (7 pts), and recurrent fistula (4 pts). Recurrent fistulas occurred between 6-11 months after initial AFP. Repeat AFP was successful in the 1 pt with technical issues and 2 pts with recurrent fistulas. No patient with primary plug failure was healed with repeat AFP. Univariate analysis showed that cigarette smoking, male gender, posterior and recurrent fistulas were associated ( $p<.05$ ) with failure of the AFP. Pelvic magnetic resonance imaging (MRI) was offered to patients with fistulas which had been healed at least 9 months with 8 pts accepting. The 8 studies showed complete healing of the fistula with no evidence of fluid or residual fistula tract.

**Conclusions:** These data suggest that: 1.) AFP is effective for the initial management of anal fistulas but longer term recurrence occurred in 7% of patients. 2.) Complete fistula healing can be achieved with the AFP. 3.) Repeat AFP is less successful for pts with longer term recurrent fistulas. 4.) Repeat AFP may not be indicated for pts with primary plug failure. 5.) Predictors of failure of the AFP include cigarette smoking, male gender, posterior and recurrent fistulas.

#### One Hundred Percent PreClinical Success With a New Sphincter Conserving Treatment for Anal Fistula

(17)

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. . . . Harrow, United Kingdom; London, United Kingdom

**Purpose:** The use of an infill material as a sphincter conserving treatment for anal fistula is attractive. However, previously used track preparation and infill techniques have had varying success rates. A new treatment consisting of an instrument designed to remove all granulation tissue and a permanent infill material was evaluated in a porcine model.

**Methods:** 36 fistulas were created by previously published procedures. At fistula induction a skin biopsy was taken from which to culture fibroblasts. At 4 weeks post induction, when fistula tracks were well established, a new instrument was used to remove granulation tissue from all tracks. A collagen paste, modified from standard injectable Permacol™, was used alone as an infill material in 11 tracks. Cultured autologous fibroblasts were added to the infill material in 18 tracks. 7 control tracks had granulation material removed with the new instrument but were not treated with infill material. All internal and external openings were closed. Anorectal excision was carried out under terminal anaesthesia at 2 weeks, 4 weeks, 2 months and 3 months after fistula treatment and histological examination of entire individual tracks was carried out by an experienced pathologist.

**Results:** In this quadrapedal pre-clinical model, all infill treated tracks healed. Addition of autologous fibroblasts showed slightly superior tissue integration. Only 2 out of 7 control tracks healed.

**Conclusions:** The essential elements for sphincter preserving fistula repair are preparation of the track by the removal of all granulation tissue from the internal wall surfaces and subsequent infilling with an appropriate infill material. Use of the new instrument and collagen paste provides both of these essentials. A pilot study in human anal fistula patients is approved and will start February 2008.

#### Treatment of Fistula-in-Ano Using Porcine Small Intestinal Submucosa (Surgisis® AFP™)

(18)

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..... Chicago, IL; St. Louis, MO

**Purpose:** The purpose of this study is to evaluate the effectiveness of a porcine small intestinal submucosa bioprosthetic plug (Surgisis® AFP™) for the treatment of fistula in ano.

**Methods:** A prospective multi-institutional study was conducted in 73 patients with anorectal fistulas. Rectovaginal fistulas were excluded from the study. Plugs were inserted under local, regional or general anesthesia. Patients received preoperative mechanical bowel preps and parenteral antibiotics. Fistula openings were identified followed by minimal curettage and irrigation of the tract. The tapered end of the rehydrated fistula plug was then dragged into the fistula tract from the primary opening to the secondary opening until snug. The plug was then trimmed at the primary opening and then anchored to the submucosa and internal sphincter with a 2-0 Polyglactin figure of eight suture covering the plug at the internal opening. The tapered end of the plug was then trimmed at the secondary opening and anchored to one side of the external fistula orifice with a 3-0 polyglactin suture. Patients were scheduled for 2 week, 3month, 6month and 12 month follow-ups.

**Results:** 78 anal fistula plugs were inserted into 73 patients (28 women and 45 men). Six patients were lost to follow-up. Mean follow-up time period was 17 months or 1.4 years. 73% of the patients (N=53) had primary fistulas whereas 27% (N=20) had recurrent fistulas. There was no difference in closure rates between primary and recurrent fistulas (primary:16/53=30% and recurrent:6/20=30%) Plug fallout rate was 9% (N=7/78). Mean fistula tract length was 4.3 cm. Overall, there was a 42.5% patient success rate and a 39.5% plug success rate excluding fallouts. Crohn's etiology was present in 11% (8/73) patients and 4 (50%) of these closed. There were no intraoperative complications. There were 4 postoperative abscesses (4/73=5.5%). Other complications included pain at the insertion site, plug extrusion, and prolonged drainage from the fistula site.

**Conclusions:** The use of porcine small intestinal submucosa bioprosthetic plug (Surgisis® AFP™) for the treatment of fistula in ano is safe and moderately effective with long term follow-up.

#### Who is at Risk for Developing Chronic Anal Fistula or Recurrent Sepsis after Initial Perirectal Abscess?

(19)

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**Purpose:** Little is known about the risk factors contributing to the formation of chronic anal fistula and/or recurrent perirectal sepsis after a first time perirectal abscess. The goal of this study was to determine whether there are any predictors for developing a chronic anal fistula or recurrent sepsis following an initial anal abscess.

**Methods:** A retrospective review was conducted of all patients who presented to a tertiary academic center with a first time perirectal abscess between 1995 and 2007. Variables extracted from medical records and through phone interviews included age, gender, smoking status, diabetes, HIV, and perioperative antibiotic use. Comparisons were tested with the Fisher exact test.

**Results:** 182 patients met the inclusion criteria. Of these, 142 patients had complete follow-up data [103 males, mean age at presentation 43.3 years]. During a mean follow-up of 33.8 months, the incidence of subsequent anal fistula or recurrent perirectal abscess was 34.5%. No difference was noted in the development of chronic or recurrent disease between males and females [34% v/s 36%, respectively, p=0.845]. Patients under 40 years were more likely to develop chronic or recurrent disease [53% v/s 27%, p=0.005]. Diabetic patients had a decreased risk compared to non-diabetics [17% v/s 39%, p=0.03]. HIV negative status, non-smoking, and perioperative antibiotic carried the same risk of fistula formation or recurrent anal sepsis compared to HIV positive status, smoking, or no antibiotic use [28% v/s 35%, p=0.604, 37% v/s 33%, p=0.59, and 37% v/s 34%, p=0.83, respectively.]

**Conclusions:** Local sequelae after initial perirectal abscess are common. Younger age increases the risk of developing chronic anal fistula or recurrent anal sepsis while diabetes lowers the risk. Smoking, HIV status, and perioperative antibiotic use did not influence the risk of acquiring a chronic anal fistula or perirectal abscess.

# Treatment of Transsphincteric Anal Fistulas by Endorectal Advancement Flap or Anal Fistula Plug: A Comparative Study

(20)

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**Purpose:** Treatment of anal fistulas involving a significant amount of sphincter is challenging. In this study, we compared the outcomes of patients with complex cryptoglandular fistulas after treatment by endorectal mucosal advancement flap (ERAF) and Surgisis® anal fistula plug (AFP).

**Methods:** We analyzed retrospectively data on all patients with trans- or suprasphincteric anal fistulas treated in our institution by ERAF or AFP from January 1998 through April 2007. Patients with rectovaginal, Crohn's and post-surgical fistulas were excluded and only the first AFP procedure in patients who had repeated AFP procedures was analyzed. Results were obtained with a combination of chart reviews, mailed questionnaires and phone interviews. Success was defined as a closed external opening in absence of symptoms at a minimal follow-up time of 6 months. Patients with follow-up time under 6 months were censored unless their procedure had evidently failed (e.g., early AFP extrusion, need for additional surgery).

**Results:** 49 patients had an ERAF and 38 patients had an AFP procedure. The two cohorts were comparable for age, gender, smoking status, fistula location, amount of external sphincter involvement, months of symptoms, number of prior failed fistula repair attempts and previous use of seton. The median follow up time for successful repairs was 29 (range, 6-122) months in the ERAF group and 10 (range, 6-16) months in the AFP group. The outcome is shown in Table.

**Conclusions:** The success rate of ERAF for the treatment of complex cryptoglandular fistula is approximately 50% and is superior to treatment with the AFP.

S20

	ERAF (n=49)	AFP (n=38)	p value
Success	25	11	0.007
Failure	16	26	
Censored	8	1	

# Stapled Transanal Rectal Resection (STARR) for Obstructed Defecation Secondary to Rectocele and Rectoanal Intussusception: A Cautionary Tale

(21)

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**Purpose:** This prospective study was designed to assess the effectiveness and safety of STARR in the treatment of outlet obstruction syndrome (ODS) caused by rectoanal intussusception and/or rectocele.

**Methods:** From January 2000 to January 2007, 230 patients with ODS were operated on and followed up at 2, 6 and 12 months by clinical examination, continence score and patient satisfaction questionnaires. There were 187 (81%) female and 43 (19%) male patients with a median age of 58 years (range 19-90). All patients had symptoms that did not respond to conservative measures. Patients with slow transit constipation, pelvic floor dyssynergy and anal stenosis were excluded. Follow-up was for a median of 8 months (range 3-56).

**Results:** Operating time was short (mean 35, range 20-95 minutes), with 159 (69%) of operations being performed as day-cases; unplanned overnight stay occurred in 12 (5%) patients. Major complications were seen in 16 (7%) cases; there were no postoperative deaths. Severe postoperative pain was reported by 12 (5%) patients; one patient developed chronic pain. Urgency of defaecation was encountered in 107 (46%) patients in the immediate postoperative period; this improved with time, so that at 6 months follow-up only 26 (11%) patients complained of urgency. Three patients (1%) had recurrent rectal prolapse, which was successfully treated by laparoscopic rectopexy. Of the 142 patients incontinent preoperatively, 96% reported improvement of their symptoms: the median Wexner score decreased from 9 (range 2-20) preoperatively to 4 (range 2-8) postoperatively. Constipation symptoms improved in 58 (77%) of the 75 patients in which it was present preoperatively. 178 (77%) of patients were very glad they had the operation, and 197 (86%) would recommend this operation to a friend.

**Conclusions:** STARR can be performed as day-case surgery with high patient satisfaction and low recurrence rates in the treatment of ODS. Both incontinence and constipation are improved postoperatively. However, significant morbidity complicates the postoperative course in 1/15 patients, and urgency of defaecation persists beyond 6 months in approximately 10% of cases.

# STARR for Obstructed Defecation Syndrome (ODS): 12 Month Follow-up

(22)

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**Purpose:** A European registry was set-up to determine the short-term safety and efficacy of the STARR procedure for ODS. 12 month follow-up will be complete in February 2008 and presented.

**Methods:** STARR registries in Italy, Germany and the UK were designed to allow pooling of data for combined analysis. Recruitment commenced in February 2006. Data collection included symptom severity score (SSS), obstructed defaecation score (ODS), Cleveland clinic incontinence score, symptom-specific (PAC-QoL) and generic (ED-5Q

utility and VAS) QoL scores. STARR was performed using the double stapling PPH-01 technique. All complications were recorded. Data collection was performed at baseline, 6 weeks, 6 and 12 months. Data analysis was performed independently MedAlliance, Brussels).

**Results:** 1456 patients were eligible for analysis. 214(14.7%) were male. The mean age was 54 yrs(17-92). Defaecating proctography was performed in 92.7% and showed: rectocele (55%), mucosal prolapse (53.8%), intussusception (49.7%), enterocele (5.5%). Mean operative time was 44mins (15-210). Average length of stay was 3 days (1-36). By September 2007, 698 (48%) and 422 (29%) had complete 6 and 12 month follow-up. A significant symptomatic improvement was seen between baseline and 6 months and maintained at 12 months (SSS: baseline 24.1(95%CI: 23.8,24.4) v's 12 months 12.5 (95%CI: 12.1,12.9),  $p<0.001$ ; ODS: baseline 15.3(95%CI: 14.9,15.6) v's 12 months 5.8(95%CI: 4.8,6.7),  $p<0.001$ . This was reflected in a significant improvement in both PAC-QoL and ED-5Q QoL at 6 and 12 months. Incontinence scores improved from 3.1(95%CI: 2.9,3.3) at baseline to 2.9(95%CI: 2.1,2.7) and 1.9(95%CI: 1.5,2.2) at 6 and 12 months ( $p<0.001$ ). 457 minor and major complications were reported, the most frequent being: unexpected pain (7.7%), urinary retention (6.8%), bleeding (4.5%), stapled line complications (3.2%), sepsis (1.4%), incontinence (1.3%). Postoperative defaecatory urgency was reported in 17% . There was no mortality.

**Conclusions:** The STARR procedure for ODS is safe and effective and results in a significant improvement in QoL. Complete 12 month follow-up data will be presented.

#### STARR - Is it Safe?

(23)

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**Purpose:** Stapled trans-anal rectal resection (STARR) to treat obstructive defecation has recently been introduced to the UK. 2 circular stapling guns achieve full thickness resection of both anterior and posterior rectal walls. As the straightened rectum empties more efficiently, incomplete evacuation, straining, digitation & laxative dependency are all improved. Surgery is however invasive & may cause serious complications. NICE has recommended that only specially trained nominated surgeons with sub-specialty interest perform the surgery. A prospective audit under the auspices of the ACPGBI is currently underway. We report our collective experience from the southern pelvic floor surgeons of the safety of the procedure during its introduction into clinical practice in the UK.

**Methods:** 8 members of the group performing the STARR procedure in the south of England submitted data

by standard Performa. Length of stay & complications were recorded.

**Results:** 286 STARR procedures were performed between January 2006 & October 2007. 229(80%) were females with a median age overall of 56 years (range 19 - 89). 47% were performed as a day case; one surgeon achieved same day discharge in 79% of cases. For the remainder the median stay in hospital was one night (range 1 - 6 days. 7 patients (2.4%) developed acute retention of urine requiring urethral catheterization. Two (0.7%) developed anastomotic strictures at 6 weeks & three months post procedure but both were successfully treated by trans anal dilatation. One patient (0.4%) developed an allergic rash; one suffered a vaso-vagal episode delaying discharge. 12 patients (4.2%) bled following surger. 9 settled without intervention; 3 returns to theatre (1%) all for bleeding, 2 required a suture of the staple line only and one (0.4%) required packing and creation of a temporary de-functioning colostomy. All others in hospital for more than one night post procedure were due to social reasons - not as a direct consequence of the procedure. There were no gun mis-firings, no recto-vaginal fistulae and no deaths.

**Conclusions:** Following its introduction in to UK practice, this study would suggest that STARR is a safe procedure. Sub-specialty interest, appropriate training and peer review are pivotal. Longer term functional outcome results are awaited.

#### Clinical Outcomes of Stapled Transanal Rectal Resection as Compared to Transvaginal Rectocele Repair for the Management of Obstructive Defecation Syndrome

(24)

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..... Orlando, FL

**Purpose:** To observe the clinical outcomes for stapled transanal rectal resection (STARR) as compared to transvaginal rectocele repair (TVR) when utilized for patients with obstructive defecation syndrome (ODS).

**Methods:** : This is a retrospective review of prospectively collected data of patients that received TVR for ODS from June 1997 to February 2002 as compared to patients that received STARR from June 2002 to August 2007. All patients received pelvic floor testing which included anorectal manometry, noninvasive EMG, concentric needle EMG, and defecography. Colon transit studies and colonoscopy were performed where indicated. The clinical outcomes observed were operative times, estimated blood loss, length of stay, complication rate, procedure failure rate, recurrence rate, time to recurrence, re-operation rate, dyspareunia rate and postoperative ODS score.

**Results:** Thirty-seven patients had TVR for management of ODS while 36 patients had STARR. There was no difference in the age of the patients receiving either procedure



(TVR- 57.92, STARR- 53.19,  $p=0.1096$ ). Evaluation of the clinical outcomes showed that TVR had longer operative times (TVR- 85.47 min, STARR- 52.71 min,  $p<0.0001$ ) greater estimated blood loss (TVR-107.9 mL, STARR- 42.90 mL,  $p=0.0015$ ), longer time to recurrence (TVR- 26.75 months, STARR- 4 months,  $p<0.00001$ ), and a decreased complication rate (TVR-18.9% STARR- 61.1%,  $p=0.0001$ ). However there was no difference in length of stay (TVR- 2.96 days, STARR-2.63 days,  $p=0.224$ ), postoperative ODS score (TVR-1.86, STARR- 1.97,  $p=0.868$ ), procedure failure rate (TVR-21.6%, STARR- 16.7%,  $p=0.7976$ ), recurrence rate (TVR-10.8%, STARR- 2.7%,  $p=0.169$ ), reoperation rate (TVR-5.41%, STARR- 2.7%,  $p=0.555$ ) and rate of dyspareunia (TVR-12%, STARR- 10.5%,  $p=0.8397$ ).

**Conclusions:** The clinical outcomes for STARR appear comparable to TVR and provide another alternative to the treatment of patients with ODS. Although the complication rate is greater, as experience grows with this technique we anticipate a decrease in complications.

#### Anal Dysplasia in Renal Allograft Recipients

(25)

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**Purpose:** The risk of anal cancer among those who are immunosuppressed is significantly higher than the general population. Recently developed screening methods for detecting precancerous anal dysplasia have not been studied in solid-organ transplant recipients. Within this cohort we sought to identify the incidence of anal dysplasia and associated risk factors for harboring dysplasia.

**Methods:** We performed a cross-sectional study of kidney transplant recipients with a functioning allograft that were transplanted at the University of Minnesota between 1963 and 2006. We interviewed willing participants and then performed anal cytology and high resolution anoscopy (HRA), selectively performing biopsies based on identified microscopic abnormalities. We tested the association between variables within the questionnaire (age, gender, previous cancer diagnoses, smoking status, sexual history) and the results from anal cytology and biopsy.

**Results:** Of the 37 participants recruited into the study, 14 were female and 23 were male. The mean age was 62 years (range, 42 to 72), 95% were Caucasian and the median duration of immunosuppression was 6.5 years (range, 1 to 26). The mean age of first sexual intercourse was 19 years; 57% ( $n=21$ ) had less than 5 lifetime sexual partners and 14% ( $n=5$ ) reported a previous sexually transmitted infection. Five percent reported ever practicing anal intercourse. Eighty-six percent ( $n=32$ ) of cytology specimens had sufficient cells for interpretation and 6% (2 of 32) demonstrated dysplasia. We performed biopsies in 11 patients – 6 of which showed dysplasia (4 low-grade and 2 high-grade). Of these 6 patients, 5 did not show dysplasia on anal cytology.

The sensitivity of cytology to predict histologic evidence of dysplasia was 17%. Overall, 7 out of 38 (18%) patients had dysplasia on either cytology or histology specimens; high grade dysplasia was present in 5%.

**Conclusions:** A significant proportion of renal allograft recipients harbor intra-anal or peri-anal dysplasia, though in most cases it is low grade. Anal cytology is not a sensitive test for dysplasia in this cohort. While larger screening studies in transplant patients are needed, additional strategies, including use of HPV typing for high-risk serotypes, should be investigated.

#### HPV Typing by Hybrid Capture II (HCII) and Other Predictors of Anal High-grade Dysplasia (HSIL) in Men Who Have Sex with Men (MSM)

(26)

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**Purpose:** Anal HSIL and cancer in MSM is rising. In anal Pap tests (Paps) Atypical Squamous Cells of Undetermined Significance (ASCUS) is a common, nonspecific finding and rarely predicts HSIL. Oncogenic (HR) HPV causes most HSIL and is rare in MSM without it. We showed in a small sample that HC II HPV testing for HR HPV in MSM with ASCUS improved the ability to predict HSIL reducing MSM referred for HRA by 50%. We now report on a much larger study to determine if HCII is useful with ASCUS and low-grade (LSIL) Paps and to identify predictors of future HSIL so that screening intervals might be adjusted.

**Methods:** We performed a retrospective chart review of MSM undergoing anal screening for HSIL with ASCUS Paps, HCII HPV typing and HRA between September 2003–June 2006. We also analyzed results for prior and subsequent screenings as well. All HSIL was ablated prior to follow-up.

**Results:** We enrolled 597 MSM (mean age 39 yrs) with 435 (73%) HIV-. Overall 1,620 anal Paps with HRA's were performed from 1997-2007. Of 1024 ASCUS Paps, 555 (54%) had HR HPV and 187 (18%) had HSIL on biopsy. 29 (6%) of MSM with ASCUS without HR HPV had HSIL. Of 396 LSIL Paps, 321 (81%) had HR HPV and 142 (36%) had HSIL on biopsy. 14 (19%) with LSIL Paps without HR HPV had HSIL. Table 1 shows sensitivity, specificity, NPV and PPV. Of 330 MSM followed after ASCUS Pap, 103 (31%) subsequently developed HSIL, and of those, 62 (60%) had prior HSIL. The relative risk (RR) of HSIL after ASCUS was greater in those with prior history of HSIL ( $RR=1.88$ ,  $p=0.0002$ ). HIV+ MSM were more likely to develop subsequent HSIL ( $RR=1.77$ ,  $p=0.0003$ ). Age did not affect subsequent development of HSIL. 25% of MSM never had HR HPV at any screening. HR HPV increased the risk of developing HSIL ( $RR=3.49$ ,  $p=0.0095$ ).

**Conclusions:** HCII HPV screening is useful in MSM with ASCUS Paps and referring those with HR HPV reduced the number requiring HRA by almost half with few HSIL's missed. HCII is not useful in those with LSIL Paps



as many have HSIL without HR HPV. The risk of developing HSIL after ASCUS is moderate, greatest in those with prior HSIL and HIV. Screening intervals might be lengthened in MSM without prior HSIL or HR HPV.

#### Screening Anal Dysplasia in HIV-infected Patients: Is There an Agreement Between Anal Pap Smear and High Resolution Anoscopy Guided Biopsy?

(27)

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**Purpose:** To analyze the agreement between concurrent anal Pap smear and high resolution anoscopy guided biopsy for detection of anal dysplasia in HIV-infected patients.

**Methods:** 222 consecutive HIV positive patients were prospectively submitted to anal Pap smear and high resolution anoscopy guided biopsy at a single visit. Follow up visits for these patients were also included, giving a total of 311 satisfactory pairs of anal Pap smears and biopsies in a one year period. Specimens were read blind. Anal Pap technique utilized a Dacron swab, and the cytological specimens were prepared using a conventional slide method. Cytological and histological results were stratified in 2 categories: absence or presence of dysplasia. Agreement between measures was estimated by weighted kappa-statistics.

**Results:** Histological examinations revealed a prevalence of 46% (95%CI: 40% - 51%) of anal dysplasia. Anal Pap smear showed 61% of sensitivity, 60% of specificity, 56% of positive predictive value, and 64% of negative predictive value. Weighted kappa of agreement between the two methods (Pap smear and guided biopsy) was 0.20 (95%CI: 0.10 - 0.29).

**Conclusions:** Anal Pap smear alone did not rule out anal dysplasia. Based on our experience, we recommend the routine use of high resolution anoscopy guided biopsy as a complementary screening test for anal dysplasia in high risk patients.

#### HIV and Anal Canal Cancer Outcomes: A Single Institution's Experience

(28)

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**Purpose:** Patients with HIV are at an increased risk for development of squamous cell carcinoma (SCC) of the

anus. Combined modality therapy (CMT) is the current treatment regimen recommended for anal SCC. 5-year overall survival for this disease is reported to be 70-80% for patients receiving CMT. The purpose of this study is to identify the relative contribution of HIV status to diagnosis and outcomes of anal SCC.

**Methods:** A retrospective review was performed on all patients with "carcinoma of the anal canal" treated at a single academic institution between January 1996 and December 2006.

**Results:** Our search identified 87 patients who had invasive SCC: 46 men and 41 women with a median age of 55 years; 20 were HIV positive (HIV+). Median follow-up from time of diagnosis was 38 months (range: 4 to 128 months). 85% of HIV+ patients with early stage anal SCC (Stage I or II) relative to 60% of those that were HIV negative (HIV-), ( $p<0.05$ ). In response to CMT, 85% (57/67) of HIV- patients and 80% (16/20) of HIV+ were identified as complete responders based on absence of disease 6 weeks after therapy (NS). Of those patients initially identified as complete responders, no HIV- patients recurred within 6 months compared to 19 % (3/16) of HIV+ patients ( $p<0.001$ ), which were thus re-identified as incomplete responders. Moreover, 3 of the 57 HIV- (5%) and 3 of the 13 HIV+ (23%) true complete responders recurred after 6 months following CMT ( $p<0.05$ ). 3-Year overall survival for HIV- and HIV+ patients was 76% and 75%, respectively (NS).

**Conclusions:** HIV+ patients diagnosed with anal SCC present with earlier stage disease at initial evaluation, likely due to closer surveillance. However, after CMT, HIV+ patients recur more often than those that are HIV-. Interestingly, overall survival in these two groups is equivalent at 3-years. Previous studies of HIV+ patients and anal SCC have been limited by small sample numbers and have been inadequately powered to identify differences in patient outcomes based on HIV status. This study highlights several of these differences and provides evidence that HIV+ patients are a distinct subgroup of anal SCC patients that behave differently post-CMT.

#### Gene Expression in Sessile Serrated Adenoma

(29)

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**Purpose:** Sessile serrated adenomas (SSAs) are newly

#### S26 Predicting HSIL by ASCUS and LSIL Cytology Combined with HCII Testing for HR HPV

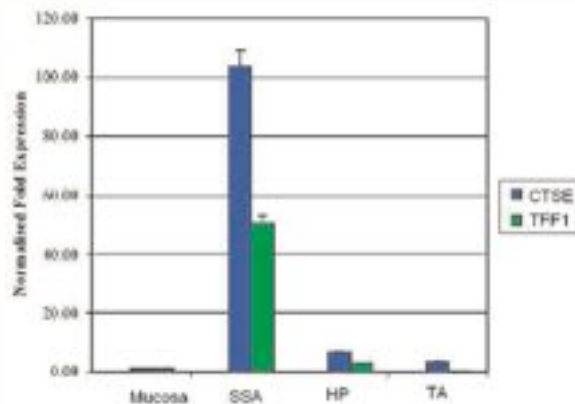
	ASCUS Cytology (95% CI)	LSIL Cytology (95% CI)
Sensitivity	85% [78%,89%]	90% [84%,95%]
Specificity	53% [49%,56%]	24% [19%,30%]
Positive Predictive Value (PPV)	28% [25%,32%]	40% [34%,45%]
Negative Predictive Value (NPV)	94% [91%,96%]	81% [71%,89%]

described colorectal polyps that until recently were diagnosed as hyperplastic polyps (HP). SSAs are now recognized as precursor lesions of a substantial subset of colorectal cancers arising via the so-called "serrated pathway". The molecular biology of this pathway remains unclear and biomarkers have not been defined. The aim of our study was to identify genes that are expressed differentially in SSAs compared to HPs and conventional tubular adenomas (TAs).

**Methods:** A microarray experiment on a 19k cDNA human oligonucleotide library was conducted to compare gene expression between histologically verified SSA samples (13) and TAs (13). Results were analysed statistically to provide a list of differentially expressed genes. The five most differentially expressed genes were verified by quantitative real time PCR (QRT-PCR). RNA was extracted from RNAlater fixed and histologically verified samples of 21 TAs, 19 SSAs and 8 HPs. Pooled RNA extracted from normal colonic mucosa from 6 patients was used as a control. Automated immunohistochemistry (IHC) using commercially available monoclonal antibodies was then performed on the samples used in the initial QRT-PCR experiment and a further 61 samples of SSA, 160 HPs and 165 TAs, to assess the protein expression of the two most up-regulated genes identified from the QRT-PCR study.

**Results:** The five most differentially expressed genes identified in the microarray study were Muc5ac, Muc3, Muc17, TFF-1 and CTSE. On the QRT-PCR study, two genes, CTSE (Cathepsin E) and TFF-1 (Trefoil Factor 1) showed markedly higher expression in SSAs compared to either HP or TAs ( $p < 0.05$ , relative to normal tissue). The other three genes did not show significantly different expression. Confirming these results, IHC demonstrated strong staining of abnormal crypts in all SSAs while staining in the TAs and HPs was generally weak or focal. Normal tissue did not stain significantly.

**Conclusions:** This is the first study to demonstrate CTSE and TFF-1 over-expression in SSAs compared to both HPs and conventional adenomas. Further investigation of these potential biomarkers is warranted.



Expression of CTSE and TFF1 in SSA

### Lymphovascular Invasion in Colorectal Cancer is Associated with Alterations in Cell Adhesion and Cytoskeletal Pathways

(30)

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 . . . . . Tampa, FL; Omaha, NE; Minneapolis, MN; San Francisco, CA; Augusta, GA

**Purpose:** Lymphovascular invasion (LVI) in colorectal cancers (CRC) may represent an initial step in the metastatic process and is associated with a worse prognosis. Little is known about genomic changes that occur in CRCs in association with LVI. Using gene expression profiling and a comprehensive database, we sought to compare clinical and genetic differences between LVI+ and LVI- CRCs.

**Methods:** From 1993 to 2003, CRC specimens were collected from consenting patients and were profiled using the Affymetrix 133 Plus 2.0 Gene chip. Statistical comparisons of clinical data were performed using either the Fisher Exact Test or ANOVA. The Statistical Analysis of Microarrays method was used to identify differentially expressed genes between LVI+ and LVI- tumors. Gene ontology software was used to identify altered biologic pathways.

**Results:** We identified 50 LVI+ and 59 LVI- (with no nodal or distant metastasis) tumors. The population consisted of 55 males and 54 females with a median age of 66 years (range 27-90). Patients with LVI+ tumors were more likely to present with a change in bowel habits, higher grade and higher T-stage (Table 1). At a false discovery rate of 0.2, LVI+ tumors displayed 352 upregulated and 3 downregulated genes as compared to LVI- CRCs. By gene ontology analysis, we demonstrated a total of 14 significantly upregulated biologic pathways in LVI+ tumors which included 11 involved in either cell adhesion or cytoskeletal remodeling (e.g. Regulation of actin cytoskeleton by RhoGTPases,  $p=0.004$  and Integrin-mediated cell adhesion,  $p=0.01$ ) and 2 involved in vascular permeability (e.g. Histamine receptor signaling in the interruption of cell barrier integrity,  $p=0.001$ ).

**Conclusions:** The acquisition of a metastatic cell phenotype is known to be associated with alterations in cell morphology, cell motility, cell adhesion and local vascular permeability. Our expression profiles strongly confirm the acquisition of such changes in association with the presence of LVI. Our findings may lead to refinements in determining patient prognosis, selecting patients for adjuvant therapy as well as the potential development of targeted therapies.

### Copy Number and Methylation Analysis of Microsatellite and Chromosome Stable Colorectal Cancers Associated with Poor Outcome

(31)

N. Sengupta, A. Banerjee, N. Suraweera, L. Hammond, A. Silver, S. Dorudi . . . . . London, United Kingdom

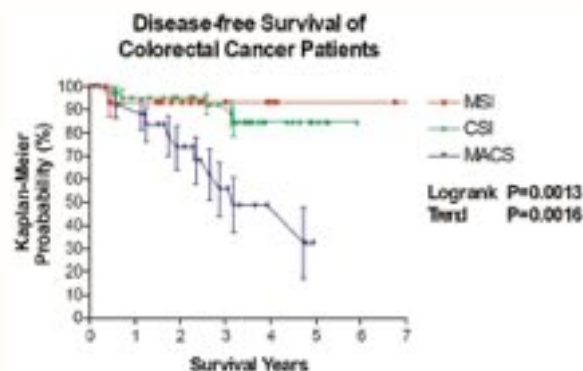
**Purpose:** In sporadic colorectal cancer, approximately 30% are described by the microsatellite and chromosome stable (MACS) molecular genotype. MACS have distinctive clinical and pathological features when compared with other chromosomal or microsatellite unstable colorectal tumours. We aimed to investigate the molecular profile of these tumours in a three way single nucleotide polymorphism (SNPs) analysis of the 3 common genotypes leading to colorectal carcinogenesis.

**Methods:** Fresh frozen colorectal cancer tissue from 60 patients who underwent resection for sporadic colorectal cancers were analysed for microsatellite instability and ploidy status using the FACS Calibur. The Infinium BeadChip arrays (Illumina) 550K and methylation chip was used to interrogate over 555,000 SNPs in order to identify copy number changes and methylation profiles of the 3 genetic pathways of sporadic colorectal cancer.

**Results:** Of 62 tumours undergoing curative R0 resections, 37.1% were MACS, 11.3% were microsatellite unstable (MSI/MIN), 46.8% were chromosome unstable (CSI/CIN) and 4.8% were microsatellite and chromosome unstable (MSI+CSI+). Patients undergoing curative surgery for MACS cancers had significantly poorer disease-free survival ( $P=0.002$  Logrank test) and multivariate analysis confirmed that the MACS genotype was an independent predictor of poor outcome ( $HR=2.44$ ,  $1.33-4.47$ ,  $P=0.004$ , Cox's Proportional Hazards Model). Within the microsatellite stable group, we identified 2 distinct subgroups that exhibited significantly different prognostic stratification. Patients with the CSI genotype had a similar outcome to those with MSI but patients with MACS had a worse outcome (Figure 1). Copy number changes and methylation analysis of MACS, CSI and MSI colorectal cancers suggest that there is a unique genetic pathway associated with the MACS genotype.

**Conclusions:** Our data indicate differing genetic and clinico-pathological features between MACS and MSI+ colorectal cancers. Additionally, there is a significantly different prognostic profile between these 2 groups.

Figure 1 Kaplan-Meier plots of groups stratified by MSI and ploidy status (MSI-H n=16; CSI n=47; MACS n=28)



### If Colon and Rectal Cancers Wear Different Genes, Why are They Thrown Together in the Wash?

(32)

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**Purpose:** Colorectal cancers develop through various mechanisms such as chromosomal instability, DNA mismatch repair deficiency, and methylation. Molecular changes including microsatellite instability (MSI) and CpG island methylator phenotype (CIMP) have been used to describe neoplastic pathways and it is well-known that MSI-high tumors have better prognosis than tumors arising from chromosomal unstable origins (microsatellite stable). Although colonic cancers have better prognosis than rectal cancers, genetic differences between the two are not well-characterized. This study evaluates disparity in neoplastic mechanisms between colon and rectal cancers.

**Methods:** A single institution IRB-approved colorectal frozen tumor bank was queried for colon and rectal adenocarcinomas not associated with inflammatory bowel disease.

### S30 CLINICOPATHOLOGIC CHARACTERISTICS

PARAMETER		LVI + (n=50)	LVI - (n=59)	p-VALUE
Change in Bowel Habits	Yes	22 (45%)	13 (25%)	0.04
	No	27 (55%)	39 (75%)	
T Stage	T1/T2	2 (4%)	17 (29%)	0.003
	T3/T4	48 (96%)	42 (71%)	
Differentiation	Well-Moderate	37 (74%)	56 (97%)	0.01
	Poor	13 (26%)	2 (3%)	
Perineural Invasion	Yes	7 (14%)	2 (3%)	0.078
	No	43 (86%)	56 (97%)	
Mucinous Histology	Yes	6 (12%)	3 (5%)	0.30
	No	44 (88%)	55 (95%)	

Tumor DNA was extracted and analyzed for MSI using PCR-based analysis and for hypermethylation of gene promoter regions defining CIMP using MethyLight quantitative PCR. Mutations in oncogenes BRAF and KRAS were determined by DNA sequencing. Corresponding patient demographics and tumor characteristics were reviewed. Molecular, genetic, and clinical characteristics were compared between colon and rectal cancers.

**Results:** 269 patients with colon and 89 with rectal cancer were included. Both groups were similar in age, gender, tumor size, stage, and differentiation (see table). Colon cancers had a higher incidence of MSI-H (27%) and CIMP (28%) compared to rectal cancers (7%, 3%, respectively;  $p < 0.001$ ). Although both populations had statistically similar rates of KRAS mutations, colon cancers had a higher incidence of mutations in the oncogene BRAF (16.7% vs. 0%;  $p < 0.001$ ). 91% of rectal cancers were both microsatellite stable and CIMP-negative (not as good prognosis) whereas only 61% of colon cancers shared the same molecular pattern.

**Conclusions:** Colon cancers are molecularly heterogeneous with different prognosis for various subsets. In contrast, rectal cancers are relatively homogeneous for neoplastic pathways and only a small percentage have MSI-H survival advantages. These crucial differences demand that colon and rectal cancers be separated when analyzing outcomes or designing clinical trials.

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	Colon	Rectum	p Value
N	269	89	
Median Age (years)	69 (18-93)	66 (27-90)	NS
Gender (Male/Female)	148/121	55/44	0.388
Mean Tumor Size (cm)	5.1 $\pm$ 0.3	4.7 $\pm$ 0.4	NS
Stage			0.323
I	47 (17%)	21 (24%)	
II	94 (35%)	29 (33%)	
III	96 (36%)	33 (37%)	
IV	32 (12%)	6 (7%)	
Differentiation			0.311
Well	9 (3%)	5 (6%)	
Moderately	185 (69%)	64 (72%)	
Poorly	75 (28%)	20 (22%)	
MSI-High	73 (27%)	6 (7%)	<0.001
CIMP-High	75 (28%)	3 (3%)	<0.001
KRAS Mutation	88 (33%)	23 (26%)	0.26
BRAF Mutation	45 (17%)	0	<0.001

MSI-High = High microsatellite instability; CIMP-High = High CpG Island Methylator Phenotype

### Patients with Low Rectal Cancer Treated by Abdomino-perineal Excision have Worse Tumours and Higher Involved Margin Rates Compared with Those Treated by Anterior Resection

(33)

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**Purpose:** Patients with low rectal cancer, particularly those who have abdomino-perineal excision (APE), have worse outcomes compared with upper rectal cancer. Reports suggest that low anterior resection (AR) may be oncologically superior to APE, though no good evidence exists to support this. Patients who require APE may have less favourable tumours. We looked at a large recent series of patients with low rectal cancer to explore some of these issues.

**Methods:** 153 patients enrolled in the MERCURY study with low rectal cancer (lower edge of the tumour  $\leq$  6 cm from the anal verge) were analysed. The median tumour height, percentage undergoing neoadjuvant therapy, involved circumferential resection margin (CRM positive) rates and degree of local invasion were compared in patients who had APE compared to AR.

**Results:** The median height of the tumour from the anal verge was 3cm for the 72 patients who had APE compared with 5cm in the 81 who had AR. (Table 1). Overall the CRM positive rate for low rectal cancer was 20% (30/153) but was significantly higher for APE compared to AR (28% versus 12%). A higher proportion of patients who had APE had neoadjuvant therapy (64% versus 41%). Patients who had APE had more locally advanced tumours with 14% of APE specimens being T4 compared to 0% of those who had AR.

**Conclusions:** These results confirm previous suggestions that patients who have AR for low rectal cancer have lower CRM positive rates. However, patients who had APE had lower and, in general, more locally extensive tumours despite a higher proportion having neoadjuvant therapy. Patients with low rectal cancer pose particular difficulties with regard to optimal staging, neoadjuvant therapy and surgical treatment. Targeted strategies are needed to improve outcome in this complex and common cancer.

### Influence of Aspirin and NSAIDs on Colorectal Cancer Risk and Survival

(34)

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**Purpose:** Colorectal cancer (CRC) is the 2nd-ranked cause of cancer death in Western countries and 5-yr survival in Scotland is 51%. Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) protect against colorectal neoplasia.



In a large prospective case/control series, we explored the relationship between CRC risk and NSAID dose and duration. The impact of NSAIDs on survival after CRC diagnosis has not been established and so we investigated whether NSAIDs influence overall or cancer-specific survival.

**Methods:** The association between NSAIDs and CRC risk was examined in 2254 cases and 2914 population-based controls from a Scotland-wide prospective study (1999-2006). Subjects completed food frequency, drug and lifestyle questionnaires. The study had multicentre ethical and management approvals. NSAID categories were low-dose aspirin (75mg), non-aspirin NSAIDs (naNSAIDs) and any NSAID. Users were defined as taking >4 tablets/week for >1 month. Odds ratios were calculated by logistic regression models, and adjusted for energy, fibre and alcohol intake, physical activity, smoking, sex, BMI, age and deprivation category. Logrank and Cox's proportional hazard models were used to estimate NSAID effects on all-cause and CRC-specific mortality.

**Results:** In all, 650 cases (28.8%) were taking NSAIDs compared to 1033 controls (35.5%). Aspirin or naNSAID ingestion was associated with a significant decrease in CRC risk, which was dose-related for aspirin (see Table). The inverse association was related to duration of use and was evident even after 1 year. Although there was a protective effect on risk, there was no demonstrable survival benefit for any NSAID category with respect to adjusted all-cause (OR 1.24, CI 1.01-1.55,  $p=0.04$ ) or CRC-specific survival (OR 1.15, CI 0.91-1.46,  $p=0.25$ ) in the whole group and when stratified by AJCC stage.

**Conclusions:** Aspirin and NSAIDs protect against CRC in this prospective case/control set. The effect is dose-related and present for the lowest aspirin dose. The effect is apparent after 1 year and increases with duration of use to at least 10 years. Despite its size, this study was not able to clarify whether NSAIDs influence survival and so large RCTs are required to address this issue.

#### The Role of 18- FDG PETCT in the Clinical Management of Anal Squamous-Cell Carcinoma

(35)

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**Purpose:** Anal Squamous cell carcinoma (SCC) is relatively uncommon, comprising 4% of lower gastrointestinal tract malignancies but is increasing in incidence. Optimal treatment and outcome are dependent on pre-

treatment staging. The role of 18 FDG PETCT in the clinical management of anal SCC has been investigated.

**Methods:** Patients with a histologically confirmed anal SCC underwent standard staging investigations by a multi-detector CT thorax, abdomen and pelvis and MRI scan of the pelvis along with an examination under anaesthetic. A tumour, node, metastasis (TNM) staging system was used. After local ethical approval all patients also underwent a whole body 18 FDG PETCT. At a multidisciplinary meeting (MDM) their management was planned accordingly blinded to the PETCT findings and reviewed after the results of the PETCT scans were disclosed.

**Results:** There were 34 patients (20 male) whose median age was 61 (38 to 87) years. All primary tumours were FDG avid. PETCT did not change the T stage of the tumours but upstaged the disease influencing management in 7 (20%) patients; two had distant metastases resulting in altering their chemotherapy, five patients had FDG avid lymph nodes not detected clinically or on CT or MRI scanning which were all positive on fine needle aspiration or biopsy resulting in modifying the radiotherapy fields and radiotherapy boosts.

**Conclusions:** PETCT upstages the disease which influences management of anal SCC and where available should be considered although the benefit of such strategy is yet to be established.

#### Is Surveillance for Recurrent Anal Cancer Beneficial after Complete Tumor Regression?

(36)

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**Purpose:** Post-operative surveillance with physical exam (PE) and imaging studies (IS) after successful treatment of colorectal adenocarcinoma has shown survival benefit. No recommendation exists for surveillance of patients with squamous cell cancer of the anal canal (SCCa) following complete response to chemoradiation (CRT). The purpose of this study was to determine if intense long-term surveillance with PE and IS detects recurrent disease.

**Methods:** A retrospective review of 45 patients seen between July 1996-November 2007 at a single institution was performed. Mean age was 54.5 years (range 32-81). All had invasive SCCa. Stage of disease was as follows: I, 33%; II, 44%; III, 20%; IV, 2%. Forty three (95.5%) completed recommended chemotherapy (5FU with mitomycin or cisplatinum) plus external beam radiation (45-54 Gy), while two refused. Patients with

**S33 Table 1: Comparison of APE versus AR for low rectal cancer**

Operation	n	Median Tumour Height (range)	Neoadjuvant Therapy	CRM +ve %	Local Invasion				
					T0	T1	T2	T3	T4
APE	72	3 (0-6cm)	64% (n=46)	27.8 (n=20)	2	3	19	38	10
AR	81	5 (1-6cm)	41% (n=33)	12.3 (n=10)	4	6	18	51	0



stage II and III had a boost to the inguinal node basin. PE was performed 4-10 weeks later to assess tumor regression. Mean follow-up was 37 months (range 4-98).

**Results:** Three of 43 patients (6.9%) had persistent local disease after CRT and are excluded from analysis. Forty (93%) had complete resolution of tumor on clinical exam; biopsy was not done. Surveillance included PE and digital rectal exam (DRE) every 3 months for 2 years, then every 6 months for 3 years, then yearly up to 10 years. CXR and abdominopelvic CT were done yearly. Three patients developed local recurrence (LR) after CRT (7.5%), all detected on PE: two were detected at 12 months; one patient with persistent HPV developed LR at 33 months. No LR or distant metastasis was detected on imaging study absent symptoms of recurrence. Two patients (5.0%) developed symptomatic distant metastases at 7 and 19 months, in the absence of LR; both were chronically immunosuppressed. No local recurrence was detected after 12 months in the absence of active HPV.

**Conclusions:** Patients in this study did not develop local recurrence more than one year after successful chemoradiation for invasive SCCa. Intense long-term surveillance, especially with imaging studies, is therefore not warranted in the absence of symptoms. Periodic exams should be considered in patients with persistent HPV and chronic immunosuppression.

#### Outcomes for Patients Developing Anastomotic Leak after Ileoanal Pouch Anastomosis: Does it Matter Whether they had a Handsewn or a Stapled Anastomosis?

(37)

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**Purpose:** Long-term outcomes have been reported to be better after a stapled (SIPAA) when compared with a hand-

sewn ileoanal pouch (HIPAA) anastomosis. Outcomes for patients developing a leak after the 2 procedures have not been well investigated. We compare early and long-term outcomes for patients who developed an anastomotic separation after stapled and handsewn IPAA.

**Methods:** Patients with anastomotic separation were identified from a prospectively maintained pouch database and occurrence of the complication confirmed by chart review. Demographic data, perioperative details, long-term outcomes and quality of life over time were compared between the two groups. Kaplan-Meier analysis, univariable and multivariable analysis were used.

**Results:** One hundred and seventy-five patients with anastomotic separation (141 SIPAA, 34 HIPAA) were identified. The two groups had similar gender, diagnosis, and indication for surgery. HIPAA patients were significantly younger (35.7+/-12.7 vs. 41.4 +/-13.4, p=0.036) with less perioperative steroid (32.4% vs. 51.4%, p=0.049) and more diverting ileostomy use (100 vs. 86%, p=0.015). Thirty-day complications were similar regarding anastomotic stricture (p= 0.16), septic complications (p=0.53), and wound infection (p=0.4). More patients undergoing HIPAA had intraoperative transfusion (32.4% vs.16.3%, p=0.038) and postoperative hemorrhage rate (26.5% vs. 7.1%, p=0.003). Kaplan-Meier analysis showed that long-term pouch failure rate was significantly higher in patients with HIPAA (P=0.007). On multivariable analysis, leak after HIPAA was independently associated with pouch-failure after adjusting for age, diagnosis, steroid use, and intraoperative transfusion (Odds ratio 3.23; 95% Confidence Interval, 1.37- 7.69; p=0.007). Patients with SIPAA had a lower rate of incontinence than HIPAA group at 5 years (p=0.043). Quality of life was comparable during 15 years of follow-up (p=0.59).

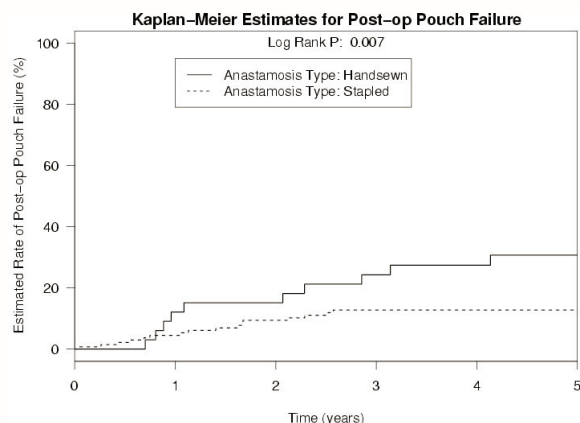
**Conclusions:** Pouch failure rate is significantly higher after HIPAA when compared with SIPAA for patients devel-

#### S34 NSAIDs and Colorectal Cancer Risk

	Cases	Controls	Adjusted analysis*		
			OR	95% CI	p
Drug category					
any NSAID	650	1033	0.72	0.63-0.82	<0.0005
75mg aspirin	355	528	0.77	0.65-0.90	0.002
naNSAIDs	241	391	0.72	0.59-0.87	0.001
aspirin & naNSAIDs	54	114	0.52	0.36-0.75	0.001
Aspirin dose					p for trend
<525mg/ week	293	441	0.79	0.66-0.94	0.002
>525mg/ week	34	62	0.65	0.43-1.04	
Duration of use					p for trend
any NSAID (>10 years)	89	154	0.70	0.53-0.94	<0.0005
75mg aspirin (>10 years)	62	102	0.81	0.58-1.14	0.002
naNSAIDs (>10 years)	13	30	0.39	0.33-0.94	<0.0005
aspirin & naNSAIDs (>5 years)	26	59	0.50	0.30-0.84	0.002

\* adjusted for energy, fibre and alcohol intake, physical activity, smoking, sex, BMI, age and deprivation index

opening anastomotic separation after IPAA. Long-term functional outcomes are also more favorable for patients developing a leak after SIPAA.



### The Effect of Seprafilm on Septic Complications and Bowel Obstruction Following Primary Restorative Proctocolectomy

(38)

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**Purpose:** This study aimed to investigate the impact of an antiadhesive membrane (Seprafilm, Genzyme Corp) on complications following restorative proctocolectomy(RPC) and to determine if the quantity of antiadhesive used affected outcomes.

**Methods:** Prospectively collected data for 1,885 patients undergoing primary RPC at a tertiary referral colorectal unit from 1994-2007 were reviewed. Analysis was performed using Chi2 test, Kaplan Meier survival curves, univariate and multivariate analysis.

**Results:** Sixty five percent (n=1220) of patients had ulcerative colitis, 44.1% (n=830) were female and median follow up was 4.0 years (range=13). Twenty four percent (n=451) had Seprafilm inserted intra-operatively. There were no significant differences in demographics between patients with and without Seprafilm, except mean age at operation (no Seprafilm 44.6±14.0years vs. Seprafilm 43.0years±14.6; p=0.029). ASA grade (p=0.554) and use of ileostomy

(p=0.546) were similar between groups. Seprafilm was associated with a higher incidence of pelvic sepsis (no Seprafilm 6.8%, n=97 vs. Seprafilm 10.2%, n=46; p=0.016) and wound infection (no Seprafilm 8.0%, n=115 vs. Seprafilm 13.5% n=61; p<0.001). For patients with data on quantity of Seprafilm inserted, 122 (77.2%) patients had ≥2 sheets. Use of ≥2Seprafilm was more likely following completion proctectomy/RPC (p<0.001), with non use of Seprafilm being more likely in total proctocolectomy/RPC (p<0.001). On multivariate regression analysis, ≥2 sheets of Seprafilm was significantly associated with pelvic sepsis in comparison to no Seprafilm (p=0.002). There were no difference in small bowel obstruction (SBO) between the groups (p=0.746), however the mean follow-up time was significantly less for ≥2Seprafilm (no Seprafilm 5.4±3.5years vs. ≥2Seprafilm 1.6±1.97years;p<0.001). Patients' age(p=0.152), staged resection(p=0.999) and immunosuppressive treatment(p=0.599) were not significant factors for pelvic sepsis or SBO.

**Conclusions:** Quantity of seprafilm inserted does not appear to adversely impact on post operative outcomes. Seprafilm should be used selectively in patients in whom the benefit is outweighed by the high risk of septic complications.

### Gender is a Risk Factor for Anastomotic Leak in Ileal Pouches

(39)

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**Purpose:** Ileal pouch anal anastomosis(IPAA)is associated with significant postoperative morbidity, the most serious of which is anastomotic leak. We analyzed patients with IPAA to determine pre-operative factors influencing the rate of anastomotic leaks and other complications.

**Methods:** We performed a review of 313 patients(44% women)who had an IPAA from 1992-2007. Data regarding demographics, disease type and duration, medical and surgical history, medication use and short-term postoperative complications were analyzed using t-tests and chi square analysis. Multivariate logistic regression was performed to assess risk factors independently associated with anastomotic leakage requiring intervention with surgical or percutaneous drainage.

### S37 Association between Anastomotic Technique and Pouch Failure

Variables	Odds Ratio(95%CI)	P-value
HIPAA	3.23 (1.37- 7.69)	0.007
Age*	1.00 (0.86 - 1.16)	0.95
Diverting ileostomy	0.44 (0.15 - 1.29)	0.13
Final diagnosis=Ulcerative colitis	0.93 (0.42 - 2.07)	0.86
Steroid use	0.91 (0.41 - 2.04)	0.83
Intraoperative transfusion	0.90 (0.36 - 2.28)	0.83

\*Parameter estimate and odds ratio relative to a 5 year difference.

**Results:** The anastomotic leak rate for our entire sample was 14% but there was a significant difference in the leak rate based on gender. Women were more likely to have a leak (20%vs.10%, $p=0.02$ )and had fewer diverting ileostomies compared to men(32% vs. 45%, $p=0.02$ ). However, the leak rate for women with or without diverting ileostomies was the same(18% vs.20%, $p=NS$ ),indicating that this did not influence the leak rate. Other preoperative factors that could influence the leak rate were the same in both men and women except for diabetes, which was more common in men. Other postoperative complication rates were similar in both men and women except for urinary tract infections, which were more common in women(7% vs. 2%,  $p=0.03$ ). Multivariate analysis revealed that gender remained an independent risk factor for anastomotic leak as well as diabetes.

**Conclusions:** The increased rate of leak found in women with IPAA is of particular concern because of the subsequent complications of pouch-vaginal fistula and infertility. The reason why women have higher anastomotic leak rate in our series needs to be more thoroughly investigated on a larger scale by conducting a multicenter prospective study.

**S39 Risk Factors for IPAA anastomotic leak**

	Odds Ratio	95% CI
Diverting Ileostomy	.96	0.44-2.08
Duration of Disease	0.95	0.90-1.00
Recent Steroid Use	1.12	0.48-2.6
Perioperative Steroids	2.44	0.89-6.68
Male Gender	0.36	0.17-0.76
Diabetes	8.79	1.16-66.5

#### Repeat Pouch Surgery Safely Salvages Failed Ileal Pouch-Anal Anastomosis (IPAA)

(40)

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**Purpose:** Redo and pouch salvage operations attempt to improve the outcomes of failed IPAA. The aim of this study was to report our experience with repeat IPAA and document the etiologies, presentation, diagnostic modalities, surgical management, pouch loss and risk factors.

**Methods:** All patients who underwent laparotomy, ileoanal disconnection, and repeat IPAA at the Cleveland Clinic were reviewed from a prospectively maintained pelvic pouch database.

**Results:** From 1983 to 2007, 3382 patients had IPAA and 250 redo pouches were performed. The follow up range was 4-159 months. Age range at the surgery was 8-77 years. 117 were males. The indications of primary IPAA were ulcerative colitis (UC) (n=180), familial adenomatous polyposis (n=21), Crohn's disease (CD) (n=6), indeterminate colitis(IC)-UC (n=11), IC-CD (n=6), IC (n=23) and others. In 18 patients of UC and in 6 of IC, diagnosis changed to CD. 118 patients were referred. The indications for redo were fistula (n=85), pouch dysfunction (n=54), leak (n=66), stricture (n=50), pelvic sepsis(n=14), pelvic abscess(n=11), pouchitis(n=9). 74 patients had a new pouch. Of which, 26 were constructed after previous straight anastomosis or pouch excision. 48 of 74 original pouches were excised during redo. 18 of 48 reservoir types were converted to another one. Of 250 patients with redo, 176 had original pouch salvaged by pouch repair (n=111), pouch revision (n=39), pouch advancement (n=7), pouch augmentation(n=12), partial pouch resection (n=7). 8 of 250 patients had second redo IPAA. 2 of 8 had a pouch revision, 6 had the pouch excised and had a new pouch. Indications for second redo were excision of previous IPAA, pouch obstruction, incontinence, leak, pelvic sepsis, pouchvaginal and pouchperianal fistula. 4 patients had UC. Of the patients with redo, 13 had their pouches excised and had fecal diversion. Indications for the excisions were incontinence (n=3), fistula(n=3), pouch dysfunction(n=2), stricture(n=2), pelvic sepsis(n=2), leak, evacuation disorder, chronic pouch prolapse and peritoneal abscess. Of 13, 7 had UC, 5 had CD and 1 had IC- UC.

**Conclusions:** Repeat IPAA is a valid alternative for pouch failure. Pouch salvage rate is high and survival is encouraging after pouch redo operations.

#### Septic Complications after Restorative Proctocolectomy Do Not Impair Functional Outcome: Long Term Follow-Up from a Specialty Center

(41)

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**Purpose:** Restorative Proctocolectomy (RPC) with ileal J-pouch anal anastomosis (IPAA) is the most common operation performed for patients with Ulcerative Colitis (UC) and Familial Adenomatous Polyposis (FAP). Previously published audits of our data showed a pouch leak rate of 7-8% following RPC. However, there is concern that long-term functional outcome may be impaired should there be an anastomotic or pouch staple line dehiscence. Therefore, we evaluated our patients treated with RPC to determine if septic complications were associated with worse long-term functional outcome.

**Methods:** We queried our prospectively maintained database of patients who underwent RPC for demographic, clinical, and pathologic data. We sent a questionnaire to patients containing long-term clinical, sexual, and functional questions, including the validated Fecal Incontinence Severity Index (FISI) and Cleveland Global Quality of Life Score (CGQOL). We defined anastomotic leak as any patient with clinical or radiographic evidence of leak. We compared the patients with a leak to those without to determine if there was an impact on long-term functional outcome or satisfaction with the procedure.

**Results:** Since 1982, we performed 1051 RPCs, of whom 817 patients were available for follow-up. 374 patients (46%) completed questionnaires and comprise the study population. With a median follow-up of 102 months, 60 (16%) patients had an anastomotic leak. We compared the two groups with regards to clinical and outcome variables. (Table)

**Conclusions:** Septic complications following restorative proctocolectomy do not adversely affect long-term quality of life or functional outcome. In addition, the use of antidiarrheal medication and incidence of pouchitis were not increased in those with a leak. However, although loss of the pouch or a permanent ileostomy is rare, it is significantly more likely in patients who have had a septic complication.

#### S41 Comparison of Clinical and Outcome Variables

	Leak (n=60)	No Leak (n=314)	p-Value
<b>Clinical Variables</b>			
Mean Age	36.6	38.9	0.21
Male Gender	28 (46.7%)	166 (52.9%)	0.38
CUC	56 (93.3%)	285 (90.8%)	0.56
FAP	0 (0)	16 (5.1%)	
IC	4 (6.7%)	9 (2.9%)	
CD	0 (0)	4 (1.3%)	
<b>Outcome Variables</b>			
CGQOL	0.79	0.81	0.48
FISI	15.3	14.7	0.77
Bowel Movements/ 24 Hours	7.92	7.88	0.92
Use of Antidiarrheals	22 (36.7%)	112 (35.7%)	0.88
Pouchitis	30 (50.0%)	189 (60.2%)	0.99
Loss of pouch/ permanent ileostomy	8 (13.3%)	2 (0.6%)	<0.001

CUC- chronic ulcerative colitis, FAP- familial adenomatous polyposis, IC- indeterminate colitis, CD- Crohn's disease, CGQOL- Cleveland Global Quality of Life Score, FISI- Fecal Incontinence Severity Index

#### Minimally Invasive Subtotal Colectomy and Ileal Pouch-Anal Anastomosis for Fulminant Ulcerative Colitis: Feasibility and Short-Term Outcomes

(42)

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**Purpose:** Our aim was to evaluate feasibility and short-term outcomes of staged minimally-invasive surgery (MIS) for fulminant ulcerative colitis.

**Methods:** Using a prospective procedural database, we identified all patients with a pre-operative diagnosis of ulcerative colitis from 2000-2007 who underwent MIS subtotal colectomy followed by MIS ileal pouch-anal anastomosis (IPAA) at our institution. Demographics and short-term outcomes were retrospectively evaluated.

**Results:** Over a 7-year period 50 patients underwent MIS subtotal colectomy for fulminant ulcerative colitis; 50% were female, with a median age of 34 years. All patients had refractory colitis: 96% were on corticosteroids, and 34% were on monoclonal antibody therapy, and 88% had  $\geq 1$  severe Truelove & Witts' criteria. Additionally, 100% had  $\geq 1$  of the following signs of severe ulcerative colitis: current corticosteroid ( $\geq 40\text{mg/day}$  prednisone) or monoclonal antibody therapy (98%), currently or recently hospitalized (78%),  $\geq 5$  kilogram weight loss (58%), or anemia requiring transfusions (48%); 87% of patients had  $\geq 2$  of these signs. Of these 50 patients, 72% had laparoscopic-assisted surgery and 28% had hand-assisted laparoscopic surgery. Conversion rate during MIS subtotal colectomy was 6%. Median interval between subtotal and IPAA was 3.3 months. Of the 43 patients who have undergone completion proctectomy, IPAA and diverting loop ileostomy, 95% have had their IPAA completed via a MIS approach. Short-term outcomes of both procedures are shown in Table 1. Median length of stay was 4 days for each procedure.

**Conclusions:** A staged, minimally invasive surgical approach to fulminant ulcerative colitis is feasible and safe.

#### S42 Short-term (30-day) Outcomes after a Minimal Invasive Approach to Fulminant Ulcerative Colitis

	Subtotal Colectomy n = 50	Completion Proctectomy with IPAA n = 43
Overall 30-day Morbidity	20 (40%)	17 (38%)
Ileus	6 (12%)	3 (6.8%)
Surgical Site Infections	2 (4%)	4 (9%)
Peristomal Abscess	1 (2%)	1 (2.2%)
Partial Small Bowel Obstruction	2 (4%)	2 (4.6%)
Pelvic Abscess	2 (4%)	2 (4.6%)
Presacral Hematoma	—	2 (4.6%)
Re-admission	5 (10%)	4 (9%)
Re-operation	2 (4%)*	1 (2.3%)**
Anastomotic Leak	—	2 (4.6%)

\*one re-operation for hemorrhage, one for obstruction. \*\*one re-operation to divide the pouch septum.



### Laparoscopic Total Colectomy and Ileostomy for Acute Severe Colitis

(43)

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**Purpose:** Since 1991 a prospective laparoscopic colorectal surgery database has been maintained. There are 2400 cases on the database. Laparoscopic total colectomy has been employed for refractory acute severe colitis since January 2003. There are few studies examining laparoscopic total colectomy in this setting. The aim of this study is to look at the safety and short term outcomes. The surgical technique is described along with lessons learned.

**Methods:** Patients with acute severe colitis undergoing laparoscopic total colectomy were identified from the database. All patients underwent a laparoscopic total colectomy with end ileostomy and creation of a closed, buried mucous fistula. All surgeons contributing to the database were experienced and had performed more than 200 laparoscopic colectomies. The use of Infliximab and cyclosporine was reviewed.

**Results:** 81 patients were identified. 80 patients had UC and 1 had CD. The median age was 32 years (range 16-64). The median weight was 70kg (range: 41-120). The median operating time was 170 mins (range: 70-300). The median length of stay was 6 (4-23) days. There were no deaths. 9 patients (11%) had complications. There was 1 conversion to open. This patient was morbidly obese and could not be maintained in position on the operating table. There were no readmissions with adhesive small bowel obstruction.

**Conclusions:** In experienced hands laparoscopic total colectomy can be safely performed with low morbidity and mortality. This compares favourably with historical outcomes for open surgery. In our institution this is the preferred surgical technique.

### Laparoscopic vs. Open Total Abdominal Colectomy for Severe Colitis: Impact on Recovery and Subsequent Completion Restorative Proctectomy

(44)

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**Purpose:** To determine the impact of the surgical approach to total abdominal colectomy (TAC) in patients ultimately undergoing 3-stage proctocolectomy and ileal pouch-anal anastomosis procedures (IPAA) for severe colitis.

**Methods:** Prospective comparison of consecutive patients undergoing urgent or emergent TAC (laparoscopic 27; open 34) who all subsequently underwent elective proctectomy and IPAA with diverting ileostomy and ileostomy closure from 2001-06. Comparisons were made using two-tailed T-tests and multiple regression models, with TAC results adjusted for differences in hemoglobin and albumin by

Generalized Estimating Equations methods using standard statistical software (SAS, Cary, NC).

**Results:** At the time of TAC, there were no differences in pre-operative indication for surgery, body mass index, heart rate, temperature, steroid use, preoperative transfusions, white blood cell count, and pre-operative hospital days, but albumin and hemoglobin were higher in the laparoscopic group [3.7g/dL vs 3.0 (p=0.04) and 12.3g/dL vs 10.9 (p=0.0003), respectively]. At the time of TAC, operating room time (232 vs 141 min, p=0.0001) and intravenous fluid requirement (3778 vs 2566 ml, p=0.0001) were greater in the laparoscopic group, but the laparoscopic group had less morphine equivalent usage (122 vs 266 mg, p=0.0018), faster return of bowel function (2.8 vs 6.4 days, p=0.0001), shorter length of stay (4 vs 8 days, p=0.0001). Complication rates (p=0.06) for the TAC were similar in both groups. There were no differences in any of these parameters at the time of proctectomy/IPAA and ileostomy takedown. Those patients undergoing laparoscopic TAC proceeded sooner to proctectomy/IPAA (113 vs 171 days, p=0.005) and ileostomy takedown (202 vs 267 days, p=0.013) than those patients undergoing open TAC.

**Conclusions:** The laparoscopic approach to TAC in the urgent or emergent setting is associated with faster recovery than the open approach and is associated with faster completion of the subsequent stages of restorative proctocolectomy.

### S44 Stage 1 Lap vs Open Complications By Type

Abscess	0	6
Wound infection	0	4
Rectal Stump leak	0	2
Myocardial infarction	0	1
Pneumonia	0	1
UTI	0	1
Ileus	3	4
SBO	0	1
DVT	0	1
SMV Thrombosis	1	0
Other	2	3
Total	6	24

### Laparoscopic Restorative Proctocolectomy with Ileal Pouch-Anal Anastomosis. A Comparative Prospective Study on Long-Term Functional Results

(45)

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**Purpose:** Long-term functional results after laparoscopic ileal pouch anal anastomosis (IPAA) have not been thoroughly evaluated, due to the lack of large series with adequate follow-up. Our study prospectively analyzes short and long-



term outcomes after laparoscopic IPAA in comparison with contemporary open IPAA from the same tertiary practice.

**Methods:** Between October 2002 and August 2007 174 consecutive patients were enrolled: 74 laparoscopic and 100 open IPAA. The patient and disease-specific characteristics, short and long-term postoperative outcomes were prospectively collected and analyzed.

**Results:** There were no differences in age, gender, body mass index, diagnosis, medical regimen, indication and duration of surgery, blood loss and use of an ileostomy between groups. The overall length of stay did not differ between groups ( $p=0.409$ ). Laparoscopic patients had an earlier return of flatus ( $p=0.017$ ), assumption of clear liquid diet ( $p=0.001$ ) and shorter duration of intravenous narcotic use ( $p=0.003$ ). Similar were short and long-term complications, incidence of pouchitis and pouch failure. Functional results were recorded for a week on a diary at 3, 6, 9, 12, 18, 24 months and yearly thereafter. Mean follow-up was 34 months. The average number of bowel movements was  $6.7 \pm 2.9$ /day in the laparoscopic group and  $6.4 \pm 1.7$  in the open group ( $p=0.314$ ), with no significant differences at any given time period. A total of 70.1% of patients were fully continent at three months and up to 80% at two years without differences between groups. The other indicators of continence and stooling function, including the ability to postpone a bowel movement, remain similar overtime. Patients judged quality of life, overall satisfaction and overall adjustment as excellent or good over 90% of the time, without differences between groups.

**Conclusions:** Laparoscopic IPAA confers excellent quality of life. The majority of patients are fully continent, have 6 bowel movements/day on average and can defer a bowel movement until convenient. When present, incontinence improves over time. These results mirror those obtained with open surgery. Laparoscopy is a safe alternative to open surgery.

#### Safety and Feasibility of Laparoscopic Surgery as an Initial Treatment for Ulcerative Colitis

(46)

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**Purpose:** Use of laparoscopic techniques in ulcerative colitis (UC) remains controversial because of extensive procedure and tissue fragility. We analyzed outcomes of patients who underwent LAP as an initial procedure for UC to evaluate of the role of LAP regardless of clinical setting whether emergent or elective.

**Methods:** We reviewed our data from a prospectively collected database and the medical records of 104 consecutive patients treated at a single institution from 2001 to Sep. 2007. Patients who underwent LAP for UC as an initial procedure were evaluated. Operative methods and outcome variables were analyzed with Chi-square test, Fisher's exact test and t-test.

**Results:** A total of 101 patients underwent restorative proctocolectomy (RP: 56, 55.4%) or total abdominal colectomy (TAC: 45, 44.6%) with LAP for UC as an initial procedure. RP was associated with significantly low ASA score, less severe UC, less steroid use, less cyclosporin A, 2 or less immunomodulators (IMs), elective setting. TAC was performed significantly more commonly in UC with shorter duration, more severity, and refractory inflammation. RP was associated with longer operation time, longer incision and more blood loss. There was no bowel perforation during the surgical procedures. Major complications occurred in 14 patients (13.9%) with no significant difference between RP and TAC ( $p=0.563$ ). RP with IMs  $\geq 3$  had significant high risk for major complications such as anastomotic leakage and pelvic abscess ( $p=0.042$ ).

**Conclusions:** Laparoscopic RP or TAC can be performed safely as an initial operative procedure for UC. TAC in particular is useful even in emergent or urgent circumstances. Patients with severe inflammation, or IMs  $\geq 3$  tended to undergo non-restorative procedure as an initial procedure. Patients underwent RP with preoperative IMs  $\geq 3$  had high risk for complication. Additional prospective randomized prospective studies are required to evaluate the influences of IMs on complications.

#### Impact of Complicated Crohn's Disease on the Outcome of Laparoscopic Ileocecal Resection: A Comparative Clinical Study in 124 Patients

(47)

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..... Clichy cedex, France

**Purpose:** The aim of this prospective study was to assess the feasibility of laparoscopic ileocecal resection (ICR) for complicated Crohn's disease (CD) (ie, abscess, fistula, or recurrence), and to compare postoperative outcomes of patients with complicated CD versus those of patients without complicated CD.

**Methods:** Between 1998 and 2007, 124 laparoscopic ICR were attempted for CD: 54 patients with complicated CD (group I) and 70 patients without complicated CD (group II). Postoperative mortality and morbidity, defined as the in-hospital death and complications were compared between group I and group II.

**Results:** Both groups were comparable according to age, gender, BMI, and previous steroids use. Indication for surgery in group I included fistula (43%), abscess (30%), and recurrent disease after ileocolonic resection (27%). Complicated CD was significantly associated with increased mean operative time ( $214 \pm 13$  vs  $191 \pm 53$  min,  $p<0.05$ ), conversion rate (37% vs 14%,  $p<0.01$ ), and use of temporary stoma (39% vs 9%,  $p<0.001$ ). No patient died. Overall postoperative morbidity was similar between both groups (17% vs 17%, NS), including major surgical postoperative complications (7% vs 6%, NS). Mean hospital stay was not statisti-

cally different between both groups ( $8 \pm 3$  vs  $7 \pm 3$  days, NS).

**Conclusions:** This comparative study suggested that laparoscopic ICR for complex CD was feasible and safe with good postoperative outcomes. In our experience, complicated CD, including abscess, fistula or recurrent disease at the previous ileocolic anastomosis don't appear as a contraindication to a laparoscopic approach.

#### National Trends and Outcomes for the Surgical Therapy of Ileocolonic Crohn's Disease: A Population-Based Analysis of Laparoscopic vs. Open Approaches

(48)

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**Purpose:** The laparoscopic approach to Crohn's disease has demonstrated benefits in several small series. We sought to examine its use and outcomes on a national level.

**Methods:** All admissions with a diagnosis of Crohn's disease requiring bowel resection were selected from the 2000 - 2004 Nationwide Inpatient Sample. Regression analyses were used to compare outcome measures and identify independent predictors of undergoing laparoscopy.

**Results:** Of 396,911 patients admitted for Crohn's disease, 49,609 (12%) required surgical treatment. They were predominately Caucasian (64%), female (54%), with ileocolic disease (72%). Most had private insurance (71%), and had surgery in urban hospitals (91%). Laparoscopic resection was performed in 2,826 cases (6%) and was associated with lower complications (8% vs. 16%), shorter length of stay (6 vs. 9 days), lower charges (\$27,575 vs. \$38,713) and mortality (0.2% vs. 0.9%, all  $P < 0.01$ ). Open surgery was used more often for fistulas (8% vs. 1%) and when ostomies were required (12% vs. 7%). Independent predictors of laparoscopic resection were age  $< 35$  (odds ratio [OR] = 2.4), female gender (OR = 1.4), admission to a teaching hospital (OR = 1.2), national region (South, OR = 1.4; Midwest, OR = 1.5) and lower disease stage (OR = 1.1, all  $P < 0.05$ ). Ethnic category, insurance status, and type of admission (elective

vs. non-elective) were not associated with operative method ( $P > 0.05$ ).

**Conclusions:** A variety of patient and system-related factors influence the utilization of laparoscopy in Crohn's disease. Laparoscopic resection is associated with excellent short-term outcomes compared to open surgery.

#### Anastomotic Leak and Intra-Abdominal Abscess after Resection for Colorectal Cancer: Do These Complications Really Influence Long-Term Survival and Recurrence?

(49)

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**Purpose:** The goal of this study is to analyze the effect of anastomotic leak and intra-abdominal abscess on colorectal cancer recurrence and survival.

**Methods:** Data for patients who underwent resection and anastomosis for colorectal cancer was retrieved from an IRB-approved prospectively maintained cancer database. Patients with IBD, FAP, HNPPC or mortality within 30 days were excluded. Patients who developed anastomotic leak or intra-abdominal abscess (Group B) were matched 1:2 by age, gender, tumor site, pathologic stage, tumor differentiation, and vascular invasion to a group who did not (Group A). Survival and recurrence were compared for the two groups using log rank tests. Fisher's exact, Chi-squared, and Wilcoxon rank sum tests were used to evaluate differences for other characteristics.  $P < 0.05$  was considered significant. Analyses were done separately for colon and rectal cancers.

**Results:** 2446 colon cancer patients met inclusion criteria with 71 in Group B. Matching 1:2 resulted in a comparison group of 142 patients. Right and sigmoid colectomy was most commonly performed. Renal and pulmonary disease was more common in Group B. Recurrence, mortality, and cancer specific mortality tended to be higher in Group B but was not statistically significant. 1700 rectal cancer patients met inclusion criteria with 110 in Group B. Matching resulted in a comparison group of 220. Anterior

#### S46

	RP (N=56)	TAC (N=45)	p
ASA class $\geq 3$	5 (8.9%)	12 (26.7%)	0.018*
Steroids	40 (71.4%)	41 (91.1%)	0.012*
Cyclosporin A	5 (8.9%)	13 (28.9%)	0.009*
No. of IMs $\geq 3$	24 (42.9%)	28 (62.2%)	0.041*
severe UC	22 (43.1%)	29 (56.9%)	0.041*
Emergency	1 (1.8%)	19 (42.1%)	$< 0.001^{**}$
Op. time (min) (mean $\pm$ S.D.)	287.8 $\pm$ 62.0	225.5 $\pm$ 78.0	$< 0.001\ddagger$
Length of incision (mm) (mean $\pm$ S.D.)	70.0 $\pm$ 21.6	79.7 $\pm$ 13.1	0.007 $\ddagger$
Estimated blood loss(ml) (mean $\pm$ S.D.)	255.0 $\pm$ 127.2	191.1 $\pm$ 163.1	0.029 $\ddagger$
Major complication	8 (14.3%)	6 (13.3%)	0.563*

p\* $< 0.05$  : Chi-square test, p\*\* $< 0.05$ : Fisher's exact test, p $\ddagger$  $< 0.05$ : t-test

proctosigmoidectomy was most commonly performed. Cardiovascular disease was more common in Group B. Systemic recurrence and overall mortality was significantly greater in Group B. Local recurrence and cancer specific mortality was higher but was not statistically significant.

**Conclusions:** After resection for colon cancer, long-term survival and recurrence are not affected by anastomotic leak or intra-abdominal abscess. For rectal cancer, these complications do lead to increased overall mortality and systemic recurrence, but do not result in higher rates of local recurrence or cancer specific mortality.

**Five-year Overall and Disease-free Survival in 170 Patients with Pseudomyxoma Peritonei from a Perforated Appendiceal Tumor Following Complete Tumor Removal and Intraperitoneal Chemotherapy** (50)

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..... Hampshire, United Kingdom

**Purpose:** Pseudomyxoma peritonei (PMP) usually originates from a perforated appendiceal tumour and presents as mucinous ascites, often unexpectedly at laparotomy, laparoscopy, hernia repair, or cross-sectional imaging. Traditionally treated by serial debulking, disease progression

and death was inevitable. Optimal treatment is currently considered to be complete macroscopic tumour removal (cytoreduction) and heated intraperitoneal chemotherapy (HIPEC). The experience of a tertiary referral centre is reported.

**Methods:** Between 1994 and 2006, 259 patients with PMP from a perforated appendiceal tumour underwent laparotomy. Tumours were categorised as low or high grade adenocarcinomas on histopathological examination. The aim was complete cytoreduction and HIPEC (mitomycin C, 10mg/m<sup>2</sup>) or, if not feasible, maximal debulking generally by colectomy and greater omentectomy. Outcomes are reported in 170/259 (66%) where complete macroscopic tumour removal and HIPEC was achieved.

**Results:** 115/170 (68%) were female; 144/170 (85%) had low grade adenocarcinoma and 26 (15%) high grade. Median operating time was 10.5 hours (range 4.5-18); 91 (54%) less than and 79 (46%) greater than nine hours. Operative mortality was 3/170 (1.8%). Kaplan-Meier predicted 66% five-year disease free and 79% overall survival. There was no significant difference in survival or recurrence rates between males and females or between low and high grade tumours. Operation time had no significant influence on overall survival, but operations longer than nine hours had a significant influence on disease-free survival (54% compared with 78% for procedures less than or equal to nine hours; p<0.002).

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COLON CANCER	RECTAL CANCER		P value		P value	
	A. No leak/ abscess (142)	B. leak/ abscess (71)				
Age(yr)	69	69	0.9	62	62	0.8
Gender(Male)	59%	63%	0.5	73%	75%	0.7
Comorbidities						
Diabetes	5.6%	4.2%	0.8	5.9%	4.5%	0.6
Cardiovascular	18.3%	18.3%	0.9	8.2%	18.2%	0.009*
Renal	0.7%	8.5%	0.006*	1.8%	2.7%	0.7
Pulmonary	3.5%	11.3%	0.03*	3.6%	7.3%	0.1
Pathologic Stage			0.8			0.9
I	19.7%	19.7%		26.4%	26.0%	
II	33.1%	32.4%		21.4%	20.0%	
III	31.7%	31.0%		31.0%	32.0%	
IV	15.5%	15.5%		17.0%	18.0%	
Tumor Differentiation			0.9			0.9
well/moderate	76.1%	76.5%		74.0%	74.0%	
poor	23.9%	23.5%		26.0%	26.0%	
Vascular Invasion	0.7%	4.2%	0.1	0.91%	1.8%	0.6
Systemic Recurrence‡	16 and 31%	23 and 38%	0.7	11 and 27%	16 and 37%	0.03*
Local Recurrence‡	12 and 29%	18 and 38%	0.5	7 and 26%	14 and 35%	0.09
Mortality‡	14 and 42%	26 and 47%	0.3	9 and 34%	20 and 51%	0.002*
Cancer Specific Mortality‡	12 and 29%	18 and 36%	0.5	7 and 25%	11 and 34%	0.1

P<0.05; ‡1 and 5yr.

**Conclusions:** Complete cytoreduction and HIPEC is feasible in approximately two-thirds of patients with PMP undergoing surgery in a specialist unit; 65% being disease free at five years. Length of surgery, a surrogate marker for extent of disease, significantly impacts on disease free, but not on overall survival. Post-operative mortality from this complex surgery is low in experienced units; with long term survival for most and likely cure for many.

**Development of Pouch Polyposis after Ileal Pouch-Anal Anstomosis for Familial Adenomatous Polyposis is Associated with Severity of Duodenal Polyposis** (51)

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**Purpose:** To examine whether in patients with familial adenomatous polyposis (FAP) who have undergone ileal pouch anal anastomosis (IPAA), the severity of pouch polyposis is associated with severity of duodenal polyposis over time.

**Methods:** All available pouch endoscopies and associated histology reports for patients with FAP attending for annual surveillance after IPAA at St Mark's Hospital since 1978 were reviewed retrospectively. The incidence, timing, anatomical location (pouch body and anal transitional zone [ATZ]) and histological characteristics of pouch neoplasms, as well as Spigelman stage of duodenal polyposis were recorded. Associations between variables over time were examined with hierarchical regression analysis for repeated measures using STATA/SE 9.1™.

**Results:** Of 206 patients who underwent IPAA, 140 attended for endoscopic follow-up and were included in the analysis. Median follow-up time after IPAA was 10.4 years (range 0.7-24.5). Overall, 59% of patients developed pouch body polyps during the study period. Seventy-six patients were available for follow-up beyond 10 years. Of these, 37% had no polyps, 34% had between 1 and 10 polyps, and 29% had more than 10 polyps in the pouch body. On univariate analysis, Spigelman stages I, II, III and IV were associated with a 13%, 30%, 66% and 150% increase in the number of pouch body polyps respectively ( $p < 0.001$ ). Follow-up time beyond 20 years was associated with a 300% increase in pouch polyp numbers compared with a 26% increase at 5 to 10 years ( $p < 0.001$ ). On multivariate analysis, both follow-up time and Spigelman stage IV were independent predictors of higher numbers of pouch polyps ( $p < 0.001$ ). The number of ATZ polyps was not associated with Spigelman stage over time.

**Conclusions:** The severity of polyposis in the pouch body, but not in the ATZ, was associated with Spigelman stage over time. These findings suggest that duodenal polyposis and pouch body polyposis may share a common aetiology beyond a defective APC gene that is distinct from factors governing the development of polyposis in the ATZ.

**How Uncommon are Isolated Lung Metastases in Colorectal Cancer? A Review of 754 Patients Over 4½ Years** (52)

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**Purpose:** Metastasis of colorectal cancers to the lungs without liver involvement is rare. To the best of our knowledge there are no published data on the incidence of isolated lung metastases in colorectal malignancies.

**Methods:** We performed a retrospective review of all patients with colorectal cancer diagnosed between December 2003 and August 2007 in a 1400 bed-hospital in Singapore. Isolated lung metastases were determined as (1) Definite if confirmed histology of the lung lesions and (2) Probable if there were only radiological evidence suggestive of lung metastases, both in the absence of liver lesions on CT scan. They were classified as synchronous if they met the above criteria within 6 months of diagnosis of the primary colorectal cancer or as metachronous if detected after. Patients in the colon cancer group were subdivided into right and left sided. Chi-square test was used for comparative statistics.

**Results:** There were 196 patients with rectal and 558 patients with colon cancer; and of these 360 were left sided and 198 right sided. Twenty-one patients with rectal (11%) and 33 patients with colon cancer (6%) had isolated lung metastases ( $p < 0.05$ ). There were 13 definite isolated lung metastases and the remaining 41 were probable. In the colon cancer group, 25 (7%) of these isolated lung metastases occurred in left sided lesions compared to 8 (4%) right sided ones. In addition, 31 (94%) of them with isolated lung metastases had tumour stage  $\geq T3$ , while 25 (75%) had nodal stage  $\leq N1$ . Synchronous isolated lung metastases occurred in 62% in the colon cancer group, with 39% (13/33) diagnosed at presentation. In the rectal cancer group, 43% had synchronous isolated lung metastases, of which 19% (5/21) were diagnosed at presentation.

**Conclusions:** While the incidence of isolated lung metastases is twice as common in patients with rectal cancer, it is still significant in patients with colon cancer. Search for lung metastases should be included in the staging and surveillance of all patients with rectal cancer and also considered for patients with colon cancer, especially those with lesions  $\geq T3$ , regardless of lymph node status. Absence of liver involvement should not preclude a search for lung metastases.

**The "Liver First Approach" for Patients with Locally Advanced Rectal Cancer with Synchronous Liver Metastases** (53)

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**Purpose:** The optimal strategy for locally advanced rectal cancer is pre-operative chemoradiation therapy (CTxRTx).

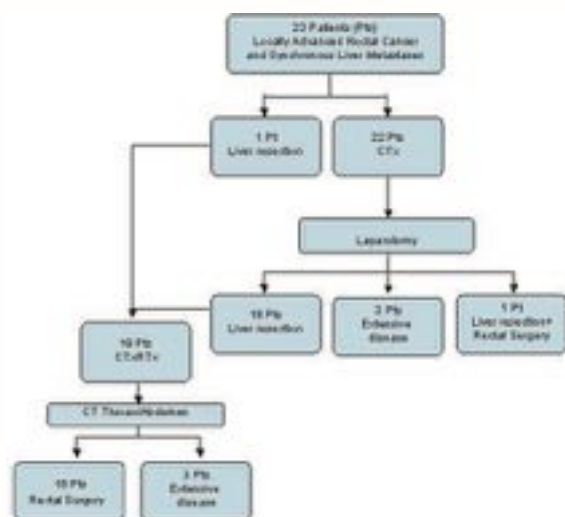


After CTxRTx, it is recommended to delay surgery for at least 6 weeks. The morbidity of rectal cancer surgery after CTxRTx is considerable. Therefore, in patients with metastasized rectal cancer, treatment of the disease that is decisive for survival maybe postponed for over 6 months. To avoid this delay in treatment, we started the "liver first approach" in patients with locally advanced rectal cancer and synchronous liver metastases.

**Methods:** Between May 2003 and May 2007, twenty-three consecutive patients with locally advanced rectal cancer and synchronous liver metastases were included. Patients were primarily treated for their liver metastases. Only after a successful liver resection, patients were treated with CTxRTx for the primary rectal tumor. If thoracic and abdominal imaging did not reveal unresectable metastases, surgery of the rectal cancer was performed 6-10 weeks after finishing CTxRTx.

**Results:** Fifteen males and eight females were included with a median age of 60 years (43-78 years). Twenty-two patients were treated with 5-FU and Oxaliplatin-based chemotherapy and one patient had a partial liver resection without neoadjuvant chemotherapy. Three patients had extensive disease diagnosed at laparotomy. One patient underwent a partial liver resection with simultaneously a low anterior resection. Eighteen patients underwent partial liver resection. Nineteen patients had subsequent CTxRTx for the primary rectal cancer. After CTxRTx, 3 patients demonstrated new extensive pulmonary and/or hepatic metastases. Sixteen patients (70%) have completed the full treatment protocol and underwent radical rectal surgery and all are alive after a median of 21 months (range 6-55 months).

**Conclusions:** The 'liver first approach' is a promising strategy in patients with locally advanced rectal cancer and synchronous liver metastases. With this strategy, the majority of patients undergo curative resections of both the metastatic and primary disease. Moreover, needless radical rectal surgery can be avoided in patients who have incurable metastatic disease.



## The Value of CEA and CT in Early Diagnosis of Colorectal Cancer Recurrence

(54)

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**Purpose:** Possible benefits from long-term follow-up after curative resection for colorectal cancer (CRC) include the detection of asymptomatic recurrence when management may prolong survival. The purpose of this study was to evaluate a simple follow up policy used within our institution.

**Methods:** During 1997-2003, 215 patients who had undergone curative surgery for CRC were followed with regular 3 monthly CEA measurements, 6 monthly CT scans and clinic visits for a minimum of 2 years. The predictive value of these measurements in detection of local or distant recurrence and in survival is compared.

**Results:** The median patient follow-up was 36 months (range 1-72). CEA became abnormally elevated in 72 (34%) patients; out of this group 50 (69%) were confirmed to have recurrence on CT scanning while 22 (31%) had a false positive CEA. Of 143 (63%) patients with normal CEA, 8 (6%) had a recurrence on CT scanning and 135 (94%) had a true negative CEA. The sensitivities of CEA and CT were 86% and 100% respectively, and the specificities were 86% and 93% respectively. The positive predictive values were 65% and 83% respectively and the negative predictive values of CEA and CT were 94% and 100% respectively. The positive diagnostic likelihood ratios (DLRs) for CEA and CT were 6.14 and 12.5 and the negative DLRs for CEA and CT were 0.16 and zero respectively. The overall recurrence rate was 27% (58/215); radical resections were performed on 31% (12/58) of patients with recurrence. False negative CEA recurrences detected on CT scanning only had a higher survival rate of 75% compared to true positive CEA recurrences that had a survival rate of 28% (P=0.0415). Overall 5 year survival was 74%. The cumulative 5 year survival in patients with recurrence was 37% and in patients treated with chemotherapy and/or radiotherapy who did not have further surgery, 26%.

**Conclusions:** Both routine CEA and CT scanning contributed to postoperative follow-up in this series. This simple follow up protocol has a relatively high diagnostic efficacy, provides early detection of recurrence, and has a high re-resection rate and overall survival with similar results to more intensive follow-up regimens compared in the literature.

## Local Recurrence Following Rectal Cancer Surgery in a Specialist Unit: Incidence, Site and Outcome in a Consecutive Series of 459 Cases

(55)

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**Purpose:** Despite selective neoadjuvant therapy and optimal surgery, local recurrence of rectal cancer continues to

be a problem, particularly in some patients with low or locally advanced tumours. This study evaluated the incidence, sites of recurrence, management and outcomes in a unit specialising in total mesorectal excision surgery.

**Methods:** Between October 1995 and December 2006, 459 consecutive patients underwent surgery for rectal cancer. 286/459 (62%) were male; 218 (47%) had tumours within 6cm of the anal verge, and 133 (29%) had neoadjuvant therapy. 396/459 (86%) had anterior resection (AR); 27 had abdomino-perineal excision (APE); 15 local excision; 15 Hartmann's and 6 other procedures.

**Results:** There were 33/459 local recurrences, and the Kaplan Meier predicted overall local recurrence rate at five years was 11%, with 11/71 (15%) in non-restorative resections. The incidence rates were 25/396 (6%) for AR; 4/27 for APE (15%); 2/15 local excisions (13%); and 2/15 Hartmann's (13%). The local recurrence rate in males was 22/33 (67%) and in females 11/33 (33%). In the local recurrence group there were 24/33 (73%) tumours less than 6cm from the anal verge, compared with 218/459 (47%) in the whole group. The site of recurrence was residual stump or perianastomotic in 12/33 (36%); pelvic side wall in 10/33 (30%), and miscellaneous pelvic/peritoneum in the remainder. APE was performed in 4/33 for attempted salvage surgery and 2/4 are alive (one with and one without recurrence at 38 months and 16 months respectively). There have been 28/33 deaths from recurrence.

**Conclusions:** In this series of 459 cases, local recurrence was more common in males, in patients with low rectal tumours, and in those who had non-restorative resection. Outcome for the 33/459 who developed local recurrence was poor, with few amenable to salvage surgery and only 1/33 currently disease free.

#### An Argument for Screening Colonoscopy Before Age 50: Current Epidemiologic Trends in the United States

(56)

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**Purpose:** Colorectal cancer screening has been shown to lower mortality through early disease detection. In 1995, the US Preventative Services Task Force (USPSTF) recommended screening at age 50 for average-risk people. This study assessed epidemiologic trends in colorectal resection for neoplasia in the interval since these recommendations were made.

**Methods:** The Nationwide Inpatient Sample was queried to identify all patient discharges for resection of neoplastic disease in the colon and rectum from 1998 to 2005. Univariate analyses of categorical variables were performed using Rao-Scott chi-square and continuous variables were analyzed by survey weighted analysis of variance. Trends were analyzed using the Mantel-Haenszel chi square.

**Results:** There were 214,042 patient-discharges following resections for colorectal neoplasia. The mean patient age was 69.9 years, 51% were women, and 82% were Caucasian. Overall, 8.1% of patients were age <50, 40.6% were age 50-70, and 51.9% were over 70 years of age. Between 1998 and 2005, there were statistically significant trends by age group (overall  $p < 0.0001$ ). Specifically, the number of resections within the entire cohort of patients for age <50 ranged from 7.3 to 8.9%, 38.6 to 41.5% (age 50-70), and 54.1 to 49.6% (age >70). Right colectomy was the most common procedure within all age groups (42.8%) compared to proctectomy (21.9%), sigmoidectomy (18.4%), left colectomy (10.7%), and transverse colectomy (4.5%). In-hospital mortality was 0.6% for age <50, 1.5% for age 50-70, and 4.6% for age >70.

**Conclusions:** While the national incidence of colorectal cancer has been fairly stable since the USPSTF recommendations, there are other important epidemiologic trends seen within this retrospective cohort. The increase in colorectal resection for neoplasia in the <50 age bracket, combined with the low in-hospital mortality rate, strengthens the argument for screening before age 50. The predominance of right-sided procedures supports the use of full colonoscopy as the primary screening method.

#### Endoscopic Brush Cytology for the Diagnosis of Colorectal Cancer

(57)

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**Purpose:** Endoscopic biopsy of a suspicious colorectal lesion can have a sensitivity for cancer as low as 60%. Brush cytology taken at the same time might increase the sensitivity for the diagnosis of cancer and reduce the need for re-biopsy. This study analyses the results of brush cytology for the diagnosis of colorectal cancer and compares them with both endoscopic biopsy and the histology of the resected specimen.

**Methods:** Between 1990-2006 there were 918 patients identified from our pathology database who had prospectively collected and reported brush cytology and endoscopic biopsies followed by a definitive resection of the colorectal lesion.

**Results:** Cytology alone had a sensitivity of 88.2 percent, a specificity of 94.1 percent, a positive predictive value of 98.6 percent and a negative predictive value of 61.9 percent for the diagnosis of colorectal cancer. Brush cytology always recognised malignant cells whether they were solely confined to the mucosa or infiltrated beyond the muscularis mucosa, with a positive predictive value of 100 percent. There was no significant difference between brush cytology and biopsy, which had a sensitivity of 86.9 percent, specificity of 98.1 percent, positive predictive value of 99.5 per-

cent and a negative predictive value of 60.3 percent. Combining the results of brush cytology and biopsy resulted in a significant increase in sensitivity to 97.4 percent ( $P < 0.001$ ), a significant increase in the negative predictive value to 88.4 percent ( $P < 0.001$ ) and a significant reduction in the false negative rate to 0.03 percent ( $P < 0.001$ ) for the diagnosis of colorectal cancer.

**Conclusions:** Brush cytology is as accurate as endoscopic biopsy for the diagnosis of colorectal cancer and combining these two modalities resulted in a significant improvement in definitive diagnosis with a reduction in the need for further biopsy.

#### S57 Diagnostic accuracy of combining the results of histology and cytology compared with the resected specimen.

	Histology Alone (%)	Combined histology and cytology (%)	P*
Sensitivity	86.9	97.4	< 0.001
Specificity	98.1	98.7	1.000
Positive Predictive Value	99.5	99.7	0.900
Negative Predictive Value	60.3	88.4	<0.001
False Positive Rate	0.02	0.01	1.000
False Negative Rate	0.13	0.03	<0.001

\*Chi-squared tests

#### Detection of Colorectal Cancer by DNA Quantification of Exfoliated Colonocytes

(58)

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**Purpose:** Colonocyte exfoliation results in the distal migration of viable cells in a mucocellular layer along side the faecal stream. This phenomenon facilitates quantification and analyses of these cells for bowel pathology such as colorectal cancer (CRC). The aim of this study was to evaluate a novel technique designed to harvest colonocytes from the rectal mucosa as a method of detecting CRC and report the interim results.

**Methods:** A prospective double-blinded multi-centre study. 236 consecutive patients referred with symptoms suggestive of CRC have so far been recruited into the trial. Exfoliated cells were collected from the rectal mucosa using an inflatable elastic membrane deployed with a proctoscope, during outpatient clinical assessment. Samples were preserved in fixative and sent to an off-site laboratory for DNA isolation and quantification (Pico-Green assay). DNA scores were calculated blindly and compared with the outcome after subjects had completed endoscopic and where indicat-

ed radiological investigations. A pre-determined DNA score of  $> 2 \mu\text{g/ml}$  from a previous pilot study was used as a cut-off point for a positive result. Samples that were heavily contacted with stool were excluded from analysis.

**Results:** 57 of 236 were excluded due to: heavy faecal contamination of samples ( $n=43$ ); declined further investigations ( $n=6$ ); unfit ( $n=3$ ); inappropriate referral ( $n=5$ ). 131 patients had lower GI endoscopy (colonoscopy = 127, flexible sigmoidoscopy = 4); 45 patients underwent CT colonography and 3 had a barium enema. The diagnosis in all 179 patients were as follows; CRC ( $n=11$ ), adenomatous polyps (AP) ( $n=12$ ), colitis (C) ( $n=6$ ) and no significant abnormality detected ( $n=150$ ). Sensitivity and specificity for detecting CRC were 100%, and 70.8% respectively. Combined sensitivity and specificity for detecting CRC and C and CRC, C and AP were 94.1% and 72.8% (CRC+C) and 75.8% and 74.7% (CRC+C+AP) respectively.

**Conclusions:** In symptomatic patients, this cheap and minimally invasive technique has been shown to be highly sensitive with greater specificity for CRC than reported for faecal occult blood testing and may hold promise as a more effective screening tool.

#### Minimal Preparation CT Colonography: A Reliable Test for Detection of Colonic Carcinoma in Elderly Patients

(59)

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. . . . . Cardiff, United Kingdom

**Purpose:** Minimal preparation CT (MPCT) is a new test used to exclude colonic cancer in the elderly patient with bowel symptoms. Most colonic imaging modalities require bowel preparation. Performing these imaging procedures in the elderly can be difficult due to immobility, incontinence and poor tolerance of bowel cleansing. MPCT avoids these problems with use of a simplified preparation and CT imaging protocol. The aim of this study was to review our initial experience of this new technique involving consecutive patients with adequate follow-up.

**Methods:** The first 100 consecutive MPCT reports from December 2002 to February 2006 were reviewed retrospectively. They were cross referenced with both the clinical data and pathology databases up to Nov 2007 for a median follow-up period of 36 months (range 21-59 months). MPCT reports were classified as positive for colonic carcinoma, negative or inconclusive. All reports and scans were reviewed by a single senior radiologist.

**Results:** Median age of the patients was 83 (range 49-99) years. 6 out of 100 patients having MPCT were reported as positive for colonic cancer. Four had subsequently histologically confirmed cancers, but two proved to be large adenomas. 12 had an inconclusive MPCT; colonoscopy revealed that only 2 had (benign) colonic pathology. 82 out of 100 MPCT reports were negative for colonic cancer. One patient in this group later had a colonoscopy revealing a

colonic carcinoma, however no other patients have developed malignant colonic pathology during the study period. In 25 patients diverticular disease was noted and 20 had extracolonic pathology detected. All patients were able to complete the test.

**Conclusions:** Our initial experience with MPCT shows a sensitivity of 86% and a specificity of 99% for colonic carcinoma. The majority of scans in this elderly cohort were negative for colonic carcinoma. MPCT had an excellent negative predictive value with only one false negative result. This was maintained during the follow up period. With an increasingly aged population attending with bowel symptoms we have found MPCT a reliable and well tolerated test for the clinician attempting to exclude colonic cancer.

#### Impact of the National Bowel Cancer Screening Program (NBCSP) Utilizing Fecal Occult Blood Test (FOBT) Screening on the Diagnosis of Colorectal Cancer (CRC)

(60)

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**Purpose:** Screening for CRC with FOBT is proven to reduce deaths from CRC, but is yet to be widely adopted. In Australia a NBCSP was launched in May 2006, with every person turning 55 and 65 years of age between then and June 2008 to be offered an FOBT. We aimed to analyse the initial impact of this program on CRC diagnosis.

**Methods:** We examined data from a prospective, standardised and comprehensive CRC database at 13 Australian hospitals, 8 public and 5 private, between May 1 2006 and November 2007.

**Results:** 714 cases of CRC were identified. 18 of these cases (2.5%) were recorded as detected by the NBCSP, 13 of 274 (4.7%) private patients and 5 of 440 (1.1%) public patients. For patients aged 55 and 65 at diagnosis, 12 of 23 (52.2%) CRC cases were detected as part of the NBCSP. Overall FOBT screen detected cancers were diagnosed at an earlier stage, stage I 44.4% vs 15.7%, stage II 33.3% vs 38.2%, stage III 16.6% vs 28% and stage IV 5.6% vs 18%. The distribution of NBCSP detected versus symptomatic cancers was 44.4% vs 34.5% right colon, 44.4% vs 36.4% left colon, and 11.1 % vs 29.4% rectum.

**Conclusions:** Initiation of the modest Australian NBCSP has resulted in 2.5% of CRC being screen detected, including 52.2% of cancers in the target age. Screen detected cancers were earlier stage and there was a trend for less rectal cancers. Screen detected cancers however are predominantly occurring in private patients, suggesting poor uptake of FOBT among public patients, possibly reflecting differences in socioeconomic status and attitudes to screening tests.

#### Correlates of Post-operative Mortality Among Patients Undergoing an Emergency Colectomy for Fulminant Clostridium Difficile Infection

(61)

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**Purpose:** The emergence of a novel toxin-hyperproducing strain has led to an increase in the incidence of C. difficile infections (CDI) and in the proportion of patients who require an emergency colectomy to treat fulminant CDI. It has recently been demonstrated that emergency colectomy can be life-saving in such patients, but surgical decision-making remains difficult and largely empirical. We aimed to identify risk factors for post-operative 30-day mortality among patients undergoing emergency colectomy for fulminant CDI, to facilitate surgical decision-making.

**Methods:** We conducted a retrospective review of all cases of fulminant CDI for whom emergency colectomy was performed in 4 tertiary care hospitals in Montreal and Sherbrooke, Canada, between 1994 and 2007. The primary outcome was all-cause mortality within 30 days of colectomy.

**Results:** We identified 130 cases. Only 10 patients had colectomy in 1994-99, 15 in 2000-02, 97 in 2003-05 and 8 in 2006-07. The most common indications for surgery were septic shock (n=53; 42%) and non-response to medical treatment (n=47; 37%). Median age was 72 years. In 110 patients (85%), colectomy was performed during the initial episode of CDI. CDI was hospital acquired in 107 patients (83%). Overall, 48 (37%) patients died within 30 days of surgery. Mortality increased with age (< 65 y: 23%; 65-74 y: 39%; ≥75 y: 46%, p=0.06) but was not influenced by the burden of chronic co-morbidities. Mortality was strongly correlated with preoperative lactate level (<2.1 mmol/L: 26%; 2.2-4.9 mmol/L : 48%; ≥5.0 mmol/L: 79%, p<0.001), pre-operative white cell count (<20.0 X 10<sup>9</sup>/L: 35%; 20-49.9 X 10<sup>9</sup>/L: 32%; ≥50.0 X 10<sup>9</sup>/L: 71%, p=0.02) and need for vasopressors pre-operatively (51% if on pressors, 27% if not, p=0.02).

**Conclusions:** The number of emergency colectomies per year for fulminant CDI increased 20-fold during the epidemic period. The risk of post-operative mortality can be predicted by measuring simple laboratory parameters. Post-operative mortality is as high as 71-79% in patients with CDI and a leukocytosis ≥50.0 or lactate ≥5.0. When possible, emergency colectomy should be performed prior to this stage.

#### C. difficile Colitis – Predictors of Fatal Outcome

(62)

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**Purpose:** C. difficile colitis (CDC) has a clinical spectrum ranging from mild diarrhea to fulminant, potentially fatal colitis. The pathophysiology for this variation remains



poorly understood. A total abdominal colectomy may be life-saving if performed before the point of no-return. Identification of negative prognostic factors is desperately needed for optimization of the clinical and operative management.

**Methods:** In-patients with CDC between 1999-2006 were identified through the discharge database (ICD-9: 008.45). Of these, patients with positive ELISA toxin or biopsy were included. Excluded were ELISA-negative patients. Data collected included general demographics, underlying medical conditions, APACHE II score, clinical and laboratory data, duration of the conservative treatment. Mortality and cure were the two endpoints. Regression analysis was used to identify parameters associated with mortality.

**Results:** 398 patients (mean age 59, range 19-94) with CDC were analyzed. 14 patients (3.52%) underwent surgery. Mortality in the cohort was 10.3% (41/398 pts). Patients with fatal outcome had a longer pre-CDC hospital stay (11 vs. 6 days). Mortality was significantly ( $p < 0.05$ ) associated with a higher APACHE II score, a higher ASA class, a lower diastolic blood pressure, pre-existing pulmonary and renal disease, use of steroids, evidence of toxic megacolon, higher WBCs, and clinical signs of sepsis and organ dysfunction (renal, pulmonary). Parameters without significant difference ( $p > 0.05$ ) included: patient age, albumin, clinical presentation/examination parameters, transplant status, other than the mentioned comorbidities. Of the 41 fatal outcomes, 5 patients (12.2%) underwent surgery, 36 did not (87.8%). Mortality rate of the surgical group was 35.7% (4 out of 14 patients). Comparison of the fatalities not undergoing surgery with the survivors revealed decreased clinical signs, suggesting a masking of the disease severity.

**Conclusions:** Our study identified several clinical factors which were associated with mortality from CDC. Future

clinical studies will have to focus on the disease progression and the fatalities occurring either without an attempt for or despite surgical intervention, as an earlier intervention might have proven life-saving.

#### Results with the Use of a Bioprosthesis for the Management of Parastomal Hernias (PH)

(63)

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**Purpose:** This study was undertaken to determine results with the use of a bioprosthesis for the management of PH.

**Methods:** With IRB approval, the medical records of all patients (pts) whose PH was managed with a bioprosthesis were reviewed with data collected regarding patient demographics, type of stoma, method of repair, postoperative complications and hernia recurrence.

**Results:** Between 4/04-9/07, 20 consecutive pts had 22 PH repaired using a bioprosthesis (Surgisis Gold (18 pts) and EXL (4 pts), Cook Surgical, Bloomington, IL). A colostomy or ileostomy was present in 17 and 5 pts respectively with the stoma present an average of 44 months (range 10-118 months). All patients had PH related complications including pouching difficulty (18 pts), obstruction of the stoma (8 pts), pain (8 pts) and incarceration (3pts) or strangulation (1 pt) of abdominal contents. The PH was repaired in all patients via a midline laparotomy with the bioprosthesis used as an underlay and the stoma entering the abdomen at the lateral edge of the bioprosthesis (Sugarbaker technique). A closed suction drain was routinely placed in the hernia sac at the last 12 procedures. There were 13 men and 9 women with an average age of 64 years (range 43-72 years). Postoperatively there were 4 seromas related to the bioprosthesis which required aspiration

#### S62 Parameters with significant differences between non-fatal and fatal outcome

PARAMETER	NON-FATAL	FATAL	p-value
Pre-existing conditions			
COPD	0.123	0.238	0.044
Renal insufficiency	0.179	0.381	0.002
Steroid use	0.207	0.429	0.001
Scores			
Apache II	6.1	8.1	0.002
ASA	3.0	3.5	<0.001
Presentation			
Toxic megacolon	0.017	0.071	0.024
WBC	12.489	15.902	0.03
Renal insufficiency	0.160	0.452	<0.001
Organ dysfunction	0.224	0.690	<0.001
Sepsis	0.022	0.167	<0.001
Respiratory failure	0.050	0.381	<0.001
Diastolic BP	68.9	61.7	0.009

in the 10 procedures (40%) performed prior to the routine placement of a drain. There were no postoperative intestinal obstructions, erosions or infections of the bioprosthesis. Recurrent PH occurred in 2 pts, both of which were felt to be due to inadequate overlap of the edges of the defect by the bioprosthesis. One of these pts had strangulation of a loop of small bowel requiring resection. Both recurrent PH were managed by repeat placement of a bioprosthesis. There were no PH appreciated on follow-up clinical exam at a median of 16 months (range 3- 38 months).

**Conclusions:** These data suggest that in the short term bioprosthetics are safe and effective for the repair PH. Additional clinical trials with a longer follow-up period and imaging studies to rule out occult hernias are needed to further investigate the role of bioprosthetics in the management of PH.

#### Reoperations after Stapled Hemorrhoidopexy

(64)

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..... Kiel, Germany

**Purpose:** From 1998 onward stapler hemorrhoidopexy is used for the treatment of prolapsing hemorrhoids. After introduction of this method severe complications were reported. We analysed all patients after this operation for reoperation.

**Methods:** Data of all patients operated in this new technique were collected prospectively, patients who had reoperations after the procedure were studied.

**Results:** From 1998 until 2005 969 patients (424 females, median age 53 y.) were operated. Follow-up information was available in all patients (median follow-up: 20 months). 110 patients (11.4%) had to have one or more reoperations. Early reoperations (<30 d.) were necessary in 40 patients (4.1%). Reasons: postoperative bleeding (18; 1.9%), thrombosed external hemorrhoid (4; 0.4%), dehiscence of the staple line (7; 0.8%), persistent skin tags/external prolapse (2; 0.2%), fecal impaction (2; 0.2%), necrosis (3; 0.3%), severe pain (2; 0.2%), abscess (1; 0.1%) und anal carcinoma in the operation specimen (1; 0.1%). Stapler related early reoperations were necessary in 38 patients (3.9%). Late reoperations (>30 d.) were performed in 76 patients (7.8%). Indication: persisting prolapse (1; 0.1%), recurrent prolapse (7; 0.7%), persisting skin tags/external components (15; 1.5%), thrombosed external thrombosis (4; 0.4%), abscess/fistula (10; 1.0%), fissure (6; 0.6%), perianal HPV-associated lesions (3; 0.3%), recurrent hemorrhoidal complaints (6; 0.6%), stenosis (4; 0.4%), sphincter repair (3; 0.3%), anal carcinoma in the operation specimen (1; 0.1%), perianal bleeding (1; 0.1%), mucous cyst in staple line (2; 0.2%), recurrent anal fibrosis (1; 0.1%), obstructed defecation syndrome (3; 0.3%), anal papilloma (10; 1.0%), rectal pro-

lapse (2; 0.2%), severe pain (1; 0.1%). Stapler related late reoperations in 50 patients (5.2%).

**Conclusions:** Reoperations after stapler hemorrhoidopexy are necessary in less than 12% of the patients. Part of these operations is caused by operations that were performed additional to the stapler procedure. Another part is caused by complications. Only in 38 patients (3.9%) reoperation was necessary for persistence or recurrence of hemorrhoidal prolapse/complaints.

#### Effectiveness of Biofeedback in Adults with Pelvic Floor Dysfunction

(65)

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**Purpose:** Pelvic floor dysfunction (PFD) affects up to 50% of those referred to tertiary centers with constipation. Biofeedback is the first line recommended treatment and is thought to relieve symptoms in at least 70% of patients. However, most trials evaluating biofeedback have been small uncontrolled trials. Biofeedback is time consuming and labour intensive. Faced with finite resources, it seems prudent to establish the effectiveness of biofeedback.

**Methods:** A systematic review of the effectiveness of biofeedback in adults with PFD was undertaken. Online databases and references of previous reviews were searched. Relevant articles were screened by two independent reviewers to select articles that fulfilled criteria for inclusion in the review.

**Results:** Seven randomised controlled trials fulfilled inclusion criteria. Two trials compared medical treatment with biofeedback, four trials compared different biofeedback protocols and one trial compared conservative and sham feedback with biofeedback. EMG (electromyography) feedback was most widely utilized. In general, trials were heterogeneous with varied inclusion criteria, treatment protocols and definition of successful treatment. Trial quality was poor with inadequate allocation concealment. Despite recognized quality of life issues and psychological morbidity, this was poorly studied. Meta-analysis of the studies involving any form EMG biofeedback compared with any other treatment demonstrated that EMG biofeedback conferred almost a five-fold increase in the odds of treatment success (summary odds ratio 4.8, 95% CI= 1.9 to 11.7, random effects model).

**Conclusions:** Although biofeedback is the recommended treatment for PFD, definitive randomized evidence is lacking. Meta-analysis demonstrated that EMG biofeedback is superior but this must be interpreted with caution due to heterogeneity of included trials. Well designed trials are needed to resolve this issue. Impact on quality of life and psychological morbidity should also be addressed.

### Reoperative IPAA Surgery – Factors Predictive of Success (66)

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**Purpose:** Restorative proctocolectomy and ileal pouch anal anastomosis (IPAA) is the current preferred surgical treatment of choice for most patients with ulcerative colitis. Complications of the ileal pouch may require additional operations to salvage or excise the pouch. The aims of this study were to review the results of reoperative IPAA surgery and to define any predictors of successful pouch salvage surgery.

**Methods:** The medical records of all patients who underwent reoperative ileoanal pouch surgery for either pouch salvage or pouch excision between 1991-2007 were reviewed. Successful ileoanal pouch salvage was considered to be an intact functioning pouch, with good to excellent patient satisfaction and continence.

**Results:** 73 patients underwent reoperative IPAA surgery, 59 for attempted pouch salvage and 13 for pouch excision. Sixteen patients had pouch reconstruction, 8 of which were successful (50%); 13 patients had pouch advancement, with a 69% success rate; 9 patients underwent gracilis interposition with a 33% success rate. and 37 had local perianal procedures for control of perianal sepsis, with an 81% success rate, although 9 of these patients required further surgery. The overall success rate for ileoanal pouch salvage surgery was 78%, after a mean of 2.8 procedures. There was no correlation between the number of ileoanal pouch salvage procedures and failure. All 13 patients who underwent primary pouch excision were ultimately diagnosed with Crohn's disease. Among the patients who underwent pouch excision after attempts at pouch salvage six (46%) were ultimately diagnosed with Crohn's disease.

**Conclusions:** Ileoanal pouch salvage surgery is often successful although pouch advancement or local perianal repair yielded better results than did pouch reconstruction. Patients diagnosed with Crohn's disease after ileoanal pouch construction may be best suited for pouch excision.

### Vaginal Delivery Compared with Elective Caesarean Section: The Views of Pregnant Women and Clinicians (67)

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**Purpose:** Concern about maternal morbidity associated with vaginal delivery (VD) may be driving the increasing trend for elective caesarean section (CS). This study aimed to quantify the risk of morbidity from VD that pregnant women would be prepared to accept before requesting an elective CS, being aware of the potential complications associated with the procedure and to compare these views with those of clinicians.

**Methods:** Primiparous women completed an interviewer-administered questionnaire to ascertain the maximum level of risk they would be prepared to accept before opting for an elective CS, for each of 18 potential complications of VD. Clinicians completed a self-administered version of the questionnaire. Utility scores for each complication were calculated, with higher scores indicating a preference towards vaginal delivery.

**Results:** One hundred and two women (mean gestation 22 weeks), 84 midwives, 166 obstetricians, 12 urogynaecologists and 79 colorectal surgeons participated. For the evaluated 18 potential complications of VD pregnant women were willing to accept higher risks than clinicians. Pregnant women were least accepting of risks of severe anal incontinence (mean utility score 0.32), severe urinary incontinence (0.51), moderate anal incontinence (0.56), emergency CS(0.59), vaginal prolapse (0.71) and third and fourth degree tears (0.72) The views of midwives were closest to those of pregnant women. Urogynaecologists and colorectal surgeons were the most risk averse, with 42% and 41% respectively stating they would request an elective CS for themselves or their partners.

**Conclusions:** Pregnant women were able to quantify the level of risk they are prepared to accept from a vaginal delivery before opting for an elective CS being aware of the potential complications of elective CS, and these risks were significantly higher than those accepted by the clinicians involved in their care. Pregnant women's views are more closely aligned to midwives than to specialist clinicians.

### Laparoscopic Anterior Rectopexy for External and Internal Rectal Prolapse (68)

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**Purpose:** Classical posterior rectopexy has been shown in randomised trials to cause rectal autonomic denervation. It is thus suboptimal for external prolapse (EP) and contra-indicated for internal prolapse (IP), because 50% of patients complain of worsened constipation postoperatively. Minimally invasive surgery is in randomised trials demonstrably superior to open prolapse surgery. We aimed to evaluate the advantages of combining a laparoscopic approach with an autonomic nerve-sparing anterior rectopexy for EP and IP.

**Methods:** EP patients since Dec 2003 and IP patients since Aug 2005 were operated (technique as described by D'Hoore and Penninckx BJS 2004) and prospectively analyzed. Endpoints were recurrence, changes in Wexner constipation score and Faecal Incontinence Severity Index, and length of stay. Quantitative data were expressed as median and range. Analysis was performed using Mann-Whitney U test for unpaired data and Wilcoxon signed rank test for paired data (two-sided p test).

**Results:** 160 patients underwent laparoscopic anterior rectopexy (EP 85, IP 75). EP patients (med. 72 yrs, 16-93 yrs) were older than IP patients (med. 58 yrs, 25-88 yrs) (diff. in med. 14 yrs, 95%CI 9-19 yrs), and median follow up was longer (29 v 12 mns). There were 6 recurrences requiring reoperation (EP 2%, IP 5%). There were no deaths, complications were seen in 14 patients (9%) and median length of stay was 2 days. Postoperatively improvements in EP were similar to those seen in IP: constipation improved in EP (med. Wexner 9 to 4,  $p < 0.0001$ ) and IP (median Wexner 12 to 4,  $p < 0.0001$ ). Incontinence improved in EP (med. FISI 37 to 2,  $p < 0.0001$ ) and IP (med. FISI 28 to 8,  $p < 0.0001$ ). No patients experienced deterioration in function.

**Conclusions:** Laparoscopic anterior rectopexy combines the advantages of minimally invasive prolapse surgery with an anterior nerve-sparing dissection. It safely allows the great majority of EP patients the efficacy of an abdominal approach, and improves constipation without inducing new-onset constipation. The excellent functional results in EP allow it to be employed for IP causing obstructed defaecation.

#### The Community Prevalence of Fecal Incontinence: A New Zealand Cross-Sectional Study

(69)

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**Purpose:** The prevalence of fecal incontinence in the community is underestimated. Previous studies have been flawed by inconsistent definitions, selection bias, unvalidated surveys and problematic methodology. The purpose of this study was to conduct a nationwide cross-sectional survey to estimate the prevalence of fecal incontinence in the New Zealand community. Assessment of symptom severity, quality of life, risk factors and medical care seeking behavior was also made. The study also set out to examine the ethnic differences in prevalence between Non-Maori and the indigenous Maori people, who have been shown to have inequalities in other health outcomes.

**Methods:** The survey was conducted using a validated, reliability-tested, anonymous questionnaire, the Complete Fecal Incontinence Questionnaire (CFIQ), incorporating the Fecal Incontinence Severity Index (FISI) and the Fecal Incontinence Quality of Life Scale (FIQLS). It was sent by mail to 4200 individuals from all areas of New Zealand, over the age of 18, randomly selected from the national electoral roll. The sample population was stratified for age and ethnicity.

**Results:** The overall response rate was: 58.9%. The response rates for Non Maori and Maori were 60.6% and 43.1% respectively. Fecal incontinence was defined as the involuntary loss of solid or liquid stool at least 1-3 times a month. The overall prevalence was 12.6% (10.7-14.5) 95%CI. The rate for Non Maori was 12.3% (10.4-14.1) com-

pared with 17.1% (14.6-19.5) for Maori, with a difference in rates of 4.8%,  $p$ -value (0.0016). When asked directly 14.4% (12.4-16.5) of participants stated that they felt they had a "problem with bowel control." For this group the average FISI score was 15.5 (14.3-16.7) compared to 8.8 (8.5-9.1) in those with no problem.

**Conclusions:** This is the largest cross-sectional study designed specifically to look at fecal incontinence using a validated assessment tool. These national results are applicable to other westernized communities around the world. The prevalence of fecal incontinence in New Zealand is higher than previously reported. It is the first study to investigate ethnic differences in incontinence rates and has demonstrated a difference between Non-Maori and Maori.

#### Sacral Nerve Neuromodulation is Effective Treatment for Fecal Incontinence in the Presence of a Sphincter Defect or Previous Sphincter Repair

(70)

R. Brouwer, G. Duthie . . . Cottingham, United Kingdom

**Purpose:** To assess the medium term results of sacral nerve stimulation for faecal incontinence and determine whether it is an effective technique in the presence of a sphincter defect on ultrasound or if there has been a previous sphincter repair.

**Methods:** This paper presents the results of a prospective collection of Cleveland Clinic continence scores, Faecal Incontinence Quality of life scores and SF-36 scores in all patients undergoing insertion of a permanent sacral nerve neurostimulator for faecal incontinence.

**Results:** Between 2001 and 2006, 55 patients underwent insertion of a sacral nerve neurostimulator for faecal incontinence in our institution. There were 52 female and 3 male patients, with a mean age of 51 (range 25 - 65) years and a median follow-up of 37 (range 15 - 41) months. There was a significant improvement in the median Cleveland Clinic continence score for all patients, from a median of 15 (13-18) before insertion of the neurostimulator, to a median of 5 (3-6) after insertion of temporary wires and a median of between 4 - 7 during the follow-up period of up to 48 months. ( $P < 0.001$  to 0.008). Patients with a sphincter defect on endoanal ultrasound, with a pudendal neuropathy and with a previous sphincter repair did not show any significant differences in continence scores compared with those without these three variables over the follow-up period ( $P = 0.46$ , 0.25 and 0.81 respectively). The Faecal Incontinence Quality of Life Score (FIQL) also showed a significant improvement in all four scales (Lifestyle, Coping/Behaviour, Depression/Self-perception and Embarrassment) after insertion at all time intervals up to 36 months. The FIQL score was higher than the baseline at 48 months but only statistically significant for Lifestyle ( $P = 0.04$ ) and Coping/Behaviour ( $P = 0.03$ ) scores. There were eight minor device related complications, two involving the



battery and 4 involving electrodes. One device was explanted due to infection.

**Conclusions:** Sacral nerve neuromodulation results in a significant improvement in faecal incontinence and FIQL scores after medium-term follow-up, even when there is a sphincter defect or previous sphincter repair.

#### Sacral Nerve Stimulation in Fecal Incontinence: Results 5 Years after Implant

(71)

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 . . . . Bari, Italy; Rome, Italy; Vercelli, Italy; Verona, Italy; Milano, Italy

**Purpose:** Sacral Nerve Stimulation (SNS) is a valid option to treat patients with fecal incontinence (FI). Implant procedure is safe and non-invasive, and clinical effectiveness is maintained at medium-term period. However, long-term results are still unknown.

**Methods:** Thirty-two patients (22 females, mean age:  $61 \pm 12$  yrs.) were treated with definitive SNS implant for FI due to idiopathic neuropathy (16 pts.), traumatic neuropathy (3 pts.), neurological disease (3 pt.), anal sphincter lesion (5 pts.), or rectal resection+chemoradiotherapy (2 pts.). All patients were re-evaluated at minimum 5-year follow up (mean FU:  $68 \pm 8$  months; range: 60-91 months) with diary, Wexner's FI score and anorectal manometry.

**Results:** At long-term follow up, patients had significantly decreased mean number of major FI episodes and Wexner's score when compared to baseline (from  $15.3 \pm 4.7$  to  $0.5 \pm 1$ ,  $p=0.01$ , and from  $115.8 \pm 3.6$  to  $4.8 \pm 4.4$ ,  $p=0.001$ , respectively). A significantly increased functional anal canal length was recorded at anorectal manometry (from  $2.3 \pm 0.8$  cm to  $2.7 \pm 0.9$  cm,  $p=0.04$ ), while other manometric parameters did not change significantly

**Conclusions:** Long-term follow up of patients treated with SNS for FI confirmed that therapeutic effectiveness is maintained. This should improve patient's quality of life.

#### Improving the Efficacy of Sacral Nerve Stimulation for Fecal Incontinence by Alteration of Stimulation Parameters

(72)

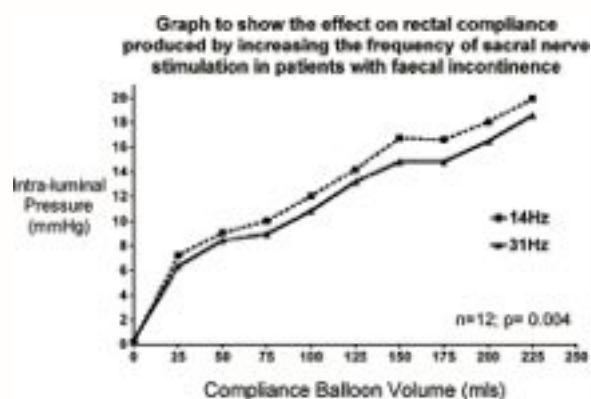
T. Dudding, A. Gibbs, C. Vaizey, M. Kamm . . . . Harrow, United Kingdom

**Purpose:** Rectal compliance is of functional importance in maintaining continence. Sacral nerve stimulation (SNS) has been shown to alter compliance in patients with faecal incontinence (FI), however, the parameters used for SNS have remained fixed with time (Frequency, 14Hz; Pulse Width, 210µsec). This study aimed to determine the effects of altering frequency and pulse width, on rectal compliance and clinical efficacy, in patients undergoing chronic SNS.

**Methods:** 12 patients were prospectively studied. All had undergone chronic SNS for >6 months and had demonstrated a >50% reduction of incontinent episodes with therapy. Rectal compliance was measured using a rectal barostat. Parameters were changed in a random sequence to avoid an order effect. The patient and main investigator were blinded to each change of setting. Frequency was increased to 31Hz and decreased to 6.9Hz; Pulse width increased to 450µsec and decreased to 90µsec. The parameter that produced the greatest increase in compliance was deemed the 'optimal' setting. A two-week bowel habit diary, St Mark's continence score (SMCS) and ASCRS FI quality of life (FIQL) score were completed before and after testing.

**Results:** Compared to standard settings (14Hz; 210µsec), a significant increase in rectal compliance occurred with high frequency (31Hz;  $p=0.004$ ) and low pulse width (90µsec;  $p=0.007$ ) stimulation. Low frequency or high pulse width stimulation did not alter compliance. In 11 patients the optimal setting was 31Hz in one patient 90µsec. With optimal settings, total episodes of incontinence were reduced from a median (range) of 7 (0-15) to 2.5 (0-11;  $p=0.050$ ) episodes per fortnight, incidence of faecal urgency reduced from a median of 18% (0-100) to 3% (0-52;  $p=0.070$ ) of all evacuations, soiling reduced from 6 (0-14) to 3 (0-14;  $p=0.039$ ) days per fortnight and SMCS reduced from 12 (6-18) to 8 (0-16;  $p=0.008$ ). There was no significant change in the FIQL subsets of lifestyle ( $p=0.844$ ), depression ( $p=0.375$ ) and embarrassment ( $p=0.098$ ) but significant improvement in coping/behaviour ( $p=0.004$ ).

**Conclusions:** A pulse frequency of 31Hz increases rectal compliance and improves clinical efficacy in those undergoing SNS for FI.



#### The Treatment and Outcomes of Peritoneal Tumors through a Centralized National Service

(73)

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**Purpose:** Aggressive loco-regional treatment of secondary peritoneal surface malignancy with combined cytoreductive

surgery (CS) and heated intraperitoneal chemotherapy (HIPEC) may improve disease-free and survival rates. To better understand patient selection and outcome prediction, we analysed 5-year results in all patients to one of two centralised treatment centres (UK).

**Methods:** A prospective database of patients referred to the peritoneal tumour service from 2002 to 2007 was analysed. Outcome analyses were performed using the Kaplan-Meier method using the date of first treatment at our centre as time zero. Potential predictors were compared using the log-rank test.

**Results:** All 268 referrals were considered by a dedicated MDT and patients were tracked on specific pathways. 75 (28%) were referred back, 111 (41%) underwent major surgery [CS and HIPEC: 70 (26%), debulking surgery: 41 (15%)], 67 (25%) joined a trial of systemic (mainly MCap) chemotherapy, 23 (8.5%) were actively monitored; and 19 (7%) are awaiting further management. Several patients were managed on multiple treatment pathways coordinated through the PTS dedicated multi-disciplinary meeting. 70 patients had CS and HIPEC [F: M = 51:19; mean age = 53 (range 17 - 76) years]. There was no 30-day mortality, 7 late deaths were identified; 4 due to disease progression, 3 were unrelated to disease. Major complications occurred in 5 (17%) patients; minor complications in 17 (24%). The 3-year cancer-related survival was 85%; 3-year disease-free rate was 62%. The extent of cytoreduction predicted for disease outcome: 3-year recurrence-free rates for complete versus incomplete cytoreduction were 63% and 56%, respectively.

**Conclusions:** The introduction of national referral centres for treatment of this rare disease has allowed refinement of techniques to achieve internationally recognised results and standards of care. CS and HIPEC appear to achieve beneficial survival and disease-free rates with acceptable morbidity. Such techniques can be translated to peritoneal metastases from more common cancers.

#### The National Bowel Cancer Audit Project: The Impact of Organizational Structure on Outcome in Operative Bowel Cancer within the United Kingdom

(74)

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**Purpose:** To investigate the relationship between organisational structure and surgical outcomes for bowel cancer within Hospital Trusts in the United Kingdom (UK).

**Methods:** An e-survey was sent to colorectal surgeon members of the Association of Coloproctology to determine the organisational structure of their Trusts. Responses were combined with the 2006-7 National Bowel Cancer Audit (NBOCAP) data. Items investigated included; number of consultants, number of operative cases, intensive care facilities and number of nurse specialists. Surgical outcomes

included 30-day risk-adjusted mortality, lymph node yield and circumferential margin involvement (CRM).

**Results:** One hundred and seventeen Trusts responded (65.8%), matched to 7,666 patient episodes (NBOCAP data) from 54(62.8%) Trusts who submitted data to the audit. Trusts treating <190 cases/annum ( $p>0.001$ ), <4 colorectal consultants ( $p>0.001$ ), <4 HDU beds ( $p>0.001$ ) and <8 ITU beds ( $p>0.001$ ) were more likely to have a 30day-risk-adjusted mortality twice that of the national mortality. Sixty five percent ( $n=1603$ ) of Trusts treating  $\geq 190$  cases/annum harvested  $\geq 12$  lymph nodes vs. 58.3% ( $n=1435$ ) in Trusts <190 cases/annum ( $p<0.001$ ). Trusts with  $\geq 2$  pathologists with an interest in bowel cancer harvested  $\geq 12$  lymph nodes more frequently ( $p<0.001$ ) and were more likely to identify extramural vascular invasion in the specimen ( $p=0.015$ ). Negative CRM was achieved in 81.4% ( $n=814$ ) of patients in Trusts treating  $\geq 190$  cases vs. 66.5% ( $n=569$ ) in Trusts <190 cases/annum ( $p<0.001$ ). Surgeons treating  $\leq 35$  cases/annum had increased major post-operative complications (<35 cases=70.2% vs.  $\geq 35$  cases=21.9%;  $p<0.001$ ), however 30 day risk adjusted mortality and abdomino-perineal resection rates in rectal cancer were not increased in surgeons treating <35 cases/annum.

**Conclusions:** The organisational infrastructure of hospitals appears to have a greater impact on patient surgical outcomes than the volume of cases performed by the individual surgeon.

#### Developing a Research Agenda for the American Society of Colon and Rectal Surgeons; Results of a Delphi Approach

(75)

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**Purpose:** Focusing research efforts in colorectal surgery on those areas most likely to have a major impact on clinical care is an important challenge for both researchers and their funding agencies. Clinicians working in colorectal surgery are in the best position to identify the key gaps in knowledge which affect their daily practice. The aim of this project is to use an organized and systematic approach to reach a wide sample of colorectal surgeons and achieve a consensus on identifying such key proposals.

**Methods:** A modified Delphi process is planned using an iterative and anonymous Web-based survey. In round 1, research questions were solicited from the general membership of ASCRS. A review group categorized the results, combined similar questions and discarded those supported by only one member. The resulting questions were rewritten in a common format and will be presented to the membership of the ASCRS in round 2 for scoring according to their opinion on the priority of the research question. In round

3, the 40 questions which had the highest mean scores in round 2 will be presented again to the membership of the ASCRS for re-analysis according to their priority.

**Results:** The project is ongoing and results will be available for the annual meeting of the American Society of Colon and Rectal Surgeons.

**Conclusions:** The questions generated will provide a research agenda which reflects the topics of greatest importance to practicing colorectal surgeons, where further knowledge is most likely to influence patient care. Identifying key gaps in current understanding of colorectal surgery is relevant and beneficial to researchers, funding organizations, editors of medical journals and their reviewers, and, ultimately, patients.

### The Impact of an Aging Population on the Demand for Colorectal Services

(76)

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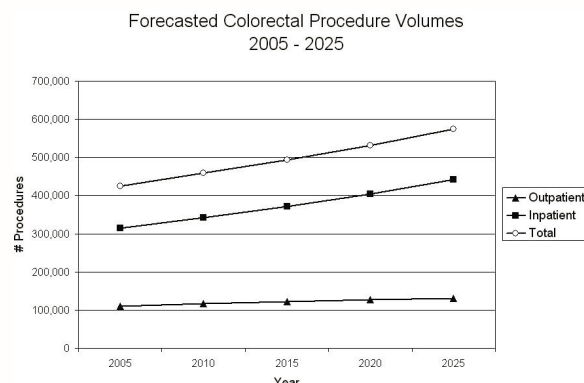
**Purpose:** With the baby boomers about to enter retirement age, the US population is seeing a dramatic increase in the number of elderly individuals. This shift will engender a changing profile of demand for surgical services, especially those used primarily by older patients. We hypothesized that over the next 20 years that the demand for colorectal procedures will far exceed overall population growth.

**Methods:** We used the 2005 Nationwide Inpatient Sample and the Florida State Ambulatory Surgery Database as source data. From these two data sources, we used ICD codes to identify all commonly performed inpatient (including colon/rectal resection, small bowel resection, ostomy creation, ostomy revision) and outpatient colorectal procedures (including hemorrhoidectomy, local anal excisions, fistulotomy, internal sphincterotomy), as well as associated diagnoses (including colon cancer, rectal cancer, diverticular disease, inflammatory bowel disease). These rates were calculated within 4 age groups (18-44, 45-64, 65-74, 75+ years old), then combined with census projections from the US Census Bureau in order to generate projected volumes for the selected procedures and diagnoses.

**Results:** Between 2005 and 2025, the US population is expected to grow by 18%, with disproportionate growth in individuals aged 65-74 (92% increase) and those aged 75+ years old (54% increase). Based on these forecasts, growth in outpatient procedures will be 20%, with a 22% growth in hemorrhoid excision and a 16% increase in local excisions. The growth in inpatient procedure volume will be over 40%. Inpatient operations for colon cancer (50% increase) and rectal cancer (45% increase) show the greatest growth.

**Conclusions:** Over the next two decades, demographic changes in the US population will lead to a marked increase in the use of colorectal surgical services, especially inpatient and oncologic procedures. The ability of the surgical work-

force to meet this projected growth in demand should be assessed. Surgeons need to develop strategies to manage increased inpatient procedural volume in a way that ensures quality of care.



### Surgical Site Infections (SSI) in a National Surgical Quality Improvement Program (NSQIP) "High Outlier" Institution: Are Colorectal Surgeons to Blame?

(77)

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. . . . . Cleveland, OH

**Purpose:** NSQIP has successfully used risk-adjusted outcomes to improve the quality of surgical care. In 2006, NSQIP deemed our hospital a "high outlier" for SSI as the rate of observed SSI was 1.7 times expected. We hypothesized that (1) our site had a greater percentage of colorectal cases than the national database (2) colorectal patients had a higher rate of SSI (3) analysis of this subset could detect risk factors for SSIs which may differ from those identified in the national database.

**Methods:** Using our 2006 hospital NSQIP database, 69 patient characteristics, laboratory values, and intra-operative factors, in cases with and without SSI within 30 days of surgery, were analyzed using logistic regression analysis. "Colorectal" was defined as patients undergoing abdominal colon, rectal, and small bowel procedures involving intestinal resection by a colorectal surgeon, appendectomy was excluded.

**Results:** Of 1,646 total patients at our site, 458 (28%) patients were colorectal (280 colon/rectum and 178 small bowel), in contrast to 20,773 (18%) colorectal patients in the national database of 113,891 patients ( $p < 0.001$ ). Our overall SSI rate was 9.4% (13.8% colorectal and 7.7% non-colorectal,  $p < 0.001$ ). Patient-related risks for SSI in colorectal cases were age  $> 55$ , pre-operative infection, hematocrit  $< 38$ , ASA 3 or 4 (all,  $p < 0.05$ ). Procedure-related risks were emergency operation, wound class  $> 1$ , intraoperative transfusion, operation  $> 180$  min (all,  $p < 0.05$ ). Of these factors, only ASA and emergency operation were used in the national NSQIP risk-adjustment model of SSI in 2006. Appropriate pre-operative antibiotics were delivered on-time in 83% of cases.

**Conclusions:** Our status as a NSQIP “high-outlier” for SSI is due to the disproportionately high percentage of colorectal cases at our site. Further analysis identified unique SSI risk factors in this subgroup; most are not amenable to modification. While efforts are being directed toward improving compliance with process measures, colorectal surgery may require further risk-adjustment for SSI due to the nature of the operations and inherent risk of SSI.

#### The Incidence of Clostridium Difficile in Colorectal Surgery

(78)

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**Purpose:** There has been increased interest in hospital-acquired infections, in particular Clostridium difficile (C. difficile) recently. Our aim was to review the incidence of C. difficile within the adult in-patient population presenting to a University Hospitals Trust and the impact upon the Colorectal Surgical Service over a 7-year period (2000-2006 inclusive).

**Methods:** Cross-referencing Medical Microbiology, Pathology and Surgical Audit databases identified in-patients, from the four main hospitals within the Trust, diagnosed with C.difficile. Retrospective analysis of prospectively collected outcome data was then performed.

**Results:** 41,356 faecal samples were tested over the 7-year period. 15% (6325) of faecal samples tested were toxin positive, via ELISA, for C. difficile. 3895 patients were diagnosed with Clostridium difficile associated disease (CDAD). 7.6% (296) of patients diagnosed with CDAD were treated by the Colorectal Surgical Unit only 23 patients underwent surgery. A detailed analysis is demonstrated below.

**Conclusions:** Over the 7-year study period, there has been an exponential increase in the number of faecal samples and consequently the number of patients tested for and diagnosed with CDAD. Despite the proportion of colorec-

tal patients, compared with the total number of patients, treated for CDAD each year not appreciably increasing. The number of individual in-patients treated conservatively for CDAD by the Colorectal Surgical Service has markedly increased impacting on the overall burden of the Colorectal Surgical Unit.

#### Death after Bowel Resection: Patient Disease, Not Surgeon Error

(79)

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 . . . . . Burlington, VT

**Purpose:** Although bowel resection is associated with a significant mortality rate, little is known about the demographics of these patients and how often surgical error is the primary cause of death. We sought to use a rigorous prospective quality database incorporating standardized peer review, to define how often patients die from surgeon error.

**Methods:** All pts undergoing bowel resection with anastomosis at a university hospital from 7/03-6/06 were entered into a prospectively maintained quality database. Pts were seen daily with housestaff by a specially trained nurse practitioner who recorded demographics and complications. Clinical case reviews were conducted monthly on all pts who suffered a complication or death by a team of GI surgeons and ascribed to either pt disease, provider related or a combination.

**Results:** 566 pts underwent one or more bowel resections with anastomosis during the study period. 193 pts suffered at least one complication (34.1%) and there were 20 deaths (3.5%). 18 of the deaths occurred following urgent/emergent surgery (Table 1). In 17 cases, death was deemed unavoidable due to pt disease; most occurred in patients who developed ischemic bowel while hospitalized for a serious concomitant illness. In 2 cases, potentially avoidable complications may have played a role in the pt's demise. In only one case, a leak after en bloc colectomy at the time of gastrectomy for cancer, did death appear clearly related to a surgical complication (0.17%).

#### S78

Year (12 months analysis period)	Number of Faecal Samples Tested	Number of C. difficile positive samples	Number of C. difficile positive patients	Number of C. difficile positive Colorectal patients	Number of patients who underwent surgery.
2000	532	150	98	4	1
2001	1185	273	175	26	5
2002	3767	653	463	35	0
2003	6833	980	612	45	2
2004	6600	998	687	49	5
2005	7841	1237	806	53	5
2006	14598	2034	1054	84	5



**Conclusions:** Complications are relatively common after bowel resection and anastomosis. However, death, as an outcome, typically reflects the need for urgent surgery in a pt undergoing surgery under dire circumstances. Surgical error is rarely responsible for pt death in this population.

**S79 Table 1: Indications for surgery in patients who died after bowel resection.**

Ischemic bowel	12
Malignant obstruction	3
Perforated carcinoma	1
Other	4

### Model for End-Stage Liver Disease (MELD) in Predicting Postoperative Mortality in Patients Undergoing Colorectal Surgery: Does the Risk Outweigh the Benefit?

(80)

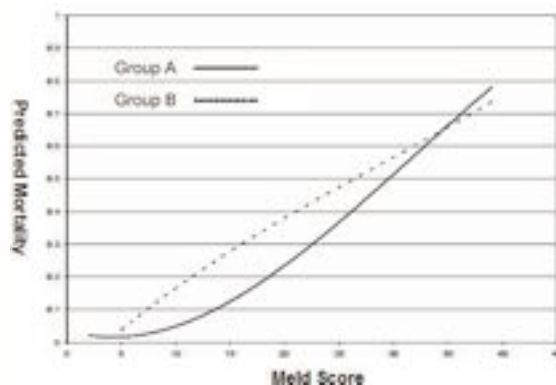
T. Hedrick, B. Swenson, C. Friel . . . . Charlottesville, VA

**Purpose:** The Model for End-Stage Liver Disease (MELD) score was previously shown to predict perioperative mortality in patients with cirrhosis undergoing a variety of nontransplant surgical procedures. We sought to determine the usefulness of this model in predicting postoperative mortality in patients undergoing colorectal procedures.

**Methods:** National Surgical Quality Improvement Program data were gathered for patients undergoing colorectal procedures (CPT codes 44005 through 45563) during 2005 and 2006 at participating centers. The preoperative MELD score was calculated using preoperative values of INR, creatinine, and bilirubin. Logistic regression modeling was employed to predict 30-day mortality using the preoperative MELD score.

**Results:** A total of 12,033 patients met study inclusion criteria (Group A). Of these, 635 also had ascites or esophageal varices (Group B). Overall 30-day mortality was 5.5% and 22.8%, respectively in Group A and Group B. For both groups, MELD was an independent predictor of mortality [1.14 (1.12 – 1.16),  $p \leq 0.001$  and 1.11 (1.07-1.16),  $p \leq 0.001$ , respectively]. (Figure 1)

**Conclusions:** The MELD score is an independent predictor of mortality in patients undergoing colorectal procedures. These prognostic data can be used to assign risk prior to colorectal surgery and may assist in clinical decision making. This is particularly true in patients with sequelae of liver disease, including ascites or esophageal varices, who have a high perioperative mortality.



### Colorectal Fellowship Training Across the Tripartite: How Does Operative Experience Compare?

(81)

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**Purpose:** Specialization in colorectal surgery has resulted in an increased demand for tertiary training across the tripartite countries. This study aims to compare the operative experience obtained during colorectal fellowship positions at leading tertiary colorectal institutions in Australia, the United Kingdom, and North America.

**Methods:** This descriptive study assessed the operative logbooks of three colorectal surgery fellows in three institutions: St. Vincent's Hospital (SV), Melbourne, St. Mark's Hospital (SM), London, and the Cleveland Clinic Foundation (CCF), Cleveland. A combined total of six fellowships were undertaken, two at each institution. The numbers were scaled to obtain a total of two years experience from each center. Cases were grouped as Anorectal, Colonic, Rectal (primary and revisional), Ileal pouch surgery (primary and revisional), Small bowel including enterocutaneous fistulas (primary and revisional), Stoma, Laparoscopic, Endoscopic, and Others.

**Results:** The mean total operative experience for each institution was 305 cases including: SV 335; SM 274; CCF 306. The case distribution was; Anorectal (SV 118; SM 128; CCF 57), Colonic (SV 37; SM 18; CCF 43), Rectal (primary and revisional) SV 65; SM 27; CCF 55), Ileoanal pouch surgery (SV 9; SM 13; CCF 26), Small bowel procedures including enterocutaneous fistula (SV 21; SM 23; CCF 20), Stoma procedures (SV 43; SM 36; CCF 43), Laparoscopic procedures (SV 16; SM 9; CCF 36), and Others (SV 29; SM 22; CCF 27). The mean number of endoscopic procedures was 104 (SV 174; SM 13; CCF 126).

**Conclusions:** The operative experience obtained during fellowship training was similar in the three units across the three continents both in quantity and content. The differences reflect the various interests of the individual surgeons and departments.

### Laparoscopic Colorectal Resections: A Long Learning Curve (82)

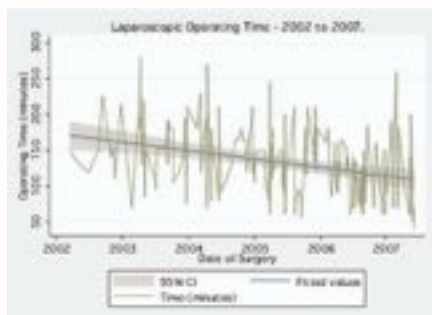
G. Makin, M. Muhlmann, M. Ballal, C. Platell  
 . . . . . Perth, WA, Australia; Southport, United Kingdom

**Purpose:** Laparoscopic colorectal resections have a significant learning curve, shown previously to be between 30-80 cases. There is increased morbidity with these initial cases. The aim of this study was to show that laparoscopic resections can be introduced safely and to determine when proficiency is reached.

**Methods:** A prospective study of 200 consecutive laparoscopic right hemicolectomies (RH) and anterior resections (AR), by a single colorectal specialist (GBM), was undertaken between 2002 and 2007. Outcome measures included mortality, conversion, return to theatre and operative time. Results overall and in the two sub-groups (RH and AR) were compared in blocks of 25 consecutive cases. Statistical analysis was performed using t-test, Chi square, linear regression, ANOVA and MANOVA.

**Results:** 100 RH and 100 AR operations were performed. Average age was 64 years, male to female ratio of 101:99 and median ASA of 2. Overall mortality, conversion and return to theatre rates were 1, 3 and 3.5% respectively. For RH these were 1, 2 and 1% and AR 1, 4 and 6% respectively. There was no statistical difference between the start and end of the study in overall mortality, conversion and return to theatre rates (p value 0.57, 0.33 and 0.43 respectively). Average overall operative time for RH was 96 minutes and for AR was 168 minutes. There was a statistically significant decrease in operative time overall and in both groups over the period of the study. ([ RH 116 min to 70 min, p value <0.001] [AR 189 min to 154 min, p value 0.003]). Multiple analysis of variance (MANOVA) showed both RH and AR operative time curves reduced at equal rates. Operating time did not plateau over the study period (Graph 1).

**Conclusions:** Laparoscopic colorectal resections can be introduced safely by a well-trained colorectal surgeon. The rates of mortality, conversion and return to theatre are very low, even in the early stages of the learning curve. There was a significant decrease in operation time. The rate of reduction is equal for both RH and AR, despite the latter traditionally being regarded as more challenging to learn. The learning curve continues beyond 200 cases, as a plateau effect has not been demonstrated.



Graph 1: Linear regression analysis of operating time

### Laparoscopic and Open Elective Colonic and Rectal Resection: A Comparison of Outcomes in English NHS Trusts Between 1996 and 2006 (83)

O. Faiz, R. Kennedy, J. Warusavitarne, A. Bottle, P. Tekkis, A. Darzi, P. Aylin . . . . . Middlesex, United Kingdom; Sydney, NSW, Australia; London, United Kingdom

**Purpose:** To use the English NHS Hospital Episode Statistics (HES) database to compare national outcomes following elective laparoscopic (LAP) and conventional colorectal surgery over a ten-year period.

**Methods:** All elective colonic (segmental and total colectomy) and rectal (anterior resection, APR, proctocolectomy +/- pouch) resections carried out in English NHS Trusts between 1996 and 2006 were included. Univariate and multivariate analyses were used to compare 30 and 365-day-mortality rates, 28-day readmission rates and length of stay between LAP and open surgery groups across three diagnostic categories (IBD, diverticular disease, malignancy).

**Results:** Between the study dates 192620 elective colonic or rectal resections were carried out. 3709(1.9%) cases were LAP procedures. Mortality was lower after LAP colonic resection compared to open surgery in Diverticular Disease (DD) (0.0% vs. 1.9%, p=0.011 at 30 days, and, 0.7% vs. 4.7%, p=0.015 at 365-days) and malignancy (1.8% vs. 3.4%, p=0.004 at 30-days, and, 7.3% vs 14.1%, p<0.001 at 365-days). Mortality was also lower following LAP rectal resection in DD (0.0% vs. 2.7%, p=0.050 at 30-days, and, 0.0% vs. 5.2%, p=0.048 at 365-days) and malignancy (2.2% vs. 3.3%, p=0.043 at 30-days, and, 6.1% vs. 12.0%, p=<0.001 at 365-days). Median hospital stay was at least 3 days shorter in all diagnostic categories following LAP colonic and rectal resection (p<0.001). Logistic regression models that corrected for age, gender, comorbidity and social deprivation demonstrated that LAP surgery was a strong determinant of reduced 30-day (OR:0.57, 95% c.i:0.44-0.74, p<0.001) and 1-year (OR:0.53, 95% c.i:0.42-0.67, p<0.001) mortality. Similarly, multivariate analysis confirmed that LAP surgery significantly reduced hospital stay (p<0.001). Rectal procedures carried out for malignancy were more likely to be readmitted if performed by LAP rather than by a traditional method (11.9% vs. 9.1%, p=0.003). Readmission rates were similar, or favoured LAP, for colorectal procedures performed for other major diagnoses.

**Conclusions:** HES data suggest that laparoscopic colorectal surgery reduces the risk of death by approximately forty percent.

# A National Comparison of Laparoscopic versus Open Colectomy using the Non-VA NSQIP Data

(84)

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 ..... Cleveland, OH; Grand Rapids, MI

**Purpose:** The recent introduction of the National Surgical Quality Improvement Project (NSQIP) outside of the Veterans Administration (VA) provides a consistent sampling process to evaluate the relative benefits of LC and OC. We assess the preoperative risk factors and the postoperative complication rates in non-VA general hospitals in the United States using the standardized NSQIP data elements and a sampling process with 30 day follow-up.

**Methods:** All patients included in the nationally reported NSQIP database from 12/1/05 thru 9/1/2007 undergoing segmental colectomy via LC approach (44204) and OC (44140) were evaluated. The data collected was defined by the NSQIP audit process.

**Results:** We analyzed a total of 4719 OC procedures and 2728 LC procedures. The BMI's were similar for LC and OC groups ( $27.9 \pm 5.8$ ;  $28.0 \pm 7.2$ ). The OC group had significantly higher rate of diabetes (16% v 12%), smoking (18% v 15%), dyspnea (14% v 9%), COPD (7% v 4%), CHF (2% v .6%); MI <6 mos (.9% v .4%) and hypertension (54% v 50%). The rate of all perioperative complications were higher in the OC group: mortality (4.9% v .8%), SSI (12% v 8%), wound disruption (2% v .8%), pneumonia (5% v 2%), ventilator >48 hrs (6% v 1%), ARF (1% v .3%), UTI (4% v 3%), MI (.5% v .1%), DVT (2% v .9%), and PE (.7% v .4%).

**Conclusions:** This is the first data reported from the NSQIP audit process outside of a VA hospital system and enables OC and LC as defined by the specific CPT codes for the procedures. The data confirm that the incidence rates for all commonly identified complications following colectomy are higher for OC compared to LC. However, analysis of the preoperative risk factors suggests that LC is still being reserved for a population with fewer of these risks despite a multitude of data that suggest that operative mortality, cardiopulmonary, and wound complications occur at a lower rate with LC. This newly available, audited, data sampling process may allow for the development of better formulas for colectomy risk adjustment. Ultimately, this data should provide a more accurate method of assessing the optimal role of LC and OC in specific populations.

# Surgery for Perianal Disease in a Population-Based Crohn's Disease Cohort

(85)

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 ..... Christchurch, New Zealand

**Purpose:** We aimed to describe the characteristics of perianal surgical interventions (PSI) in a population-based CD cohort.

**Methods:** 1421 IBD patients were recruited, representing over 91% of people with IBD in Canterbury, New Zealand (population 464,800). This study was part of the Canterbury IBD Project, a population-based study of genetic and environmental factors associated with IBD. The clinical notes of all patients were screened to confirm diagnosis and to extract clinical data (including details of PSI) that was then stored on a custom-built database.

**Results:** Of the 1421 patients with IBD, 649 CD patients were included in the analysis and 66 were excluded because of diagnostic uncertainty early in their illness. 119 (18.3%) of CD patients had undergone at least one PSI. Of these patients, 58 (48.7%), 26 (21.8%) and 35 (29.5%) had undergone one, two or greater than two PSI respectively. There was no significant difference between the sexes for undergoing PSI overall ( $p=0.22$ ). Those diagnosed at <17 years of age were 2.9 (95% confidence interval 1.5-5.6) times more likely to require a PSI than those diagnosed over the age of 40 years, even when corrected for duration of disease. Those with complicated (stricturing or penetrating) disease were 1.13 (1.06-1.22) times more likely to undergo a PSI. Those with ileal or ileocolonic disease were 2.56 (1.6-4.2) and 1.12 (1.04-1.26) times more to undergo a PSI than CD patients with colonic disease location, respectively. The mean time to first PSI from diagnosis of CD was 34.8 months (23-47 months). Sex, age at diagnosis, disease location or behaviour did not influence the time to first PSI. Males were 2.82 (1.32-6.05) times more likely to undergo greater than two PSIs than females.

**Conclusions:** Perianal surgical interventions are frequent in CD patients, particularly those diagnosed at less than 17 years of age, those with ileal disease location and those with a complicated phenotype. Males are significantly more likely to require greater than two PSIs than females. These results provide useful prognostic information concerning PSI in a validated population-based cohort.

# Preoperative Treatment with Infliximab Does Not Increase Rate of Emergent or Multi-Step Abdominal Surgery

(86)

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**Purpose:** Infliximab (IFX) is a proven and effective treatment for many patients with Crohn's Disease (CD) and Ulcerative Colitis (UC). But concerns have arisen that IFX use may delay surgery, which in turn may lead to more frequent emergent or semi-urgent multi-step surgical procedures. Our study analyzed a large cohort of patients who underwent abdominal surgery for CD and UC to analyze the relationship between IFX infusion, timing and choice of surgical procedure, and intraoperative findings.

**Methods:** 413 consecutive patients - 45.5% with CD, 30.5% with UC, 23.8% with indeterminate colitis - had

abdominal surgery at Massachusetts General Hospital between January 1993 and December 2006. 101 (24.5%) received IFX  $\leq$  8 weeks pre-surgery. We analyzed these 101 patients' demographics, comorbidities, surgical indications, lab results, intraoperative findings, and surgical procedures, and compared them to the other 312 patients, using Fisher's Exact or Student's T-Test.

**Results:** The IFX and non-IFX groups were similar in gender (59.4 vs. 48.1% ♂,  $p=0.06$ ), age (36.1 vs. 37.8,  $p=0.32$ ), Charlson Comorbidity Index (5.7 vs. 5.3,  $p=0.83$ ), concomitant steroids (75.3 vs. 76.9%,  $p=0.89$ ), and preoperative albumin level (3.3 vs. 3.2,  $p=0.36$ ). There were no differences in frequency of emergent surgery (3.0 vs. 3.5%,  $p=0.79$ ), surgical indications, or intraoperative findings. Of 188 patients with small bowel CD, IFX exposure did not increase small bowel resection rates vs. strictureplasty (61.8 vs 62.1%,  $p=0.85$ ) or length of sacrificed bowel (12.6 vs. 12.3 cm,  $p=0.89$ ). Rates of subtotal colectomy vs. total proctocolectomy in 126 UC patients were similar in both groups (19.2 vs 18.0%,  $p=0.88$ ). Interestingly, while patients on IFX were more likely to have CD (56.4 vs. 41.9 %,  $p=0.01$ ) and strictures, they had lower WBC counts (8.7 vs. 10.2,  $p<0.001$ ), and decreased incidence of intra-abdominal abscess (table).

**Conclusions:** IFX treatment does not appear to worsen surgical patients' medical condition, increase rate of emergency surgery, or increase frequency of multi-step procedures for UC or small bowel resection for CD.

#### Long Term Outcome of Infliximab in the Treatment of Complex Perianal Crohn's Fistulas

(87)

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**Purpose:** Infliximab (anti-TNF  $\infty$ ) and immunosuppressives after selective seton drainage are effective in treating

fistulizing perianal Crohn's disease in the short term. This study evaluates the long term outcome of this treatment.

**Methods:** A retrospective chart review was conducted of all patients with complex fistulizing perianal Crohn's disease treated with infliximab between March 2000 and December 2006. Imuran or methotrexate were used as adjunctive immunosuppression in all patients. Setons were used selectively to control perianal sepsis prior to infliximab. No patients were candidates for a simple fistulotomy.

**Results:** Fifty three patients (28 male; mean age 34 years) received infliximab for complex perianal Crohn's fistulas. Overall mean follow up was 32 months (range 12 to 84); mean follow up for patients with complete response was 36 months post closure (range 6 to 79 months). Four patients had a reaction to infliximab that precluded further treatment. 27 of the remaining 49 patients (55%) had a complete response (CR; no discharge on examination or by history), 18 of whom are infliximab dependent. Three of these patients became non compliant and relapsed at a mean time of 21 months. 16 patients (33%) had a partial response (PR; improved but drainage on examination or by history), 14 of whom are infliximab dependent. Five of these patients became non compliant and relapsed at a mean of 14 months. 5 patients (13%) were non responders (NR; no change in symptoms or improvement not sustained for  $> 6$  months). Setons were used in 24 of 49 patients (49%); 9 of 27 CR, 10 of 16 PR and 5 of 6 NR. Complete healing was seen in 18 of 25 patients without a seton and 9 of 24 patients with a seton ( $p=0.012$ ).

**Conclusions:** Infliximab provides long term symptomatic control in over half of patients with complex perianal Crohn's fistulas. Compliance with ongoing medical therapy appears to be critical in maintaining clinical response. Patients who require setons for control of sepsis are less likely to obtain a complete response.

#### S86

	Infliximab N=101 (%)	No Infliximab N=312 (%)	P Value
Indications for Surgery			
Failure Medical Management	68.3	63.8	NS
Stricture	27.7	15.7	$<0.01$
Perforation	3.0	5.7	NS
Toxic Colitis	1.0	0.64	NS
Intraoperative Findings			
Active Disease	75.3	73.7	NS
Entero-Enteric Fistula	6.9	9.3	NS
Enterocutaneous Fistula	0.99	2.3	NS
Adhesions	11.8	6.4	NS
Abscess	4.0	10.9	$<0.05$



### Characteristics of Resectional Surgery in a Population-Based Inflammatory Bowel Disease Cohort

(88)

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..... Christchurch, New Zealand

**Purpose:** We aimed to determine the rate of, and characteristics of patients undergoing resection in a population-based IBD cohort

**Methods:** 1421 IBD patients were recruited, representing over 91% of people with IBD in Canterbury, New Zealand (population 464,800). This is part of the Canterbury IBD Project, a population-based study of genetic and environmental factors associated with IBD. The clinical notes of all patients were screened to confirm diagnosis and to extract clinical data (including surgery) that was stored on a custom-built Database. Rates of perianal surgery were compared between patient groups using Chi-square testing.

**Results:** 218/649 (33.6%) of CD and 109/668 (16.3%) of UC patients had undergone at least one bowel resection. CD patients aged <17 years at diagnosis (A1) were 1.75 (1.07-2.90) and 3.10 (1.78-5.42) times more likely to undergo a resection than patients diagnosed at 17-40 (A2) and >40 (A3) years of age, respectively. CD patients with stricturing (B2) (OR= 18.6 (10.4-26.5)) and penetrating (B3) (OR= 70.4 (33.5-148)) disease were more likely to require a resection than those with uncomplicated disease (B1). CD patients with ileal (L1) (OR=6.94 (4.23-10.7)) and ileocolonic (L3) (OR=2.03 (1.27-3.25)) disease location were more likely to require a resection than those with colonic (L2) disease. 85/218 (39.0%) CD patients had more than one resection. 109/668 UC patients had undergone a resection and were most likely to be younger (A1) and have extensive disease (E3) (OR=3.49 (2.27-5.35)). CD patients with A1, B3 and L1 had the shortest time from diagnosis to first resection. 36/649 (5.6%) CD and 42/668 (6.3%) UC patients had a permanent stoma.

**Conclusions:** Diagnosis before 17 years of age (A1), complicated (B2/3) behaviour and small bowel (L1/3) location were risk factors for both requiring a resection and having an early resection. Diagnosis before 17 years of age (A1) and extensive disease (E3) were associated with colectomy in UC patients. These data provide prognostic data from a validated population-based cohort.

### A Prospective Evaluation of the Long-Term Outcome of Ileal Pouch-Anal Anastomosis in Patients with Indeterminate Colitis

(89)

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**Purpose:** Although ileal pouch-anal anastomosis (IPAA) is associated with excellent results in patients with ulcerative colitis (UC), long-term outcomes in indeterminate colitis (IC) patients remain controversial. Prior papers examining this issue have been plagued by a variety of study design issues, including their retrospective nature, suboptimal patient followup and ill-defined clinical endpoints. The aim of this study was to prospectively evaluate the long-term outcome of IPAA in a closely followed cohort of UC and IC patients.

**Methods:** Prospectively generated clinical profiles on consecutive UC or IC patients undergoing IPAA by one surgeon were reviewed. Patients were seen in followup every 3 months for the first year after stoma closure and yearly afterwards. IC features included atypical distribution of disease, presence or history of perianal disease, small bowel inflammation more than 3 cm proximal to the ileocecal valve, or by identification of transmural inflammation or granulomas in the resected colon. All patients were classified as either UC or IC in the immediate postoperative period. Long-term outcomes were no pouchitis, acute pouchitis (antibiotic responsive), chronic pouchitis (antibiotic dependent/resistant), or *de novo* Crohn's disease (small bowel inflammation proximal to the pouch or development of a pouch fistula or other perianal complication > 3 months after stoma closure).

**Results:** The study cohort of 323 patients had a median age of 38 years (range, 8-81) and included 178 (55%) males. Patients were classified as UC in 221 (68%) and IC in 102 (32%). IC was diagnosed on the basis of transmural disease (n=44), atypical disease distribution (n=20), proximal small bowel disease (n=16), granulomas (n=12) and perianal disease (n=10). No patient was lost to followup. Median followup after stoma closure was 24 months (range, 3 to 164). Long-term outcomes are shown in the Table.

**Conclusions:** The incidence of acute pouchitis, chronic pouchitis and *de novo* Crohn's disease after IPAA do not differ significantly between patients with UC and IC. IC patients can undergo IPAA and expect a long-term outcome equivalent to UC patients.

S89 Long-Term Outcome

	Study Cohort	Ulcerative Colitis	Indeterminate Colitis
N	323	221	102
No Pouchitis	203	141 (64)	62 (61)
Acute Pouchitis	50	35 (16)	15 (15)
Chronic Pouchitis	37	23 (10)	14 (14)
de Novo Crohn's Disease	33	22 (10)	11 (11)

all trends not significant parentheses denote percent

# IL-10 Producing Attenuated Salmonella Typhimurium is Beneficial for Treatment of DSS Induced Murine Inflammatory Bowel Disease

(90)

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**Purpose:** Inflammatory bowel disease (IBD) is a chronic, immune-mediated process involving the colon or small bowel. Experimental IBD models exist and one such model, the IL-10 deficient mouse develops transmural inflammation of the distal GI tract. As this model suggests that IL-10 is important in the normal GI immune system, we hypothesized that IL-10 delivery to the distal GI tract may serve as a novel therapeutic agent for experimental colitis.

**Methods:** C57BL/6 mice were orally exposed to 4% dextran sodium sulfate (DSS) in 3 cycles. A murine interleukin 10 (IL-10) cDNA was subcloned into an aspartate semialdehyde dehydrogenase (asd) containing plasmid expression vector and transformed into *S. typhimurium*. This construct was utilized in both a treatment and prevention approach against DSS induced murine IBD. Mice were euthanized 2 weeks after *S. typhimurium*/IL-10 treatment and weights recorded up to this point. A histologic scoring system based on number and size of colonic ulcers was utilized to assess disease severity.

**Results:** We previously constructed a mIL-10 producing *S. typhimurium* construct and demonstrated in vitro production and function. After murine oral gavage feeding of 107 bacteria, this construct could be identified within the distal small bowel and peyer's patches 3 days after feeding and within mesenteric lymph nodes at 6 weeks. The same bacterial dosing with or without the IL-10 producing plasmid was gavage delivered to C57BL/6 mice (n=7/group) both before and after exposure to DSS. Though feeding of this construct prior to DSS exposure did not protect against DSS induced inflammation, feeding after DSS exposure resulted in more rapid weight gain in the *S. typhimurium*/IL-10 group compared to *S. typhimurium*/plasmid only (pYA292) and PBS controls (p<0.0001). In addition, the mean histology score (2 weeks post gavage) for *S. typhimurium*/IL-10 was 0.86 compared to 3.14 and 3.17 for the *S. typhimurium*/pYA292 and PBS controls respectively (p=0.03).

**Conclusions:** Attenuated *S. typhimurium* producing IL-10 can be successfully delivered to the murine GI tract by single oral dosing. This data indicates that locally delivered IL-10 may be a useful treatment for IBD.

# Risk Factors for Recurrence and the Impact of Post-operative Prophylaxis in Ileal Colonic Crohn's Disease

(91)

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**Purpose:** We sought to define risk factors for recurrence after primary laparoscopic ileocelectomy for Crohn's disease, and determine if post-operative prophylaxis with immunomodulating medications would decrease time to recurrence in this selected patient population.

**Methods:** Patients from a prospectively collected database who underwent primary laparoscopic ileo-colectomy from 1994-2007 at Mayo Clinic, Rochester were included. Postoperative follow-up, recurrence (defined as one or more of: endoscopic, or radiologic finding of recurrent Crohn's), risk factors for recurrence, and postoperative medical treatment were evaluated.

**Results:** One-hundred nine patients were identified, of which 89 were followed postoperatively at Mayo with a median follow-up of 2.5 years (range 27 days-10 years). Forty-four (49%) had recurrence; median time to recurrence or last follow-up was 40.6 months. No patients with recurrence underwent re-operation for Crohn's during follow-up. Forty-nine percent received postoperative immunomodulating prophylaxis (azathioprine/6-mercaptopurine - 46%, infliximab -3%). In a multivariate model of various risk factors for recurrence, presence of granulomas was the only significant predictor of recurrence (p=0.0068). Patient and disease demographics were similar between the prophylaxis group and the non prophylaxis group. Postoperative prophylaxis with immunomodulating medications did not lead to significant delay of recurrence (p=0.798).

**Conclusions:** Recurrence occurred in half of patients with Crohn's disease after laparoscopic primary ileo-colectomy. In this highly selected patient population, the use of postoperative immunomodulating prophylaxis may be of limited benefit in delaying recurrence. The presence of granulomas was the only significant predictor of recurrence. These finding should be further explored in larger and less selected patient populations.

# Severity of Inflammation as a Predictor of Colectomy in Patients with Chronic Ulcerative Colitis

(92)

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**Purpose:** Colon resection is required in up to 30% of patients with ulcerative colitis (UC). While much of this risk is incurred in the first year of disease, there are few data concerning predictors of colectomy in patients with long-standing disease. We evaluated a large cohort of patients with UC in a dysplasia surveillance program to determine

predictors of colectomy, with a focus on colonic inflammation.

**Methods:** We queried the Mount Sinai Dysplasia Surveillance database which includes patients with  $\geq 7$  years of UC who have undergone at least two colonoscopic surveillance examinations, at least one in either 1996 or 1997. Demographics, UC history, medications, extraintestinal manifestations, and endoscopic and histopathologic results of all colonoscopies comprise the database. Inflammation on colonoscopic biopsies was recorded on a validated 4-point scale (absent/quiescent, mild, moderate, or severe). We evaluated demographic variables and performed a multivariable analysis of the mean, maximum, and binary (present vs. absent) inflammation scores (IS) per patient to determine predictors of colectomy. Patients undergoing colectomy for dysplasia or malignancy were censored at the time of surgery, those not undergoing surgery at the time of last contact.

**Results:** 564 patients met our inclusion criteria, with a median follow-up of 21.5 years. 27 patients (4.1%) underwent colectomy, at a median of 18.1 years from diagnosis of UC. Univariate and multivariate analysis of predictors of colectomy are summarized in the Table.

**Conclusions:** Increased inflammation over time was a significant predictor of colectomy in patients with longstanding UC enrolled in a surveillance program, although maximum inflammation was not. In addition, corticosteroid use (often a surrogate for active inflammation) was predictive of colectomy. Our results indicate that over a relatively long period of follow-up (>20 years), patients who enter a long term surveillance program have only a 4.1% likelihood of requiring colectomy. Additionally, our results suggest that better control of inflammation over time may decrease the need for colectomy in patients with longstanding UC.

## Incidence and Implications of Pre-pouch Ileitis Following Restorative Proctocolectomy with Ileal Pouch-Anal Anastomosis

(93)

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**Purpose:** Pouchitis following RPC for ulcerative colitis (UC) is common. Inflammation proximal to the pouch; pre-pouch ileitis (PI) has recently been described. Its incidence and implications are not known. Some authors have suggested it may indicate missed Crohn's disease (CD). The aim of this study was to identify the incidence of pre-pouch ileitis at pouchoscopy and correlate this with symptoms, diagnosis and outcome.

**Methods:** It is routine practice at our institution to intubate the pre-pouch ileum at pouchoscopy. We searched the endoscopy database for the terms "pouchitis" and "ileitis" in all pouchoscopy procedures performed at our institution between April 2004 and September 2007, hospital records were then reviewed. Those with CD were excluded

**Results:** 1448 pouchoscopies were performed on 754 patients (polyposis 179), (UC/indeterminate colitis (IC) 568), (CD 5). Pouchitis was diagnosed in 254 (34%) patients. PI was diagnosed in 34 (6.2%) of patients with UC/IC and 1 (0.6%) patient with polyposis. 1 UC patient took NSAIDs and was excluded from the analysis. All had concurrent pouchitis. 3 had ileal stricturing. PI length was recorded in 32 procedures (65%), mean PI length =13.3 cm. PI was found in 13% of patients with pouchitis. Of the 35 patients with PI 25% were asymptomatic. At follow-up (mean 13 months) n=0 were reclassified as Crohn's disease, and no patient required an ileostomy for poor function. Histology of the terminal ileum at time of colectomy was available in 19 patients, 6 (34%) had histological backwash ileitis.

### S92 Univariate and Multivariate Analysis of Predictors of Colectomy

			Univariate Analysis		Multivariate Analysis	
			RR	p-Value	RR	p-Value
Inflammation Score	Mean	N/A	3.0	<0.001	3.0	<0.001
	Maximum	N/A	1.5	0.02	NS	NS
	Binary	N/A	2.5	0.3	NS	NS
Medications	Corticosteroids	326 (37.8%)	6.5	0.01	5.6	0.01
	5-ASA	392 (69.5%)	0.5	0.07	NS	NS
	Thiopurines	151 (26.8%)	1.8	0.15	NS	NS
Extraintestinal Disease	Any	95 (16.8%)	1.4	0.5	NS	NS
	PSC	14 (2.5%)	1.5	0.7	NS	NS
	Arthritis	63 (11.2%)	1.0	0.9	NS	NS
	EN	16 (2.8%)	2.0	0.4	NS	NS
	PG	13 (2.3%)	1.2	0.9	NS	NS
	Uveitis	13 (2.3%)	1.30	0.8	NS	NS
Pancolitis		284 (50.4%)	0.6	0.3	NS	NS

PG - pyoderma gangrenosum, EN- erythema nodosum, PSC- primary sclerosing cholangitis, NS- not significant

**Conclusions:** The incidence of pre-pouch ileitis in patients with UC/IC is 6.2%, and it occurs in 13% of patients with pouchitis; this is in keeping with earlier work. It is rare in polyposis patients. All identified patients had associated pouch inflammation, however not all patients were symptomatic. The incidence of backwash ileitis in this group was twice that expected (18%) at colectomy for UC; this may suggest a similar disease process. Our results demonstrate that PI is relatively common in patients with pouchitis; it does not imply missed Crohn's disease or predict an increased rate of pouch failure at least in the short term.

#### CT Scan for Severe Acute "Toxic" Colitis: No Impact on Same Admission Colectomy Rate

(94)

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..... Cleveland, OH

**Purpose:** Severe acute colitis (SAC, "toxic colitis"), in patients with inflammatory bowel disease, is treated with intravenous steroids, supportive care, and sometimes infliximab. Plain abdominal xray (AXR) is routinely used to evaluate the colon. Colectomy is indicated for patients who respond inadequately to medical therapy and for those who develop peritonitis. Abdominal CT is often performed in patients with SAC but its utility in this setting has not been established. We hypothesized that routine CT does not impact the decision to perform colectomy in SAC.

**Methods:** All patients with a history of ulcerative colitis admitted to our clinic, with SAC, between 2002 and 2007, were evaluated retrospectively. SAC was defined as six or more bloody bowel movements per day and one or more of the following parameters: fever > 37.8C, Heart rate > 90, hemoglobin < 10.5 g/dl. Patients were given a SAC score (2-4) according to the number of SAC parameters present at the time of admission. Chi-square and Fisher exact test were used for categorical data, Wilcoxon rank sum test to quantitative data.

**Results:** There were 93 patients with UC, 48 (52%) were female, and median age was 37 (17-83) years. CT was performed in 27 (29%). SAC score, serum albumin levels, AXR, and infliximab use were similar in the CT and no CT groups. CT findings were normal, proctosigmoiditis, left-side colitis, and pancolitis in 2, 3, 4, and 18 patients, respectively. Same admission colectomy was performed in 42 (45%), including 32/66 (48%) in the no CT group and 10/27 (37%) in the CT group (p=0.7, table). The median SAC score in patients who underwent colectomy was increased compared to patients who did not have colectomy (3 versus 2, p<0.01). Failure of medical therapy was the indication for colectomy in 28/32 (87%) patients who did not have CT and 8/10 (80%) patients who had CT (p=0.3). The surgical pathology result was pancolitis in 41(98%) patients who underwent colectomy. Length of hospital stay (LOS) was similar in the CT and no CT groups.

**Conclusions:** In patients with severe acute "toxic" colitis, CT scan does not influence the rate of same admission colectomy. The frequent use of CT in this setting should be reconsidered.

#### S94 Comparison of No CT and CT groups.

	No CT N=66	CT N=27	p value
Age	37 (17-74)	34 (17-83)	0.7
SAC Score	3 (2-4)	3 (2-4)	0.7
Serum Albumin	3.0 (1.7-4.9)	3.1 (2.2-4.4)	0.6
Infliximab	5 (8%)	6 (22%)	.07
Abdominal X-RAY	55 (83%)	22 (81%)	1.0
Colectomy	32 (48%)	10 (37%)	0.7
LOS (days)	6 (3-23)	7 (3-40)	0.1

SAC: Severe Acute Colitis. LOS: Length of Stay

#### Terminal Ileal Crohn's Disease – Aggressive Physician and Conservative Surgeon?

(95)

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**Purpose:** Little is known about the best management for acute presentation of terminal ileal Crohn's Disease (CD) and will present at appendicectomy in 2.5% of cases. We aim to assess how UK Consultant Coloproctologists and Gastroenterologists manage terminal ileal CD in acute and elective settings.

**Methods:** A survey was sent to all 460 Association of Coloproctology of Great Britain and Ireland (ACPGBI) members. Questions were; the surgical treatment of Crohn's terminal ileitis (non-obstructed and non-perforated) at presumed appendicitis (normal appendix and caecum identified); the initial management of TI Crohn's electively and performing elective resection without 'trial' of medical therapy (gastroenterology referral). A similar questionnaire was sent to 1043 BSG members (excluding those not involved in medical management of adult Crohn's disease) asking medical opinion on resection for acute presentation of terminal ileitis and initial management of TI Crohn's in an outpatient setting.

**Results:** 247 (54%) replied to the ACPGBI questionnaire. For CD at presumed appendicectomy 40% did nothing (washout), 33% would perform limited ileal/ ileo-caecal resection and 27% appendicectomy only. Managing Crohn's electively, 51% instituted medical therapy and referred to a gastroenterologist, 40% referred directly to a gastroenterologist and 9% followed-up patients themselves. Only 19% of surgeons would be happy to resect without prior medical therapy. 398 (38%) responded to the BSG questionnaire. 54% would prefer their surgical colleagues to perform an ileo-caecal resection and 46% opted for no



resection. In initial management 39% chose 5-ASA derivative and steroids, 32% high dose 5-ASA derivative alone, 22% steroids alone, 2.6% immunomodulation and steroids and only 1.8% would refer for surgery as primary therapy.

**Conclusions:** Our surveys show a difference in the management of acute CD: Surgeons appear more conservative with two-thirds opting for medical treatment. However over half of physicians prefer resection in the acute setting, seemingly more conservative electively. The reasons for this are unclear. Coloproctologists value gastroenterological input and 'trial' of medical therapy prior to embarking on elective CD surgery.

#### Outcomes of Crohn's Disease Presenting with Abdomino-pelvic Abscess: A Decision Analysis

(96)

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**Purpose:** The aim of this study was to evaluate clinical outcomes, quality adjusted life-years (QALYs) and cost-effectiveness gained from percutaneous drainage (PD) followed by elective surgery vs. initial surgery for abdomino-pelvic abscesses related to Crohn's Disease (CD).

**Methods:** All consecutive patients with spontaneous CD-related abdomino-pelvic abscess identified at admission by CT scan during 1997-2007 were reviewed. We excluded postoperative and peri-rectal abscesses. Data were collected from an IRB-approved database and chart review. Probability estimates were obtained from 91 patient episodes, supplemented with expert opinion to establish plausible ranges. Decision analysis over a single year of patient life was used to calculate QALYs and cost-effectiveness for each strategy. Sensitivity analysis, Chi-squared, Fisher's exact and Wilcoxon tests were performed as appropriate to analyze different variables on PD success.  $P < 0.05$  was considered statistically significant.

**Results:** Out of 91 patients, 46 patients were initially approached with PD. 30/46 (65%) patients had successful PD, based on factors shown in the attached table, then

delayed elective surgery. Failed PD prompted surgery after a median of 72 hours. Initial treatment was surgery in the remaining 45 patients (technically impossible PD in 32, surgeon preference in 7 and peritonitis in 6 patients). Immediate surgery resulted in significantly higher postoperative infection rates than any surgery after initial PD (9/45 patients, 20% vs. 4/46 patients, 9%,  $p = 0.02$ ). Elective surgery after successful PD achieved reduced rates of stoma diversion when compared with initial surgery (7/30 patients, 23%, vs. 23/45 patients, 51% respectively,  $p = 0.01$ ). Initial approach with PD gave higher QALYs and was more cost-effective than initial surgery (0.850 vs. 0.759 QALY and \$6,769/QALY vs. \$11,212/QALY, respectively). PD was still the optimal strategy in spite of the risk of failure and septic complications within the plausible range.

**Conclusions:** PD is the most effective strategy from the patients' and payers' perspective and is indicated where feasible. PD failure is associated with steroid use, multiple or multi-locular abscesses.

#### S96 Factors associated with PD success (median and ranges reported as indicated)

	Successful PD	PD failure	P value
Age	31 (18-73)	38 (19-69)	0.1
Male gender	14 (47%)	8 (50%)	0.8
Steroid use	10 (33%)	11 (69%)	0.02
Multiple abscesses	3 (10%)	6 (38%)	0.04
Multi-locular abscess	4 (13%)	10 (63%)	<0.01
Abscess size (cm)	6 (2.6-20)	5 (2-11.3)	0.3
Initially aspirated volume (cc)	75 (2-800)	35 (2-140)	0.03
Fistula	8 (27%)	3 (19%)	0.7
Albumin	3.3 (1.5-4.7)	3.2 (1.6-3.9)	0.8
Hemoglobin	10.4 (7-14.3)	10 (8.1-13.1)	0.3
WBC count	14.4 (6.8-29)	13.9 (6.4-18)	0.5

PD = percutaneous drainage; WBC = white blood cell

## POSTER ABSTRACTS

### Local Anesthetic Day-care Open Hemorrhoidectomy Challenges Traditional Concepts - A Randomized, Controlled Trial

(P1)

N. Rao, W. Hutchings, C. Davies

..... Ashford, United Kingdom

**Purpose:** Local anaesthetic day-care open haemorrhoidectomy (LH) is feasible and may be the most cost-effective approach to haemorrhoidectomy. This prospective randomised trial compares patients and clinical evaluation of LH with general anaesthetic day-care open haemorrhoidectomy (GH).

**Methods:** 41 patients with third degree haemorrhoids were randomised to LH (19 cases) and GH (22 cases). Patient demographics were comparable. Single haemorrhoid was excised in 15 patients; two and three haemorrhoids in 13 each. Independent nurse-led assessment and clinical evaluation ran parallel for 6 months duration. Outcome measures were: average and expected pain scores at 30, 60 and 90 minutes and then daily for 10 days as well as satisfaction scores at 10 days, 6 weeks and 6 months. Secondary outcomes were journey time within the day-surgery unit and overall cost.

**Results:** Ninety minutes following surgery, LH had more pain ( $p=0.028$ ). However pain scores on reaching home were similar [ $p=ns$ ]. Maximum pain in the LH group was on Day 3 vs. Day 6 for GH. From Day 1, LH had less pain each day reaching significance on Day 8 [3.61 (1.74) LH vs 5.29 (2.32) GH;  $p=0.0273$ ]. Patient's average pain over 10 days, expectation and satisfaction scores were similar between the two groups. LH had shorter journey time and was 1.5 times less expensive than GH.

**Conclusions:** LH has similar tolerance and clinical outcome, associated with a shorter journey time and is cheaper than GH. This study challenges traditional views on open haemorrhoidectomy and questions the need for expensive alternatives.

### Rectal Function after Stapled Hemorrhoidopexy and Milligan-Morgan Hemorrhoidectomy: Prospective, Randomized Study

(P2)

P. De Nardi, M. Corsetti, S. Squillante, A. Castellaneta, S. Di Pietro, S. Passaretti, C. Staudacher . . . . . Milano, Italy

**Purpose:** Aim of this study was to compare rectal physiology testing and functional outcome after stapled hemorrhoidopexy (SH) and Milligan-Morgan's hemorrhoidectomy (MMH).

**Methods:** Between april and december 2006, 20 patients with third and fourth degree hemorrhoids were randomly assigned to SH (Group A) and MMH (Group B). One week before, 6 and 12 months after surgery they underwent three different rectal distensions (pressure stepwise, volume step-

wise and volume ramp distension) controlled by an electronic barostat to assess rectal motor and sensory response to distension; a one week questionnaire on bowel symptoms (frequency of bowel movements, urgency, abdominal pain, incontinence, consistency of stool according to the 7-point scale of the Bristol Index) and a psychological symptoms checklist (SCL-90) were also completed.

**Results:** Up to now 6 and 5 patients in Group A and B respectively have completed the protocol. Rectal distensibility during all 3 distensions were significantly lower after surgery in Group A whereas they were not different in Group B. Discomfort and desire to defecate occurred at significantly lower volume after surgery during all 3 distensions in Group A but not in Group B. Pressure thresholds for desire to defecate and discomfort did not differ before and after surgery during any distensions in either group. The frequency of bowel movements per week increased from  $10 \pm 7$  to  $19 \pm 11$  ( $P=0.07$ ) in 4/6 of patients after SH but in none of the patients after MMH. Fecal urgency appeared with a daily frequency ( $P=0.03$ ) in 3/6 patients in Group A. Scores for each items of the SCL-90 symptoms check list did not differ significantly between the two groups before surgery and within the two groups before and after surgery.

**Conclusions:** Rectal distensibility and volume thresholds for sensations decreases after SH while they did not change after MMH. These modifications of rectal function associate with the occurrence of rectal urgency and increased stool frequency. The results of the present study suggest caution in selecting patients for stapled hemorrhoidopexy

### Impact of Previous Hemorrhoids Surgery and Out-Patient Procedures for Hemorrhoids on the Results of Stapler Mucosectomy

(P3)

P. Garg, S. Ismail . . . Mohali, India; Perintalmanna, India

**Purpose:** To study the impact of previous hemorrhoids surgery and out-patient procedures (Banding and Injection Sclerotherapy) on presentation, operation and post operative results by Stapler Mucosectomy

**Methods:** A total of 500 patients who underwent Stapler Mucosectomy by Longo's technique were recruited in the study. Out of these 71 patients had undergone previous surgery (open or closed hemorrhoidectomy), 66 had previous out-patient procedures (Banding=32, Injection Sclerotherapy=34) and 363 patients had no previous procedure for hemorrhoids. Age, sex and grade of hemorrhoids were similar in all the three groups

**Results:** Higher percentage of Previous Surgery (38/71, 54%) group patients presented with bleeding PR as presenting complaint as compared to Previous out-patient procedures (24/66, 36%) and No previous procedure (98/363, 27%) group patients [ $p=0.0001$ , ANOVA]. Previous Surgery patients had much higher operating time (mean=  $27.2 \pm 0.9$ ) compared to No previous procedure

patients (mean =  $23.5 \pm 0.4$ ) [ $p=0.0005$ , t-test]. Post operative urine retention was significantly higher in Previous Surgery (60/71, 85%) group as compared to Previous out-patient procedures (42/66, 64%) and No previous procedure (9/363, 2.5%) groups [ $p<0.0001$ , ANOVA]. Percentage of patients highly satisfied by the procedure was significantly higher in No previous procedure group (348/363, 96%) and Previous out-patient procedures (39/66, 59%) group patients compared to Previous Surgery group patients (28/71, 39%) [ $p<0.0001$ , ANOVA]. Incidence of incomplete doughnut and requirement for intra operative suturing was similar in all three groups. Hospital stay, post operative bleeding and incontinence (urge, gas or liquid), anal stenosis and long term recurrence rates (bleeding or prolapse) were also similar in all three groups.

**Conclusions:** Previously operated patients presented more frequently with bleeding PR, had significantly higher operating time, had higher incidence of post operative urinary retention and had significantly lower satisfaction rates compared to patients with no previous procedure and patients with previous out patients procedures done.

#### **Doppler-Guided Hemorrhoidal Artery Ligation (DGHAL), Rectoanal Repair (RAR), Hemorrhoidopexy (HP) and Minimal Mucocutaneous Excision (MMCE) for Grade III-IV Hemorrhoids: A Multicenter Prospective Study**

(P4)

G. Theodoropoulos, N. Sevriassianos, A. Dounavis, A. Dervisoglou, J. Spiliotis, A. Datsis, D. Dardamanis, E. Leandros, J. Bramis. . . . Athens, Greece; Irakleio, Greece; Peiraeus, Greece; Mesologi, Greece

**Purpose:** The isolated application of DGHAL for advanced grade hemorrhoids (HR) has led to considerable treatment failure. Suture HP and mucopexy by RAR result in mucosal lifting and fixation of the HR plexus. Purpose of the study was the prospective evaluation of DGHAL and its adjunctive procedures.

**Methods:** Participating institutions: 1 academic, 2 public and 2 private hospitals. Analysis included only 147 pts (mean age: 45.5, males: 102, grade III: 95, IV: 52) satisfying inclusion criteria and scheduled contacts (1, 6, 12 months) for assessment of surgical result and functional recovery. Presenting symptoms: bleeding (73%), prolapse (62%), pain (14%) and thrombosis (17%). 6 patients had a previous surgery for HR.

**Results:** An average of 9.3 (range: 4-16, SD: 2.7) ligations were placed. More ligations were required for grade IV HR ( $10.7 \pm 2.8$  vs  $8.6 \pm 2.2$ ,  $p<0.001$ ). Following completion of DGHAL, use of HP (continuous sutures or RAR) and MMCE was intraoperatively dictated by remaining mucocutaneous protrusion at surgeons' discretion. Suture HP and RAR at 1-4 positions was deemed necessary in 46 pts (31%). MMCE was added in 9 of them and in 23 pts overall. The addition of HP/RAR occurred more frequently in grade IV

HR (60% vs 16%,  $p<0.001$ ). Complications: residual prolapse (10; 2 required 2nd surgery), bleeding (15; 2 required 2nd HAL), thrombosis (4), fissure (3) and fistula (1). 30%, 31%, 16%, 14% of pts required analgesics not at all, for 1-3 days, for <1 week and for >1 week, respectively. HP/RAR was related to discomfort prolongation (17% vs 6%,  $p<0.001$ ). 90.5% of pts had complete functional convalescence by end of 1st week. At average follow-up of 15 months (range: 6-24), 96% of pts are asymptomatic (6 with skin tags/ minimal protrusion). 94.5% reported to be satisfied with procedure's results. 90.4% would repeat it if necessary.

**Conclusions:** DGHAL with the selective application of HP, RAR and MMCE is a safe, effective technique for advanced grade hemorrhoids, offering reduction of previously reported reoperations and recurrences, minimalization of anal trauma and high patients' satisfaction rate.

#### **High Patient Satisfaction and Low Recurrence Rates with Stapler Mucosectomy in 960 Patients with Stage III Hemorrhoids**

(P5)

S. Ismail, P. Garg. . . . Perintalmanna, India; Mohali, India

**Purpose:** Stapler Mucosectomy is a new procedure to treat advanced stages of hemorrhoids. It has distinct advantages of less pain and early return to work as compared to Milligan Morgan procedure. The main disadvantage reported is high recurrence rate. Since the extent of mucosectomy is limited by stapler procedure, total prolapse reduction in all the patients with stage IV is difficult to accomplish. So stage III hemorrhoids with lesser degree of prolapse can be treated better with this technique. We prospectively enrolled 960 patients with Stage III hemorrhoids and studied the results of Stapler Mucosectomy in them.

**Methods:** The procedure was performed in lithotomy position in Spinal or General Anesthesia. After inserting anoscope, a circumferential purse-string suture with 1-0 polypropylene was placed about 2 to 3 cms above the dentate. This was followed by firing a 33 mm circular stapler (Ethicon PROXIMATE<sup>®</sup>, PPH03). Any bleeding point in the staple line was secured with 2-0 polyglycolic acid suture. Antibiotic (Ampicillin) was given for one week and Analgesic (Tramadol) for one day and then need based. Patients were reviewed and their satisfaction rate was assessed after one week. Follow-up was done at 4 weeks, 6 months and one year.

**Results:** The mean age was  $40.9 \pm 12$  years with 708 (73.8%) males and 242 (26.2%) female. The presenting complaint was mucosal prolapse in 697 (72.6%), bleeding in 261 (27.2%) and pain/itching in 2 (0.2%) patients. The mean operating time was 23.8 minutes (10-45 min). 959 (99.9%) patients were discharged within 24 hours of surgery and 885 (92.2%) patients returned to their normal activity level within 10 days of surgery. 856 (89.2%) patients were very satisfied, 90 (9.4%) were somewhat satisfied, 8

(0.8%) were somewhat unsatisfied and 6 (0.6%) patients were very unsatisfied with the procedure. 12.8% (123/960) of patients had urinary retention and 9.4% (9/960) patients experienced post-operative bleeding. The recurrence rate was 0.6% (6/960). Prolapse-3, bleeding-3) and anal stenosis rate was 0.2% (2/960 patients).

**Conclusions:** Stapler mucosectomy is effective procedure for Stage III hemorrhoids with low recurrence rates and high patient satisfaction rates.

#### Short and Long-Term Outcomes of Urgent Hemorrhoidectomy for Prolapsed Thrombosed Internal Hemorrhoids Compared to Conservative Management (P6)

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**Purpose:** Even urgent hemorrhoidectomy is considered superior for the management of prolapsed thrombosed internal hemorrhoids, conservative management is, still, a good option. The aim of our prospective study is to evaluate the impact of treatment on short and long-term on quality of life of patients with prolapsed thrombosed internal hemorrhoids.

**Methods:** We involved in this study 120 consecutive patients with prolapsed thrombosed internal hemorrhoids treated in our clinic during a period of 18 months. 60 patients were submitted to surgery using Milligan-Morgan technique and 60 were treated conservatively with topical and general drugs. We evaluated symptomatology and endoanal ultrasonographic features at the admission and after treatment at 3 and 12 months.

**Results:** Median postoperative hospital stay was 3 days (1-7) in patients treated conservatively and 4.6 days (2-11) in surgical group ( $p < 0.01$ ). There were only minor complications: rectal bleeding in 4 patients from first group and 7 from the second ( $p = \text{NS}$ ) and minor incontinence for stool and flatus in 3, respectively 4 patients ( $p = \text{NS}$ ). At 3 months we observed no clinical differences between these two groups, but a higher incidence of anal sphincter damage detected at ultrasonography ( $p < 0.01$ ). At 12 months 5 patients from conservative group necessitate elective hemorrhoidectomy.

**Conclusions:** 1. On short term operative treatment for prolapsed internal hemorrhoids is associated with a higher hospitalization and a risk of anal sphincter damage. 2. On long term the risk of relapsing is greater for conservative treatment.

#### Doppler-Guided Hemorrhoidal Arterial Ligation and Anopexy: Results in the First 100 Patients (P7)

M. Albert, S. Larach . . . . . Altamonte Springs, FL

**Purpose:** Radical departure from standard hemorrhoidal surgical techniques have taken place over the last 10 years.

Despite success in Europe with doppler guided hemorrhoidectomy and ligation anopexy, no literature exists in the United States evaluating this technique. The purpose of this study was to evaluate the outcome of this new technique on grades I-IV hemorrhoids.

**Methods:** 100 consecutive patients with grade I-IV hemorrhoids who failed medical or office management were selected to undergo doppler-guided hemorrhoid arterial ligation with anopexy using the HTS by Medchannel. Outcomes were measure at 2 and 6 weeks. Outcomes were determined by clinical examination and simple questionnaire including: postoperative pain score, return to work, resolution of symptoms, complications, and recurrence.

**Results:** A total of 100 patients, with a mean age of 53.4 (range 21-78) underwent hemorrhoidal arterial ligation and mucopexy. Follow up evaluation was performed in all but 7 patients. Overall 95 % of patients had resolution of their preoperative symptoms. No immediate complications requiring reoperation, or late complications were encountered. The average pain score immediately following surgery was 3.7 (scale 1-10). On average patients required narcotic pain medicine for 3 days (range 0 to 11) and returned to work 3.9 days after surgery (range 1-14). 98% of patients' symptoms were improved and 94% of patients stated they were extremely satisfied with the results of the operation at 6 weeks.

**Conclusions:** Doppler guided hemorrhoidal arterial ligation and anopexy is a safe, feasible alternative to all other forms of surgical management. Further randomized trials should be performed to determine whether this technique is superior to others.

#### Stapled Hemorrhoidopexy (PPH): Role of Concomitant Excision of External Disease (P8)

N. Robinson, A. Ferrara, J. Gallagher, S. Larach, S. DeJesus, P. Williamson, J. Aversa, M. Kruppenbacher . . . . . Orlando, FL

**Purpose:** 1) To look at a single group's experience with PPH with regard to complications and need for secondary procedures. 2) To look at the utility of performing concomitant excision of symptomatic external disease with PPH.

**Methods:** Retrospective review of the medical records of 215 consecutive patients treated with stapled hemorrhoidopexy from 1/12/2003 to 9/20/2006. 5 surgeons from one group performed all the procedures. Patients were divided into 2 groups: internal hemorrhoids only, and mixed hemorrhoids. The mixed group had an external hemorrhoidal component or adjacent skin tags causing symptoms.

**Results:** 215 patients underwent PPH. 130 males (60%), 85 females (40%) with a mean age of 56 (range 26-87). Mean follow up was 3.2 months (range 1 wk to 21 mos). Indications were grade II (19), grade III (187), and grade IV (9) hemorrhoids. Included in these were 101 (47%) cases of



mixed hemorrhoids. Complications occurred in 81 (37.7%) patients, most commonly symptomatic residual external disease (6.7%), recurrent internal hemorrhoids (5.1%), and persistent pain (3.3%). 29 (13.5%) patients required secondary procedures related to complications. Of the 101 patients with mixed hemorrhoids, 20 (19.8%) underwent concomitant excision of external disease at the time of PPH. None of these patients had residual symptoms on follow up. 81 mixed hemorrhoid patients did not undergo concomitant excision and of these, 15 had residual symptomatic external disease, 3 requiring excision. Of the 81 mixed hemorrhoid patients, 26 (32.1%) had complications, 10 requiring secondary procedures vs 4 (20%) complications in the concomitant excision group, none requiring secondary procedures. Of 209 patients with available pathologic specimen examination, 8 (4%) had unexpected findings, 4 (2%) of these had findings requiring further follow up or therapy. This included 1 proctitis, 1 squamous dysplasia, 1 schistosomiasis, 1 carcinoid.

**Conclusions:** Concurrently addressing external hemorrhoids or skin tags with PPH in selected cases may decrease residual symptoms, improve patient satisfaction and decrease need for secondary procedures with acceptable pain and morbidity. We recommend routine histopathological examination of all PPH specimens.

#### Can ALTA, a Novel Sclerosing Agent for Noninvasive Parenteral Treatment of Internal Hemorrhoids, Become an Alternative to Surgery?

(P9)

M. Takano, J. Iwadare, A. Ishibashi . . . Kumamoto, Japan; Tokyo, Japan; Osaka, Japan

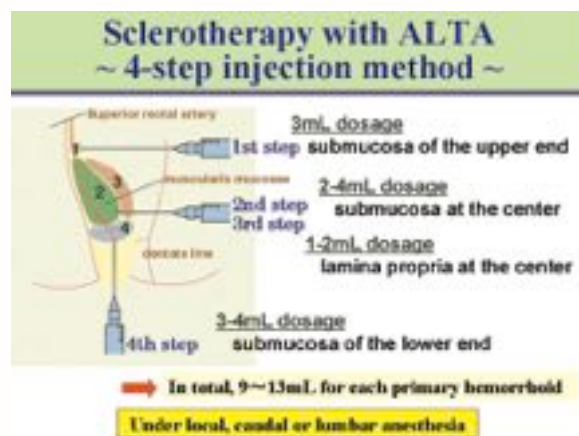
**Purpose:** Aluminum potassium sulfate/tannic acid (ALTA) injection is a novel sclerosing treatment for internal hemorrhoids approved in Japan in July 2004. ALTA injected into internal hemorrhoids in 4 steps induces rapid disappearance of prolapse and bleeding of hemorrhoids. ALTA treatment is superior to surgery in terms of QOL, since it shortens the hospital stay, causes less postoperative pain, and has other beneficial effects. To give early feedback about findings related to ALTA treatment, interim results of the post-marketing surveillance are presented here.

**Methods:** The survey was begun in March 2006. Each physician, trained in advance in the four-step injection method, registered the first 10 consecutive patients who underwent ALTA treatment. For each patient, the background factors, details of ALTA therapy and adverse events were surveyed. In addition, a follow-up survey was conducted on clinical symptoms one year later.

**Results:** As of July 2007, the data had been collected on 3,307 patients at 318 facilities. The overall incidence of adverse reactions was 10.3%. The major adverse reactions observed were pyrexia (2.9%), decrease in blood pressure (1.9%), perianal pain (1.3%), rectal ulcer (0.7%) and rectal

stenosis (0.3%). Factors influencing the occurrence of adverse reactions included ALTA dose level, number of ALTA-injected hemorrhoids, and others. When the efficacy was assessed approximately 28 days after ALTA treatment, the efficacy rate was 98.2%. Factors influencing the efficacy included the degree of prolapse according to the Goligher's classification and others. In the follow-up survey, information was available on 257 patients of registered 495, and relapse had been observed in 29 of them at one year after ALTA treatment.

**Conclusions:** Although severe internal hemorrhoids have been considered indicated for surgery, interim results of the surveillance indicate the possibility that ALTA treatment, which is safe and effective, is also applicable to the hemorrhoids and expected to expand the alternatives available for hemorrhoid treatment. The follow-up survey is an issue in the future.



#### Clinical and Experimental Study on An's Hemorrhoid Injection in the Treatment of Hemorrhoid

(P10)

A. An . . . . . Beijing, China

**Purpose:** To evaluate the clinical effect of An's hemorrhoid injection in the treatment of hemorrhoid and to discuss its mechanism.

**Methods:** A total of 564 adult patients suffering various grades of internal and varicose combined hemorrhoid were randomly treated with An's hemorrhoid injection (446 cases) and control injection (118 cases) respectively. Pathologic changes were observed in 25 cases through biopsy at different times after the An's hemorrhoid injection treatment and 8 cases after hemorrhoidectomy.

**Results:** Among 446 cases in An's hemorrhoid injection group, 415 cases (93.5%) were cured; 30 (6.73%) were remarkably improved and 1 (0.22%) was improved. The duration of the treatment was from three days to eight days with 4.5 days in average. No any side effect or sequelae was observed after the injection. Among 118 cases in the control group, 90 cases (76.27%) were cured; 18 (15.25%) were remarkably improved and 10 (8.48%) were improved. The

duration of treatment was from 5 days to 14 days with 9 days in average. In An's hemorrhoid injection group, after the injection, local scleroma appeared in 112 cases, and intestinal stricture in 3 cases. There was considerable difference between two groups in term of therapeutic effect. The pathological results suggest that the application of An's hemorrhoid injection could cause a kind of non-inflammatory coagulation degeneration of protein and constriction of blood vessel. The degeneration is highly reversible. After three to seven days, local restoration without scar formation could be found in the original injection site. In the mean-while, there was no sign of inflammation, hemorrhage or necrosis.

**Conclusions:** An's Hemorrhoid Injection, characterized by it's high effectiveness, safeness, and no complications in the treatment of hemorrhoid clinically, is further confirmed in pathology that it is different from previous sclerosing agents and necrotic agents. It is advisable to be applied to different stages of internal hemorrhoid and varicose combined hemorrhoid.

#### Sacral Nerve Modulation in Treatment for Fecal Incontinence after Colorectal Surgery

(P11)

D. Weimann, M. Schmerer, T. Schiedeck . . . Ludwigsburg, Germany

**Purpose:** Sacral Nerve Modulation (SNM) is proven as treatment of fecal incontinence (FI) since 1995. In the beginning SNM was thought to be effective in FI with anatomically intact sphincter and pelvic floor only. Further investigation showed that FI even in patients with sphincter defects is influenced positively by SNM. Purpose of this prospective investigation was to prove the efficiency of SNM in patients with FI after colo-rectal surgery.

**Methods:** From Feb. 2005 to Nov. 2007 in 16 patients SNM was tested by percutaneous nerve evaluation (PNE-test). Of these 16 patients 6 (4 female) underwent previous colorectal surgery (4 rectopexy combined with high anterior rectal resection, 1 low anterior rectal resection after combined radiation chemotherapy, 1 reconstruction due to rectal atresia). 5 had positive PNE-testing and were therefore implanted permanently. In all patients FI was evaluated by Fecal Incontinence Severity Index (FISI; Rockwood; 1999) and stool habits before, during and after PNE-test were documented by an ongoing diary. Permanent implantation was performed 4 to 6 weeks after PNE-test, follow-up 2 and 6 weeks and 6, 12 and 24 months after permanent implantation. All data were collected prospectively.

**Results:** PNE-test failed in 1 patient (FISI pre-PNE 50;

during PNE 50; after PNE 50). In 5 patients PNE-test showed a decrease of FISI (pre-PNE 41 (14-57); during PNE 15 (7-29)) and of the episode of FI per week (pre-PNE 11 (5-15); during PNE 1 (0-2)). When the PNE-electrodes were removed FISI and episodes of FI per week raised again (FISI after PNE 41 (14-57); episodes per week after PNE 10 (5-14)). When the permanent electrodes were placed FISI and episodes of FI decreased, but not as good as with the PNE-test (FISI 16 (0-34); episodes per week 4 (0-7)).

**Conclusions:** Though we just can present short-term results there is a clear improvement of episodes of FI per week and in the FISI and therefore in quality of life in 5 of 6 patients (83%). Especially patients with long-standing FI due to functional disorders of the pelvic floor have a good prognosis to achieve continence, if surgical correction of the pelvic floor is not effective alone.

#### Role of Sacral Nerve Stimulation in Vulvodynia

(P12)

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..... Cottingham, United Kingdom

**Purpose:** Vulvodynia is difficult to treat seriously affecting QOL. There are no reports of SNS in vulvodynia. We have reviewed our experience in two cases to determine whether it is a worthwhile procedure.

**Methods:** Patients were identified from our prospectively maintained SNS database and the notes reviewed.

**Results:** Case 1 : A 62yr female cook was diagnosed to have vulvodynia when she was aged 20. Symptoms affected her QOL significantly. She experienced high intensity spasms lasting for 1-2 mts with worsening pain. With insignificant past medical history, etiology has not been ascertained. Having failed analgesics, antiepileptics, antidepressants, phenytoin infusions and caudal blocks (Short lived), she was referred by the pain team for SNS. Following assessment for SNS, She had a temporary SNS on the left side involving S2 nerve root. Spasms were less severe lasting only 30-40 seconds. On a PACS / BPI assessment there was 70% relief at the end of two weeks. There was minimal pain described in the lower back associated with the procedure. Patient described improved QOL and is extremely happy with the outcome. The temporary wires were removed and the patient is awaiting permanent implant. Case 2 : A 43 yr female dress designer was diagnosed vulvodynia associated with left buttock and perineal pain. With insignificant past medical history, etiology has not been ascertained. Having failed the whole spectrum of analgesics, gabapentin and caudal blocks, she was referred by the pain team for consider-

#### P11

41 (14-57)	15 (7-29)	41 (14-57)	16 (0-34)	23 (0-38)
FISI pre-PNE	FISI during PNE	FISI after PNE	FISI chronic SNM	FISI last follow up (mean 5 months (2-11))
FISI (0 = continent; 57 = max. incontinent); Mean (max. range)				

ing SNS. Following assessment for SNS, She had 3 temporary SNS procedures done. The first one was a temporary SNS placed on right S3 nerve root. Not entirely satisfied with the marginal improvement she had, a second temporary SNS was done on the left involving S3. Following the failure of second SNS, unsatisfactory assessment on the right S3 led to a repeat right S3 test, which was successful. PACS / BPI assessment showed a reduction in pain of 60% after day 1 and 80% improvement at the end of 1st and 2nd week. Patient is extremely happy with the outcome and is awaiting for a permanent implant.

**Conclusions:** We conclude that SNS for vulvodynia with our limited experience offers a satisfactory outcome, when other treatments have failed.

### Anal Sphincter Stimulation Can Improve Sphincter Pressures and Aid in Continence Control

(P13)

L. Salcedo, M. Damaser, P. Zaszczurynski, G. Wang, M. Zutshi . . . . . Cleveland, OH; Minneapolis, MN

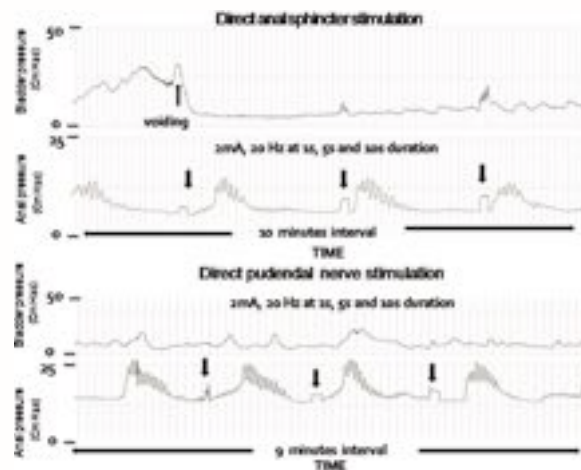
**Purpose:** To study the effects of electrical stimulation(ES)of the pudendal nerve(PN)and anal sphincter in rats.

**Methods:** 20 virgin female Sprague Dawley rats were divided into control(C),electrostimulation variables(EV),intact pudendal nerve stimulation(PNS),transected pudendal nerve(TPN) and anal sphincter stimulation(AS)groups.PN was identified bilaterally in an open surgery.A balloon connected to a physiologic recording system(PRS)was inserted into the anus to test anal pressure(AP)and a bladder catheter through the urethra tested bladder pressure(BP).AP and BP were measured before and during ES in all groups.A dual electrode probe was hooked to the PN in all but AS.EV tested stimulation parameters and selected ES parameters were repeated in the PNS,TPN and AS groups.In the PNS AP and BP were recorded pre and during bilateral PN stimulation.In TPN,AP and BP were recorded pre and post transection of bilateral PN.AS had 2 monopolar needles in proximity to the anal sphincter. AP/BP were recorded pre and post direct anal sphincter stimulation.

**Results:** Baseline AP and BP testing were consistent in all groups. EV group showed unilateral and bilateral PNS at 20Hz with current ranging from 0.1-6 mA,induced increase in AP with no change in BP.ES of the PNS showed increased AP and signal spread evidenced by tail twitching at currents higher than 4mA;no changes in BP were seen even at high currents.TPN showed that PNS induced increase in AP appears to be transmitted via efferent motor fibers as proximal PNT had no effect in AP but distal PNT eliminated any rise in AP from ES,regardless of the order of transection.AS showed results similar to ES of the PN at same stimulation levels. However BP was increased with ES with high current(6mA and 10s) stimulation.The increase

in BP with anal sphincter ES was mediated by abdominal muscle(AM) contraction since AM transection eliminated increase in BP, but not in AP with anal sphincter ES.

**Conclusions:** Increase in AP with ES of PN or anal sphincter occurs without bladder involvement.These initial results suggest that direct anal sphincter stimulation may have a significant effect on anal sphincter pressure, thereby enhancing continence and have future therapeutic applications.



### Continence after Anal Sphincter Repair

(P14)

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**Purpose:** External anal sphincter (EAS) defects may appear after vaginal delivery, but also after surgical interventions (e.g. fistulotomy). In fecal incontinence sphincter repair may be offered in defined defects of the EAS. The aim of this retrospective study is to determine to what extent the patients experience an actual improvement after repair.

**Methods:** The patients, who had sphincter repair in the years 1996 until 2005, were examined by means of questionnaire. 59 patients (57 women, median age (47 y.) were operated with a proven defect of the EAS by endoanal ultrasound (EAUS). Anal operations were performed in 12 patients (2 males). Parity: unknown or P0: 3, 5%, P1: 21, 37%, P2: 24, 42%, P3: 9, 16%. Episiotomy/perineal laceration was found in 51 patients (89%). Preoperatively routine bowel cleansing was performed. Intraoperatively antibiotics were given. The sphincter ends were sutured in the overlapping technique in most cases.

**Results:** In 16 patients (28%), the operation was combined with a levatorplasty. Median operation time: 53 min. Complications: only minor wound dehiscence. Patients received a questionnaire in January 2007. Follow up: 85%, median follow-up, 48 months. Continence score (Cleveland Clinic Continence Score): 0 to 4: 20, 40%, 5 to 9: 13, 26%, 10 to 14: 7, 14%, 15 to 20: 10, 20%. 70% of the patients experienced a moderate or good improvement of fecal continence. Patients with a higher continence score did not

experience improvement of continence and experienced more symptoms related with incontinence. 82% of the patients would have the operation done again, if necessary. Patients with urinary incontinence showed higher continence scores.

**Conclusions:** Repair of the EAS confers an improvement of continence in two thirds of the patients. Some patients do not experience any improvement; in these cases other factors may cause fecal incontinence. In the case of idiopathic or neurogenic incontinence sphincter repair will not have any success. Since it is a simple procedure with only minor complications, sphincter repair should be offered in cases of defined defects of the EAS. If this should not be successful, other procedures may be considered (dynamic graciloplasty, SNS, ABS).

#### Effect on Anal Pressure after Pudendal Nerve Transection and Sphincterotomy in a Rat Model

(P15)

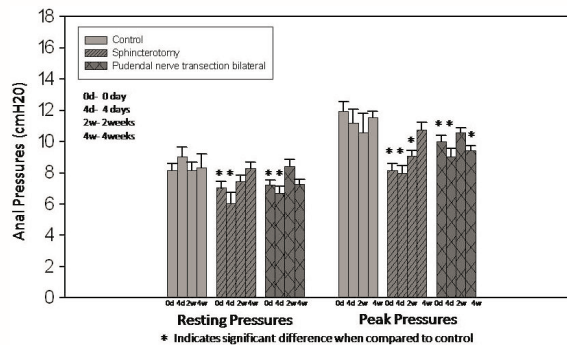
L. Salcedo, M. Damaser, T. Hull, M. Zutshi  
..... Cleveland, OH

**Purpose:** To study the longterm effect of pudendal nerve transection(PNT) and sphincterotomy on anal sphincter.

**Methods:** 72 virgin Sprague Dawley rats were grouped into control (C n=12),sphincterotomy group (SG n=30),and pudendal nerve transection group (PNTG n=30),evaluated at 4 days,2 and 4 weeks post injury(PI). The PN was identified bilaterally through the ischiorectal fossa and isolated with a suture. A balloon connected to a physiologic recording system was inserted into the anus to test anal pressure(AP). A monopolar electrode sphincter recorded EMG.All groups had baseline EMG and AP recorded.SG had a precise injury to the sphincter.The PNT was done by gently tugging the silk sutures unilateral & bilaterally.EMG was qualitatively analyzed.Histopathology utilized H&E and Masson trichrome staining.

**Results:** Baseline AP and BP testing was consistent in all groups and demonstrated spontaneous and periodic AP and EMG recordings.AP analysis used base pressure (RP),peak pressure(PC),number of peaks, peak time and contraction interval. SG data showed a significant decrease in RP and PC compared to control ( $p<0.05$ ) at 4 days PI.AP recovery was seen at 2 weeks and was comparable to controls at 4 weeks PI.EMG analysis of SG did not show any significance. PNTG showed significant decrease in RP and PC at 4 days PI( $p<0.001$ ), recovery was seen at 2 weeks, however a significant decrease was seen at 4 weeks PI( $p=0.01$ ).PNTG EMG analysis showed loss of activity on day 1 and 4 PI, however some EMG activity occurs during 2 and 4 weeks PI.SG histology showed sphincter transection at day 0, mild inflammation at day 4,fibrosis at 2weeks and increased fibrosis at 4 weeks PI.PNTG histology was same as control on day 0 and 4,however,external anal sphincter(EAS) atrophy was seen starting at 2 weeks and marked atrophy occurred at 4 weeks.

**Conclusions:** PN injury causes atrophy of the EAS altering the AP and leading to non-recovery.EMG signal was significantly decreased only after pudendal nerve transection.AP after sphincterotomy recovers significantly.The inflammatory response PI results in a time related recovery after several weeks.



Resting and peak anal pressures in controls and post anal sphincter injury at different intervals.

#### Anorectal Physiology Score and Fecal Incontinence

(P16)

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**Purpose:** Anorectal physiology (ARP) complements clinical assessment of faecal incontinence. However, individual anorectal physiology tests do not always correlate with severity of faecal incontinence. Further, because incontinence usually results from multiple and cumulative insults, it seems desirable to consider ARP tests collectively.

**Methods:** A retrospective review of patients with incontinence who underwent ARP assessment at Royal Prince Alfred Hospital was performed. ARP results were extracted and Wexner incontinence scores calculated. An APS (anorectal physiology score) was developed using maximum resting pressures, anal canal length, internal and external sphincter defects and pudendal terminal motor latency (PNTML). Univariate analysis of each of the 5 variables with incontinence score as well as multiple regression of APS with incontinence scores was carried out.

**Results:** 508 (419 women) patients underwent anorectal physiology assessment for incontinence. Wexner incontinence scores and APS were both available in 311 patients. The average maximum resting pressure was 51mmHg and 39mmHg (SD 23.2mmHg and 19.2mmHg) for men and women respectively. Functional anal canal length was 1.7cm and 0.7cm (reference: 2.5-3.5cm in men and 2.0-3.0cm in women) in men and women respectively. Univariate analysis demonstrated highly significant associations between the Wexner score and maximum resting pressures ( $p=0.0002$ ), anal canal length ( $p=0.0006$ ) and PNTML ( $p<0.0001$ ). Multiple regression demonstrated a significant relationship between APS and the Wexner score ( $p<0.0001$ ). However, APS only explained 9.2% of the variability in incontinence scores.



**Conclusions:** APS provides a quantitative, global assessment of anorectal function. However, it explains less than 10% of the variability in incontinence scores. Other physiological markers may be needed to improve the predictive ability of the model.

#### Are Patients with Double Incontinence and Fecal Incontinence Different?

(P17)

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**Purpose:** Patients seeking treatment for either urinary(UI)or fecal(FI)incontinence are rarely screened for both conditions. We compared patients with both UI and FI(double incontinence,DI) to those with only FI to assess differences in FI severity,associated symptoms,and risk factors for DI.

**Methods:** Patients with FI were selected from our database of all patients evaluated for pelvic floor disorders at our institution from 2004 to 2007.They completed a self-report questionnaire that included the Fecal Incontinence Severity Index(FISI),Fecal Incontinence Quality of Life Scale (FIQL),Sandvik Urinary Incontinence Severity Index(UI SI) and Incontinence Impact Questionnaire Short Form(IIQ-7).We compared the DI and FI-only groups using t-tests and Chi-squared analysis and identified independent risk factors for DI using multivariate logistic regression analysis.

**Results:** Of 535 patients with FI, 299 also reported urinary incontinence(56%).Significantly more women than men reported DI.The mean FISI score was slightly worse in DI patients and FIQL scores were similar for all of subscales except Embarrassment.DI patients were more likely to have

vaginal prolapse,pelvic pressure,fecal leakage with urgency,a need for pad or diapers,and a history of spinal injury,chronic back pain,arthritis,sexual abuse or pain medication use(p's <0.05).FI-only patients had more anorectal surgery(p=0.002)and internal sphincter defects on ultrasound(p=0.04).Vaginal prolapse and sexual abuse were independently associated with DI (OR 2.4, p=0.012 and OR 2.5, p=0.049, respectively), whereas surgery for fecal incontinence was independently associated with FI(OR 0.27, p=0.009).In the subset of DI patients, significant correlations were found between FISI and UI SI scores as well as between FIQL and IIQ-7 scores.

**Conclusions:** Patients presenting with fecal incontinence are likely to report urinary incontinence and there is a relationship between severity and condition-specific quality of life for both conditions. Vaginal prolapse and sexual abuse were more prevalent in DI patients. These findings highlight the importance of evaluating both anterior and posterior pelvic compartments and providing a multidisciplinary approach in this patient population.

#### The Perineal Puborectalis Sling Operation for Fecal Incontinence: A Six-Year History

(P18)

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**Purpose:** The purpose of this study was to analyze our six years of experience with the perineal puborectalis sling operation (PPS) for fecal incontinence.

**Methods:** Between August 2001 and September 2006, we performed PPS on 16 patients with idiopathic fecal incontinence. As previously reported, the PPS technique involves placing a specially designed polyester mesh sling posterior to the anorectal angle as a backboard for the rectal sling, which

#### P17

	FI	DI	P value
N	236	299	
Mean Age(yrs)	55.3	58.5	0.232
Women(%)	59	37	<0.0001
Mean FISI Score	31.4	32.1	0.058
Mean FIQL Sum score	9.3	9.5	0.289
Mean FIQL Lifestyle Score	2.5	2.6	0.801
Mean FIQL Depression/Self Perception Score	2.6	2.6	0.821
Mean FIQL Coping/Behavior Score	2.0	2.0	0.196
Mean FIQL Embarrassment Score	2.2	2.3	0.053
Mean UI SI Score	—	5.3	
Mean IIQ-7 Sum Score	—	3.8	
Correlations	r	P value	
FISI/UI SI	0.337	<0.0005	
FIQL/IIQ-7	-0.416*	<0.0005	

\*Increase in FIQL score and decrease in IIQ-7 score associated with worse quality of life.

pulls it forward. During this period, mesh placement and routing techniques were modified. Patients were questioned as to the frequency of incontinence episodes both before and six months after the operation. Along with these questions, Manometry and defecography were performed.

**Results:** There were two men and 14 women with a mean age of 67 (range, 44–79). Of the first eight patients, all of whom received intersphincteric mesh placement, an anorectal ulcer developed in one patient. Subsequently, mesh placement was changed to an extrasphincteric fashion. After adopting the extrasphincteric mesh placement, there was one who developed severe peripubic abscesses that required repeated drainage operations among the next five patients. Another of these patients developed intractable right groin pain. Beginning with the 14th patient, we abandoned retrobupic routing and adopted superficial routing, which has become our standard. We encountered no complications in the three patients that followed. Excluding the three patients with significant complications, the remaining 13 patients were analyzed. Two patients (15%) reported that the frequency of incontinence episodes had reduced to  $<1/2$  as often, and eight patients (62%) reported that the episodes had reduced but did occur  $>1/2$  as often as before. Three patients (23%) reported no improvement. No significant difference was found between pre- and post-operative maximum resting pressure and maximum squeeze pressure. However, the median anorectal angle on defecography, with a strain and squeeze phase, was significantly reduced after the operation (122 vs 112, 110 vs 101,  $p<0.05$ ).

**Conclusions:** PPS can be an effective procedure for idiopathic fecal incontinence. Further investigation is needed to reduce the risk of potential complications.

#### Quality of Life and Functional Outcome after Secondary Repair of Obstetric Anal Sphincter Injury (OASIS)

(P19)

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..... Southampton, United Kingdom

**Purpose:** OASIS is a common cause of anal incontinence in women. Anterior overlapping sphincter repair improves early incontinence rates by 60 to 97 percent, although long term functional outcome may deteriorate.

**Methods:** Thirty-four patients who underwent secondary OASIS repair between January 1999 and December 2006 were included. Preoperative and follow-up anal incontinence was measured using the Cleveland Clinic Incontinence (CCI) Score. Postoperative quality of life was assessed at a mean of 41.5 months (range 12 to 91 months) using the FIQL Scale.

**Results:** Twenty-three of the 34 patients consented to participate. The mean age at surgery was 44 years (range 26–74). Pre and postoperative CCI scores were available for 15 patients. Improved continence scores were recorded in 11 (73%) of these patients. The median CCI score reduced

from 14 preoperatively to 9 postoperatively. Patients with a CCI  $> 9$  scored significantly lower in all domains of the FIQL questionnaire ( $P<0.001$ ).

**Conclusions:** Secondary anal sphincter repair improves anal incontinence for the majority of patients after obstetric injury. Seventy-three per cent of patients in this series had improved continence at 3.5 years follow-up. Patients with a postoperative CCI  $> 9$  had a significantly lower quality of life score. Anal incontinence symptoms have a negative impact on patient quality of life.

#### Effectiveness of Surgeon Advice and Conservative Management in Fecal Incontinence

(P20)

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**Purpose:** Conservative management by dietary modification and general advice is usually the first line treatment for faecal incontinence. It may be the only treatment needed in patients with mild faecal incontinence and is often the bridging treatment while awaiting other interventions such as biofeedback or surgery. This advice is commonly provided by colorectal surgeons who first encounter these patients but its effectiveness is poorly documented.

**Methods:** A retrospective study of patients with faecal incontinence presenting to a single surgeon was carried out between 1999 and 2006. During consultation with the surgeon (Time 1), incontinence was assessed using Pescatori scores and standardized (written and verbal) advice for faecal incontinence was given. Six to eight weeks after surgeon consultation (Time 2), Pescatori scores were repeated prior to commencement of biofeedback by a biofeedback therapist. Change in Pescatori scores between time 1 and 2 were compared using a paired t test.

**Results:** Over the study period, 146 (132 women) patients had Pescatori scores documented at both encounters. The mean Pescatori scores were 4.49 (SD 1.00) and 3.96 (SD 1.59) at time 1 and time 2 respectively giving a mean difference of 0.53. This difference was highly significant ( $t=3.895$ ,  $df=145$ ,  $p<0.0001$ , 95% CI= 0.26 to 0.81). There were no significant differences in the mean difference in Pescatori scores by gender or baseline severity of incontinence.

**Conclusions:** Surgeon advice is effective at reducing severity of faecal incontinence. Although Pescatori scores were assessed by different individuals at the two encounters, these results remain highly significant.

#### Quantifying External Anal Sphincter Function in Idiopathic Fecal Incontinence

(P21)

K. Thirupathy, A. Bajwa, P. Trivedi, P. Boulos, A. Emmanuel . . . . . London, United Kingdom

**Purpose:** Biofeedback and sacral nerve stimulation (SNS)

improves external anal sphincter (EAS) function in patients with idiopathic fecal incontinence (IFI). Predicting the reserve EAS function may help identify patients likely to benefit from these treatments. Voluntary EAS function can be augmented by distending the rectum as part of the bowel Guarding Response (GR). This study aims to quantify reserve EAS function by comparing the GR in patients with IFI with controls.

**Methods:** Twenty asymptomatic controls and 10 patients with IFI with ultrasound proven intact sphincters were included in this study. All patients underwent rectal barostat studies with simultaneous anal canal manometry. After determining the minimum distension pressure, stepwise 50ml distensions were performed every 2 minutes (to the limit of patient tolerance or 200mL) whilst anal maximum squeeze pressures (MSP) were recorded and compared to baseline MSP (with the barostat catheter in place but before rectal distension). EAS augmentation was quantified as the maximum percentage increase in MSP compared to baseline and termed the GR. Rectal compliance, measured using the same distension protocol, was expressed as the change in rectal pressure per mL of rectal distension and was correlated with the GR using Pearson's correlation test.

**Results:** 19 of the 20 controls and 9 of the 10 patients with IFI demonstrated the GR, namely EAS augmentation during rectal distension. The mean GR in controls and the IFI group was 17.7% (SD 15.4, range -5.5% to 58.7%) and 43.1% (SD 47.2, range -8.0 to 123.8) respectively. This 25.4% higher GR in the IFI group compared to controls was significant ( $p=0.017$ ). Rectal compliance was similar in controls and IFI groups (Mean = 0.053mmHg/mL (SD 0.029) and 0.067mmHg/mL (SD 0.033) respectively). Compliance inversely correlated with GR in controls only ( $r = 0.496$ ,  $p=0.013$ ), but not in the IFI group ( $r=0.118$ ,  $p=0.373$ ).

**Conclusions:** Compared with controls, patients with IFI have a higher proportion of unutilised EAS function that may improve with either biofeedback or SNS. The loss of correlation between rectal compliance and GR in IFI indicates anorectal dysfunction. This may form the pathophysiological basis of this condition.

#### Short-Term Fecal Incontinence after 3rd/4th Degree Tear is Uncommon

(P22)

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**Purpose:** Short- and long-term faecal continence rates after 3rd/4th degree obstetric-related perineal tears are unclear. The degree of disruption to anal sphincters is related to women's subsequent risk of faecal incontinence (FI).

**Methods:** Consecutive women with clinically diagnosed 3rd/4th degree (sphincter involving) obstetric tears over a 9 month period were referred for gastrointestinal assessment. They completed bowel function scores (Wexner incontinence

scores). Endoanal ultrasound and anorectal physiology were performed. Comparison was made between women with radiologically confirmed 3rd/4th (all of whom had undergone primary repair) and those with 1st/2nd degree tears.

**Results:** 101 patients with a clinically diagnosed 3rd/4th degree tears during vaginal delivery were referred 3 months post-partum. Ultrasound revealed that 32/101(32%) had no evidence of sphincter injury (1st/2nd degree tear), 59/69(86%) had good repair and 14% (10/69) had persisting sphincter defects. 48% of 3rd/4th degree tears occurred with first births. More women reported FI in the group with actual sphincter injury (61 vs 34%,  $p=0.01$  chi-squared). A persistent sphincter defect was associated with significant faecal incontinence. Anal resting pressure (internal sphincter function) was similar in both 3rd/4th and 1st/2nd degree tear groups (59 vs 65mmHg,  $p=0.13$ ). Anal squeeze pressure (external sphincter function) was lower in 3rd/4th than 1st/2nd degree tear groups (57 vs 73mmHg,  $p=0.003$ ). Rectal distension sensitivity and anorectal electrosensitivity was similar in both groups.

**Conclusions:** One-third of patients with reported 3rd/4th degree tears were over-diagnosed. Sphincter repairs were often intact at 3 months. Persisting defects are associated with greatest symptoms. In the absence of sphincter injury women may still suffer with FI after child birth (related to sphincter weakness rather than sensory change).

#### Is Fecal Incontinence after Surgical Treatment of Anal Fissure a Surgeon or Technique-Related Complication?

(P23)

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**Purpose:** Anal fissure is associated with a grade of fecal incontinence, but lateral internal sphincterotomy is considered as major factor for incontinence after surgery. In this study we try to determine the role of sphincterotomy in fecal incontinence comparing with the level of disease involvement.

**Methods:** We involved in this prospective study 64 consecutive patients with anal fissure. In all patients we assessed severity of incontinence clinically, using a questionnaire and objective by endoanal ultrasonography. In 32 patients we achieved lateral internal sphincterotomy and in the rest of 32 patients only a conservative internal sphincterotomy below the fissure apex. Patients were assessed postoperatively and at one month and 6 months clinically and by endoanal ultrasonography.

**Results:** Endoanal ultrasonography showed minor lesions in 7 patients (10.94%) preoperatively even clinically we discover minor incontinence in 12 patients (18.75%). After the sphincterotomy 4 patients (12.5%) from "radical" group and only one patient (3.12%) from conservative group developed incontinence ( $p<0.01$ ). During the late assessment (at 1 and 6 months) only 2 patients from each

group presented minor incontinence and two patients from conservative group presented relapsing of fissure ( $p=NS$ ).

**Conclusions:** 1. We consider lateral internal sphincterotomy as treatment of choice of anal fissure. 2. Anal fissure may be associated with a grade of fecal incontinence, symptom being remitted after surgical intervention. 3. On short term sphincterotomy below the fissure apex is associated with less complications, but on long-term there were no differences between these two groups in terms of complications.

#### Aspect of Fecal Incontinence Improved by Sacral Nerve Stimulation (SNS)

(P24)

L. Douglas, K. Cattle, E. Kiff

..... Manchester, United Kingdom

**Purpose:** SNS is an established method for the treatment of faecal incontinence. The symptoms of incontinence are varied, comprising of urge and passive incontinence. The frequency of symptoms also alters by the number of episodes a week and the number of days of incontinence that occur. The aim of the study is to identify if all aspects of faecal incontinence are improved by SNS.

**Methods:** As part of the assessment for suitability for a SNS implantation, patients complete diaries recording the number of episodes of incontinence. The diaries record the number of incontinent days a week and number of episodes of incontinence per week. This can be further subdivided in to passive incontinence, episodes of incontinence due to urgency, episodes of urgency without incontinence. We looked at the percentage improvement for each aspect recorded on the diaries to assess if one aspect of incontinence is improved preferentially.

**Results:** In our unit 41 patients have had permanent SNS implanted for faecal incontinence. Of these, 32 have fully completed diaries before and after SNS implantation. 5 patients had their initial assessment and implantation

carried out in a separate unit and their diaries are not available. The other four patients had not completed diaries for both before and after implantation. The results are shown in the table.

**Conclusions:** All aspects of fecal incontinence were improved. The most significant improvement was seen in the faecal incontinence due to urgency, although the number of episodes of urgency was not improved to same extent. This may reflect that although urgency still exists, the number of times this leads to frank incontinence is reduced. Also, the number of days on which leakage occurs was only reduced by 65% so may represent a continuing problem if leakage was the main aspect of incontinence.

#### Additional Procedures Required for Patients Who Have Had Sacral Nerve Stimulators Inserted to Aid Continence

(P25)

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..... Manchester, United Kingdom

**Purpose:** Sacral nerve stimulators are becoming one of the mainstays in the treatment of faecal incontinence. Before implanting a permanent stimulator patients have a trial to confirm that there would be benefit from having a device inserted. We aimed to assess how many further procedures have been required to aid continence.

**Methods:** All patients who have had a sacral nerve stimulator inserted are followed up closely with frequent review with regards their device efficacy and quality of life. We examined how many of the patients in our unit have required further surgical intervention to aid continence. These were sub divided into procedures related to the SNS device and other continence procedures.

**Results:** There are currently 36 patients in our unit who have had sacral nerve stimulators implanted. 4 patients have had further procedures related to their sacral nerve stimulators. 3 patients have had procedures to aid continence not related to their sacral nerve stimulators. The procedures undertaken are shown in the table.

#### P24 Results

	Average number of incontinent episodes per week	Average number of incontinent days per week	Average number of leakage episodes/ week	Average number of days with leakage/ week	Average number of urgency episodes without incontinence/ week	Average number of days with urgency episodes without incontinence/ week
Pre stimulation	2.1	3.8	4	2.3	8.6	4.1
Post Stimulation	0.5	0.6	0.8	0.8	2.6	1.7
Percentage improvement	76%	84%	80%	65%	70%	59%



**Conclusions:** Sacral nerve stimulation is an effective treatment of fecal incontinence, but there are often further procedures needed both to the device and further separate procedures to aid continence.

#### Submucous Injectable Therapy with NASHA/Dx for Anal Incontinence – 2-Year Follow-up

(P26)

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**Purpose:** The idea behind anorectal bulking therapy is to expand the anorectal junction to increase resistance to leakage of faeces. Theoretically patients with moderate internal sphincter dysfunction would have most benefit of this treatment, and it appears reasonable to assume that the effect could deteriorate with time. The aim of this study was to assess the results 2 years after submucous injection of NASHA/Dx and also to evaluate the results in relation to clinical characteristics.

**Methods:** 34 patients (5 men, mean age 61, 34-80) with fecal incontinence were injected with 4 x 1 ml in the submucous layer above the dentate line. 18 patients received a second treatment after 4 weeks. The patients were followed up every 6 months up to 2 years with registration of incontinence episodes using a 4 weeks diary and a bowel function questionnaire. 1 patient was lost to follow up.

**Results:** All injections were performed at an out patient setting without anaesthesia and no SAE occurred. 25/34 (74%), 26/33 (79%), 26/33 (79%) stated improvement after 12, 18, and 24 months, respectively. The average number of leak episodes were 25 before treatment and decreased to 15, 16 and 13 after 12, 18 and 24 months respectively ( $p < 0.01$ , Wilcoxon signed rank test). Reduction of Millers incontinence score was significant ( $p < 0.01$ , Wilcoxon signed rank test) except for patients with urge incontinence and patients

only treated once. The results were independent of age, gender, presence of sphincter defect, pre-treatment manometry and severity of incontinence.

**Conclusions:** Anorectal injection of NASHA/Dx gel was safe and induced a definite improvement of incontinence symptoms which was sustained for two years. Patients with non-urge incontinence appeared to have a better response to treatment. These results suggest that NASHA/Dx is a valuable alternative as minimal invasive treatment for passive fecal incontinence.

#### Sacral Nerve Stimulation in Fecal Incontinence Due to Anal Sphincter Lesions

(P27)

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 . . . . . Rome, Italy; Padua, Italy; Bari, Italy; Montecchio Emilia, Italy; Turin, Italy; Verona, Italy; Pisa, Italy; Ancona, Italy; Milan, Italy

**Purpose:** Anal sphincters lesion (ASL) is the most frequent cause of fecal incontinence (FI). Traditionally, sphincteroplasty has been considered the most effective surgical therapy; however, long-term results have evidenced benefits deterioration. Sacral nerve stimulation (SNS) has been used in incontinent patients with ASL.

**Methods:** Twenty patients (19 females, mean age:  $57 \pm 13$  yrs) presenting ASL, established by endoanal ultrasound (internal sphincter lesion, ISL, 4 pts., external sphincter lesion, ESL, 6 pts., external+internal sphincter lesion, IESL, 10 pts.; circumferential extension ranging between 20 and 180 degrees) underwent definitive SNS implant and re-evaluated at median follow up of 25 months (range: 6-87), in terms of number of FI episodes, number of pads consumed, Wexner score, anorectal manometry, and PNTML.

#### P25 Interventions Undertaken

	SNS related procedures	Reason for intervention.
Patient 1	Explantation	Pain ?lead infection
Patient 2	Lead repositioning	Lead inserted too far withdrawn
	Lead replacement	Lead out of sacrum. Two stage procedure: 1. remove lead; 2. replace lead at separate procedure.
Patient 3	Lead replacement	Lead out of sacrum
	Lead replacement device side switched	Lead fracture following fall, side switched to reduce infection risk
	PNE original side	SNS poorly functioning to assess if benefit of switching sides
Patient 4	Lead change switch side	PNE showed improvement
	Lead replacement	Lead fracture during orthopaedic surgery
	Procedure	Reason for intervention
Patient 5	Anal bulking agent	Urgency improved, leakage a problem
Patient 6	Anal bulking agent	Urgency improved, leakage a problem
Patient 7	Sphincter repair	Small anterior sphincter defect, persistent leakage but urgency improved.

**Results:** Compared to pre-SNS, number of major FI episodes and Wexner's score significantly improved following SNS (from 1.3 to 0.3,  $p=0.03$ , and from 15.9 to 4.6,  $p<0.001$ , respectively). Resting and squeeze pressures, and functional anal canal length also increased after SNS implant.

**Conclusions:** These data show that SNS is an effective option in treating FI patients with ASL, giving significant reduction of FI episodes and score. Mechanisms of action need to be elucidated in order to appropriately select patients with ASL to this therapy.

#### Overlapping Sphincteroplasty and Anterior Levatoplasty in Women with Obstetric Injuries – Long Term Results (P28)

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**Purpose:** To evaluate the long-term results of overlapping sphincteroplasty and anterior levatoplasty in women with fecal incontinence due to obstetric injuries.

**Methods:** Retrospective chart review of 154 patients with fecal incontinence from a large colorectal practice. The procedures were performed by five experienced colorectal surgeons. All the patients filled the Modified Wexner Incontinence Scale preoperatively and postoperatively. The median follow up was 5.5 years.

**Results:** All patients had obstetric trauma. However, 24.6% had fourth degree tears. The median age was 48 years (range 24 – 78). Majority of the patients had incontinence to flatus (96%), liquid stools (95%), solid stools (75%), and 70% had record of pad usage. Preoperative work-up included anal manometry (47%), endoanal ultrasound (81%) or both (21%). Only 12.9% had no preoperative testing. Postoperatively, 67.5% of patients had improvement in flatus incontinence, while only 53.5% had improvement in liquid stool incontinence, and 75.7% had improvement in solid stool incontinence. Ninety percent (90%) of patients had improvement in pad usage. There were no differences in the results for younger women (<50 years) as compared to older women (>50 years).

**Conclusions:** Overlapping sphincteroplasty and anterior levatoplasty provides long-term improvement in women with fecal incontinence due to obstetric injuries. These results hold true regardless of age.

#### Repair of Traumatic Cloaca (P29)

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**Purpose:** Severe obstetric injury can result in a defect similar to a congenital cloacal deformity with associated faecal incontinence and sexual dysfunction. We aimed to assess the effectiveness of surgical repair for this injury.

**Methods:** We reviewed outcomes in 29 consecutive patients over a 14 year period. Patients were identified retrospectively from hospital records. An overlapping external sphincter repair, with reconstruction of the anal canal, and vagina was performed in 27 patients. Long term follow up data was collected by telephone interview.

**Results:** Long term follow up data was available for 18 patients at a median of 5 years. Three patients had a stoma at presentation. The number of patients with incontinence to solid stool was reduced from 5/15 (33%) to 0/18 (0%) ( $p=0.012$ ), with liquid stool from 12/15 (80%) to 9/18 (50%) ( $p=0.078$ ), and with flatus incontinence from 15/15 (100%) to 11/18 (71%) ( $p<0.01$ ) after repair. Nine patients (50%) reported improvement in sexual function.

**Conclusions:** Surgical repair of the cloacal type injury is associated with significant improvements in faecal incontinence and sexual function. Outcomes are similar to those seen with repair of less severe injuries, and appear to be maintained in the long term.

#### Reduced Somatosensory Cortical Activation in Rat Models of Neuropathic Fecal Incontinence (P30)

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**Purpose:** Using two rat models simulating neuropathic faecal incontinence, the effect of the injury on somatosensory evoked potentials, axonal counts and cross sectional areas was determined. These experiments test whether altered cortical drive occurs in the models and identify whether peripheral or central alterations accompany the injury.

**Methods:** 18 female virgin Wistar rats were allocated equally to three groups: a control group, a nerve crush group and a nerve balloon compression group. The creation of the rat models (Healy et al, Dis Colon Rectum in press) involves either a focal crush of the inferior rectal nerve or compression of it by catheter balloon inflation. Four weeks post-injury, all animals underwent cortical somatosensory evoked potential (SSEP) recordings. Following this, the inferior rectal nerve which had been stimulated to evoke the SSEP was harvested, resin embedded, sectioned (1 $\mu$ m thickness) and analysed using Scion Image software.

**Results:** The nerve crush and balloon compression rats had significantly smaller SSEPs than control rats ( $p=0.024$ ,  $p=0.03$  respectively, Dunnett post hoc test). The inferior rectal nerve was successfully harvested in 14 of the 18 rats (4 control, 5 nerve crush, 5 balloon compression). There was no significant difference in median inferior rectal nerve total axonal counts ( $p=0.69$ , Kruskal-Wallis test). No significant difference was demonstrated in the frequency distribution of axonal cross sectional area: control versus nerve crush and control versus balloon compression ( $p=0.92$ ,  $p=0.17$  respectively, Kolmogorov-Smirnov test). A significant difference in the median axonal cross sectional area was

found: control  $12.6\mu\text{m}^2$ , nerve crush  $13.3\mu\text{m}^2$  and balloon compression  $17.6\mu\text{m}^2$  ( $p<0.0001$ , Kruskal-Wallis test).

**Conclusions:** There is a significant reduction of evoked cortical potentials in both models despite the fact that an equal number of axons were stimulated compared to controls. This suggests that the altered cortical drive in these models is a result of modified central processing and not peripheral axonal loss. The raised median axonal cross sectional area in the balloon compression group is possibly due to residual post-injury oedema.

#### Sacral Neuromodulation is Effective Therapy for Fecal Incontinence Due to External Sphincter Atrophy

(P31)

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**Purpose:** Management of fecal incontinence due to external anal sphincter (EAS) atrophy, thinning of the muscle or diffuse replacement by fat, is not well established in the literature. The purpose of this study was to assess the effects of sacral nerve modulation (SNM) in patients with this pathological condition.

**Methods:** Twelve patients (10 females/2 males, mean age:  $63\pm 6$  yrs) with FI and EAS atrophy were included. At MR imaging seven patients had mild EAS atrophy and five patients had severe EAS atrophy ( $<50\%$  or  $\geq 50\%$  thinning and/or replacement of sphincter muscle by fat, respectively). All patients had a permanent SNM electrode implanted. Patient response was determined by a bowel-habit diary, the Wexner incontinence and the fecal incontinence quality of life (FIQL) questionnaires and anorectal physiology at baseline and at 12 months after implant.

**Results:** The median follow-up was 14.3 months. SNM significantly reduced the Wexner incontinence score (14.9 vs. 3.7,  $p<0.001$ ), the daily number of urge incontinence episodes (test vs. baseline:  $p<0.001$ ) and improved the quality of life (lifestyle 1.17 vs. 3.37,  $p<0.001$ ; embarrassment 1.48 vs. 3.57,  $p<0.001$ ; coping/behaviour 1.19 vs. 3.32,  $p<0.001$ ; depression 2.08 vs. 3.71,  $p<0.001$ ). There was no significant difference in resting and squeeze pressures during SNM. Comparison between patients with mild or severe EAS atrophy revealed no statistical differences.

**Conclusions:** FI associated with EAS atrophy can be treated primarily with SNM. Analysis of our data, showing that SNM is effective regardless the grading of EAS atrophy, suggests that neuromodulation does not primarily act on EAS but at spinal and/or central level. Larger group is needed to allow the effects of SNS for this condition to be assessed with more certainty.

#### Comparison of the Clinical Outcome Between Open and Percutaneous Lead Insertion in Permanent Sacral Nerve Stimulation for Fecal Incontinence

(P32)

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..... Harrow, United Kingdom

**Purpose:** Sacral nerve stimulation (SNS) is an established treatment for faecal incontinence (FI) with proven long-term clinical efficacy. However, data from early studies is based on a stimulation electrode lead now rarely used, that is placed in the sacral foramen under direct vision by an open surgical technique (Medtronic InterStim 3080). With the introduction of a percutaneous inserted lead in 2003 (Medtronic InterStim 3889/3093) the therapy has become minimally invasive with reported good short-term results and low complication rates. We aimed to investigate whether there is any difference in clinical efficacy and adverse complications between the two methods of lead placement.

**Methods:** Prospectively collected data in the form of bowel habit diaries, anorectal physiology and endoanal ultrasound were analysed on 48 patients who had undergone permanent SNS for severe FI at a single institution between 1997 and 2006. 18 subjects had undergone open lead placement (group 1) and 30 subjects percutaneous lead placement (group 2).

**Results:** Those implanted with the InterStim 3080 lead had a median follow-up of 51 (range 22-106) months compared with those implanted with the InterStim 3889/3093 lead who had a median follow-up of 8 (1 - 40) months. There was no difference between baseline patient demographics, severity of incontinence or anorectal physiological measurements between the two groups. The number of subjects who had undergone a previous anal sphincteroplasty was greater in group 2 ( $p=0.028$ ). The lead type did not appear to significantly affect the functional outcome of chronic stimulation with similar reductions in episodes of urge incontinence ( $p=0.507$ ), passive incontinence ( $p=0.196$ ) and total episodes of incontinence ( $p=0.448$ ) between the two groups. There was no significant difference in the incidence of infections or lead dislocation between the two groups.

**Conclusions:** The percutaneously inserted lead appears to be as effective as the openly inserted lead in terms of clinical efficacy and complication rate in the short-term. Further long-term evaluation is required to ascertain whether the two techniques of lead insertion are comparable over time.

# Internal Sphincter-Sparing Surgery for Fissure-in-Ano: Long Term Follow-Up of 200 Cases

(P33)

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**Purpose:** To examine the long term success rate of internal sphincter-sparing surgery (subcutaneous fissurotomy) for chronic fissure in ano

**Methods:** A novel surgical technique for chronic fissure in ano (subcutaneous fissurotomy) was prospectively examined: The subcutaneous sinus tracts extending caudally from chronic fissures were laid open surgically, the edges debrided and the base of the fissure was cauterized for pain control and hemostasis. Sentinal tags and hypertrophied papillas were excised when present. This procedure results in significant release of the distal anal canal and renders internal sphincterotomy unnecessary and even potentially problematic. Postoperatively, patients were instructed to take a daily fiber supplement, take warm soaks and apply topical 10% metronidazole to the surgical site tid. Data was collected prospectively on a computer database, and the need for repeat surgery was calculated.

**Results:** Two hundred patients were accrued over a 3 year study period. Median follow-up was 2 years. One hundred and ninety two patients (96%) reported symptomatic relief and required no additional surgery. Eight patients (4%) required repeat surgery for persistent fissure symptoms: Six out of the 8 failures underwent repeat subcutaneous fissurotomy, without internal sphincterotomy, and this was successful in all cases. Two patients required internal sphincterotomy. Time to repeat surgery varied from 1 month to 1 year. Failed surgical procedures resulted from the surgical site "closing over" prematurely, rather than healing by secondary intention. No patient reported any change in continence.

**Conclusions:** Subcutaneous fissurotomy results in long term healing of fissures in 96% of patients. Failed procedures result from premature "closing over" of the surgical site, so creating another fissure and sinus tract, rather than healing by secondary intention. Failures responded to repeat subcutaneous fissurotomy in 6 out of 8 cases. Of the 200 cases in the present series, 2 patients required internal sphincterotomy. The new procedure is safe, effective and avoids potential incontinence.

# Chronic Anal Fissure: A Novel Approach to Surgical Internal Sphincterotomy with Minimal Risk of Postoperative Incontinence

(P34)

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**Purpose:** Conservative internal sphincterotomy for chronic anal fissure has focused on minimizing the longitudinal length of the divided internal anal sphincter (IAS). This study aimed to introduce a novel approach to surgically "thinning" the IAS while maintaining its longitudinal length, and to assess its outcome with regard to fissure persistence and fecal incontinence compared to traditional lateral internal sphincterotomy (LIS).

**Methods:** From May 2004 to December 2006, 45 patients (Group I) underwent a traditional open LIS while 49 (Group II) had a "thinning" open LIS. For "thinning" LIS, the taut portion of the IAS below the dentate line was deliberately made thinner with its continuity preserved through a longitudinal open incision so that it becomes flexible, under the guidance of the surgeon's finger. All procedures were done by a single surgeon under caudal anesthesia. Patients were reexamined on postoperative day 1 and at 6 weeks. Endoanal ultrasonography (EAUS) was performed preoperatively and at 6 weeks postoperatively. Continence status was assessed preoperatively, at the 6 week postoperative visit, and at the time of interview by an independent observer. Ninety percent (85/94) of patients were interviewed with a mean follow-up of 13 (range: 10-18) months.

**Results:** There were no differences in age, gender distribution, and the length of follow-up between the two groups. All patients in both groups were discharged pain-free on day 1. 44 patients (98%) in Group I and 47 (96%) in Group II had complete healing at 6 weeks follow-up ( $P>0.05$ ). All fissures were healed by 8 weeks. All patients were continent preoperatively. At the 6 weeks visit, 7 patients in Group I (15.6%) and 1 patient (2%) in Group II complained of incontinence to gas ( $P<0.02$ ). At the time of telephone interview, 5 (11%) patients in Group I and 1 (2%) in Group II remained incontinent to gas ( $P=0.07$ ). EAUS revealed a complete IAS defect in all patients in Group I while it showed a thinner portion in the IAS with its continuity preserved in Group II.

**Conclusions:** "Thinning" instead of "dividing" internal sphincterotomy can heal chronic anal fissures with minimal risk of postoperative incontinence.

**P32 Table to show the number of patients who have satisfied the primary end-point of 50% reduction in total episodes of fecal incontinence with chronic sacral nerve stimulation when compared to pre-stimulation baseline measurement by two-week bowel habit diary.**

	'Old' Model 3080 lead Median 51 months follow-up (n=18)	'New' Model 3889/3093 lead Median 8 months follow-up (n=30)
≥ 50% reduction of total episodes of incontinence	17	24
< 50% reduction of total episodes of incontinence	1	6

Fisher's exact test;  $p=0.231$



# Pharmacologic Characterization of Mechanisms Controlling Relaxation of Porcine Internal Anal Sphincter

(P35)

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**Purpose:** To evaluate the neurotransmitters involved in the relaxation of porcine internal anal sphincter(IAS).

**Methods:** Circular muscle IAS strips (3x10mm) from adult pigs (N=72) were studied in vitro in organ baths (37C). Experimental design: a) effect of inhibitory neurotransmitters (NTs) on IAS tone, b) effect of specific antagonists on responses induced by stimulation of IAS motor neurons (MNs) with electrical field stimulation (EFS 0.3-20Hz) and through nicotinic receptors (nAChRs).

**Results:** IAS strips developed active tone of  $4.3 \pm 0.2$ g. ODQ  $10 \mu\text{M}$ , L-NAME  $1 \text{mM}$  and MRS2179  $10 \mu\text{M}$  significantly enhanced tone in  $16.9 \pm 6.7\%$ ,  $13.1 \pm 1.6\%$  and  $6.7 \pm 1.2\%$  respectively. The NO donor SNP  $10 \mu\text{M}$  ( $-67 \pm 4.4\%$ ), VIP  $1 \mu\text{M}$  ( $-46.8 \pm 7.9\%$ ), PACAP  $1 \mu\text{M}$  ( $-38.7 \pm 8\%$ ), and ADP $\beta$ S  $100 \mu\text{M}$  ( $-16.3 \pm 4.16\%$ ) induced an intense IAS relaxation unaffected by TTX  $1 \mu\text{M}$ , whereas the carbon monoxide (CO) donor CORM-1  $600 \mu\text{M}$  induced a slight relaxation ( $-9.2 \pm 3.7\%$ ). ODQ specifically blocked SNP induced relaxation. MRS2179 specifically blocked ADP $\beta$ S relaxation. The peptidase  $\alpha$ CMT inhibited VIP relaxation. ODQ did not affect the relaxation induced by CORM-1. IAS strips responded to EFS with a frequency-dependent on relaxation (5Hz,  $-45.1 \pm 5.6\%$ ) and off contraction (20Hz,  $5.3 \pm 1$ g) both fully blocked by TTX. EFS induced-on relaxation was strongly inhibited by ODQ (5Hz,  $-86.8 \pm 0.9\%$ ), or L-NAME (at 5Hz  $-92.6 \pm 1.7\%$ ). Electrical contraction was enhanced by ODQ (20Hz,  $+71.1 \pm 7.2\%$ ) and fully blocked by sequential addition of atropine and phentolamine. Stimulation of MNs by NIC  $100 \mu\text{M}$  induced strong IAS relaxation ( $-48.9 \pm 6.1\%$ ) antagonized by TTX ( $-30.6 \pm 4.3\%$ ). Nicotine-induced relaxation was almost abolished by L-NAME ( $-85.8 \pm 6.1\%$ ,  $P < 0.01$ ), ODQ ( $-75.9 \pm 3.2\%$ ,  $P < 0.001$ ) or MRS2179 ( $-70.1 \pm 10.9\%$ ,  $P < 0.001$ ), and slightly affected by  $\alpha$ CMT ( $-14.50 \pm 3.74\%$ ,  $P < 0.01$ ).

**Conclusions:** IAS relaxation following stimulation of inhibitory EMNs is mainly mediated by NO acting through Guanylate Cyclase signal pathways. IAS relaxation is also mediated by co-transmission of purine acting on P2Y1 receptors and slight contribution of VIP and/or PACAP. This study suggests that CO do not play a major role in porcine IAS relaxation.

# Outcome from Botox Clinic for Chronic Anal Fissure

(P36)

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**Purpose:** A recent meta-analysis on chronic anal fissures reported an overall healing rate of 65% with Botox injection. This report summarises healing rates during the first two years of a "Botox Clinic" for the injection of chronic anal fissures with Dysport.

**Methods:** A prospectively maintained database was used to identify 71 patients who were treated at the Botox Clinic between 20/09/2005 and 20/09/2007. All patients received 100U Dysport via 2 injection sites at 3 and 9 o'clock into the internal anal sphincter. Pre-injection anorectal physiology was extracted from the database and the outcome of treatment was reviewed

**Results:** Data was available from 58 patients for analysis. In addition, 13 patients did not attend outpatient appointment and were not available for telephone follow-up. After injection, 33 patients became asymptomatic. Within the symptomatic group (n=25), 7 patients were referred for lateral internal anal sphincterotomy, 5 had repeat injections, 3 had examination under anaesthesia and 10 with relatively minor symptoms were given a further clinic appointment. There was no significant difference in mean resting pressure in patients who became asymptomatic after injection compared with those who remained symptomatic ( $P=0.204$ ) (See Table 1).

**Conclusions:** In this series, 57% of the study group were asymptomatic at follow-up and 43% of patients remained symptomatic after Botox injection for chronic anal fissure. In addition 1 in 8 patients underwent sphincterotomy for persistent symptoms. Anorectal physiology was not useful in predicting relief of symptoms after Botox injection.

# Injection of Botulinum Toxin for Functional Anal Pain

(P37)

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**Purpose:** Anal pain may occur in the absence of demonstrable anal pathology such as fissure or sepsis. Spasm of the sphincter muscles has been suggested as a cause in some patients, but the aetiology remains unclear. Existing treatments

**P36 Table 1: Anorectal Physiology in Chronic Anal Fissure (MRP mean resting pressure, MSP mean squeeze pressure, SD standard deviation, N number of patients)**

	N	MRP(mmHg)	SD MRP	MSP(mmHg)	SD MSP
Asymptomatic	33	43.2	16.1	80.9	51.3
Symptomatic	25	49.5	21.5	69.9	39.9
Unknown	13	49.3	20.1	93.9	54.1

are frequently unsatisfactory. We aimed to assess the effectiveness of injection of botulinum toxin to treat this condition.

**Methods:** Patients who had injection of botulinum toxin over a 3 year period were identified retrospectively. Patients were excluded if anal fissure, or other organic pathology was found to account for their symptoms on examination under anaesthetic.

**Results:** Fifteen patients were identified, 8 males and 7 females, with an average age of 53 years. Between 20 and 100 units of botulinum toxin were injected into the internal sphincter. Seven out of 15 (47%) reported significant improvement in their symptoms following injection. Two patients with initial improvement reported recurrence of their symptoms within 1 year. One had further injection of botulinum toxin after recurrence which was unsuccessful.

**Conclusions:** Injection of botulinum toxin into the internal anal sphincter is an effective treatment in nearly half of patients with functional anal pain.

#### The Treatment of Chronic Anal Fissure with Botulinum Toxin and Fissurectomy

(P38)

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**Purpose:** To assess the role of botulinum toxin in the treatment of chronic anal fissure compared to conservative non-surgical treatment.

**Methods:** A retrospective chart review was performed on all patients who presented with anal fissure for more than 4 weeks. These patients were given the option of continuing conservative management of topical analgesic, fiber and hot sitsz bath or the option of having a fissurectomy with botulinum toxin (BTX) injection. Most of our patients did not want a sphincterotomy as a first line treatment so those were excluded from the study.

**Results:** A total of 722 patients were diagnosed with chronic fissure from January 2000 to December 2005. 490 were female and 232 male. The average duration of the CAF was 9weeks. 115 patients underwent fissurectomy with botulinum toxin injection while 607 patients had conservative treatment. An average of 50 units of BTX were injected in those who had surgery. 697 (96percent) were in the posterior midline while the rest of the fissures were located in the anterior midline. Overall fissure healing in those who underwent BTX injections and fissurectomy was 93 percent at 4 weeks. Thirteen of those still have a visible deep fissure but was asymptomatic since the surgery. For those who failed, 5 percent went on to have lateral internal sphincterotomy which cured their fissure. None of the patients reported problems with incontinence. The average follow up was 8 months. Twenty three of the 107 patients who were healed needed repeat treatment of either LIS or BTX injection an average of 13 months after the fissure was declared healed.

**Conclusions:** BTX injection along with fissurectomy is a good first line surgical intervention for patient who does not want a sphincterotomy. The risk of incontinence is low and the potential benefit of a healed fissure is high. However, those patients who have extremely hypertrophied internal sphincters, they should be prepared for possible repeat treatment.

#### Long Term Outcomes of Use of Hyperbaric Oxygen (HBO) in the Treatment of Chronic Anal Fissures(CAF)

(P39)

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**Purpose:** Hyperbaric oxygen has been used in the treatment of chronic ulcers. Chronic anal fissures are ischaemic wounds due to anal hypertonia. Standard treatment is normally to relieve the hypertonia either chemically or surgically. These treatments have complications. HBO has been shown to be of benefit in CAF with limited side effects . The reports of the long term results are limited, so we reviewed our patient group in order to determine the long term outcomes.

**Methods:** 8 Patients who underwent HBO therapy in 2001 for chronic anal fissures were identified. Patients who had either failed conservative or surgical treatments had undergone HBO therapy . They received 15 treatments over 3 weeks. Each treatment consisted of 90 minutes of 100 percent oxygen at 2.4 atmospheres. A retrospective review of a prospectively maintained HBO database and the notes review were done. In addition a telephone survey of an ad-hoc questionnaire was carried out. The patients were assessed in Nov 2007 for symptoms of pain, bleeding, discomfort and visual analogue scales of pain and bleeding. The patients were also asked about their views on recommending HBO for CAF.

**Results:** In total 8 patients had HBO therapy for CAF in 2001. The mean age was 55 years. Female to male ratio was 4:4. The mean duration of the fissure was 2 years 9 months prior to the HBO therapy. A total of 6 (75%) patients had successful outcome, 1(12.5%) failed and 1 (12.5%) patient died due to other causes. Among the successful ones 6 (75%) of them had no pain, bleeding, discomfort or recurrence. All 6(75%) recommended HBO for CAF.

**Conclusions:** We would conclude that HBO for chronic anal fissures offers an option, when other medical treatments have failed and surgery failed or is not an option.

#### Success Rate of Closure of High Transsphincteric Fistulas using Anal Fistula Plug

(P40)

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**Purpose:** The aim of the study was to determine the heal-

ing rate after treatment with Surgesis® in a prospective series of patients with high transsphincteric fistulas.

**Methods:** Fifty-two patients with high transsphincteric fistulas (sixteen with Crohn's disease) and mean age 45 years (24 - 80) were treated with Surgesis®. All had been treated with loose seton for at least 2 months preoperatively. They were treated in an outpatient setting and got preoperative single dose of oral antibiotics. They were operated on in general anesthesia and in lithotomy position. The fistula tract was irrigated with H<sub>2</sub>O<sub>2</sub>. The plug was secured deeply into the internal sphincter and covered with mucosa. The patients were followed up at 2 weeks, 3, 6, and 12 months after surgery. The patients with Crohn's disease had no inflammation in rectum and were on continued immunosuppressive treatment. Forty-one patients were followed for at least 3 months. Healing was considered complete when the internal and external fistula openings had closed.

**Results:** After a mean follow-up of 12 months (3 -17) 19 of 32 patients with cryptoglandular and 7 of 9 patients with Crohn's fistula had healed completely. Four of 9 patients where the first treatment attempt failed healed after a second plug.

**Conclusions:** About 63% of high transsphincteric fistulas of both cryptoglandular and Crohn type heal after treatment with anal fistula plug (Surgesis®).

#### Anal Fistula Plug (Surgisis®) for the Treatment of Anoperineal Fistulas, A European Center Experience

(P41)

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**Purpose:** Numerous techniques have been described for the treatment of anal fistulas. The objectives of these techniques are to avoid recurrence and fecal incontinence. Closure of the fistula tract by an anal fistula plug (Surgisis®) has been previously reported to be successful in 80%. The objective of this study was to evaluate our results with this new method.

**Methods:** Obturation of the fistula tract by an anal fistula plug was proposed since June 2006 for patients with a high transsphincteric fistulae. The fistula tract was rinsed and the plug pulled through the internal opening following which it was firmly fixed by vicryl sutures. The external opening was left open. The patients were counseled to avoid any effort during for 2 weeks, and were re-examined at 1, 3 and 6 months. The healing of the fistula tract, and the absence of leakage and abscess were regarded as successful outcome.

**Results:** Fifteen patients (7 women) with a median age of 46 (32-58) years were included in the trial. Three patients had Crohn's disease, while three others had an ano-vulvar fistulae tract. There were no multiple tract fistulas and 7 patients had undergone 1 to 5 prior surgeries. One patient had a colostomy at the time of plug placement and all but one had undergone Seton treatment during 5,44±4,31 months. Three patients expelled the prosthesis at postoper-

ative day 3, 7 and 7 and underwent a second plug placement few days later. Two of these patients expelled again their plugs at day 7. One patient presented an abscess at postoperative day 4. The fistula tract healed in 6/15 patients (40%) at 3 months and, 6/11 (54%) at 6 months. One patient of 3 with Crohn's disease healed (33%). The success rate was of 5/8 (62,5%) and 4/6 (66,7%) at 3 and 6 months respectively for the patients who had not had prior treatment, against 1/7 (14,3%) and 2/6 (33,3%) for the others (NS). There was no adverse effect on continence noted.

**Conclusions:** Our study demonstrate a success rate of 40% and 54% at 3 and 6 months, respectively. This technique has the advantage of simplicity and safety but may be limited by the price of the prosthesis.

#### Sphincter Muscle Sparing Procedures for Anal Fistula: Are Initial Excellent Results Sustainable and Reproducible?

(P42)

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**Purpose:** In attempts to minimize changes in fecal continence, various sphincter muscle sparing techniques have been developed over the past several decades in an effort to eradicate sepsis and initiate fistula closure. The aim of this study was to evaluate the success rates of these procedures over time both amongst and within institutions.

**Methods:** A systematic review of the literature utilizing MEDLINE, Cochrane database, and EMBASE was performed. Key words included anal fistulae, fistula-in ano, fibrin glue, bioprosthetic plug, and anorectal advancement flap. All articles relating to the management of a wide range in the complexity of anal fistula were evaluated and included cryptoglandular disease, Crohn's disease, rectovaginal fistula, and peri-anal-j pouch fistula. The primary outcome variable was the cure rate after the initial procedure. Secondary outcome variables included recurrence rates, duration of follow up, and changes in continence.

**Results:** The initial cure rate after anorectal advancement flap was reported to be 99%, but rapidly declined to less than 50% within 5 years of widespread adoption. Similarly, the initial cure rate after fibrin glue instillation was 75%, but was reduced to rates of 40% or less within ten years. Finally, despite initial reports of fistula cure rates as high as 88% after placement of a bioprosthetic collagen plug, more recent reports have shown success rates of 14% - 25%. Despite lack of uniform reproducibility of results among centers or sometimes even within centers, the rates of continence preservation have been sustained over 90% after advancement flaps and 100% after fibrin glue and collagen plugs.

**Conclusions:** Extensive review of the literature tracking success rates among and often within institutions revealed

significant erosion in rates of success as series increased in size and in length of follow up. Therefore, we must approach new techniques with interest and enthusiasm, but also with realistic expectations for success. Specifically, this study revealed that we should not quote to the initial patients in whom a new technique is employed the same superlative results noted by the pioneers in that respective technique.

**Randomized Trial Comparing Needle Drainage of Perianal Abscess Under Local Anesthetic to Conventional Treatment by Incision and Drainage Under General Anesthesia**

(P43)

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**Purpose:** Study Hypothesis: Perianal sepsis can be successfully treated on an outpatient basis by needle aspiration, oral antibiotics and analgesia. Perianal sepsis is a common emergency condition seen in general surgical practise. Conventional treatment by incision and drainage under general anaesthesia requires inpatient treatment and is often seen as low priority. Immediate drainage of sepsis under local anaesthesia allows fast alleviation of symptoms and enables patients to return home very quickly. The aim of this study was to show that this method of treating perianal sepsis is safe, acceptable and without an increase in the fistula rate.

**Methods:** Patients presenting with simple perianal sepsis were randomised to either immediate aspiration of the abscess under local anaesthetic with a five day course of oral antibiotics and follow up in a colorectal clinic, or inpatient incision and drainage of the perianal abscess under general anaesthetic on the next available emergency list. The following were measured. The number of patients requiring a single aspiration of their abscess. The number of patients who needed re-aspiration or re-drainage of the abscess. The number of patients who developed perianal fistulae.

**Results:** 32 patients were recruited and randomised on a 2:1 basis, 22 to the aspiration group and 10 to the conventional treatment group. In Group 1, the aspiration group, 19 patients had 1 aspiration, 5 patients had further aspiration or drainage. Three patients developed fistulae. In Group 2, the inpatient incision and drainage (I&D) group, 8 patients had a single incision and drainage, 2 patients required a second drainage and 3 patients developed fistulae.

**Conclusions:** Simple perianal sepsis can be treated easily and safely on an out outpatient basis with local anaesthetic needle drainage and antibiotic therapy. Patients find this treatment acceptable, there is no increase in the risk of perianal fistula formation and the cost of treatment for this condition is reduced.

**Management of Deep Postanal Horseshoe Abscesses: Less is More**

(P44)

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**Purpose:** The treatment of deep postanal abscesses of cryptoglandular origin has evolved from "lay open" techniques to staged procedures with or without sectioning of the internal anal sphincter (IAS), in an attempt to improve function; but long-term results are not well known. The purpose of this study was to analyze the differences in recurrences, incontinence rates and type of definitive surgery used in cases when initial treatment included sectioning the IAS (modified Hanley procedure) and cases in which the IAS was preserved.

**Methods:** Patients operated on for deep postanal abscesses of cryptoglandular origin between 1994- 2006 were studied. Variables included initial procedure, imaging studies used, recurrences, incontinence and definitive fistula surgery.

**Results:** 29 patients were included; 56% male with a mean age of 56. 83% had a history of prior surgery. Mean follow-up was 67 months (range 20-144). 73% had horseshoe extensions. Endoanal ultrasound was used in 65% of cases, and MRI in 7%. Section of the IAS was performed in the initial surgery in 12 patients, and the sphincter was preserved in 17. Advancement flaps were used as a definitive surgery in 13 patients (2 in the IAS sectioned group and 11 in the preservation group). There were 4 recurrences (7.25%), all after advancement flaps. 4 patients referred incontinence in the IAS sectioned group, with a mean Wexner score of 6 (range 3-10), and 3 cases of incontinence were found in the preservation group, mean Wexner score 3 (range 1-4).

**Conclusions:** Conservative approaches (incision and drainage, use of setons) are effective in the management of deep postanal abscesses, and facilitate second-stage definitive procedures. Preservation of the IAS instead of sphincterotomy in the initial emergency setting may improve functional results.

**Intermediate Outcome of Total Anal Sphincter-Saving Technique for Fistula-in-Ano: The Ligation of Intersphincteric Fistula Tract (LIFT)**

(P45)

A. Rojanasakul . . . . . Bangkok, Thailand

**Purpose:** The goals of surgery for fistula-in-ano are permanent healing and preservation of anal continence. At present, there is no single technique appropriate for the treatment of all fistula-in-ano. Recently we purposed the new technique entitle the ligation of intersphincteric fistula tract, (LIFT). The outcome of the operations during the past eighteen months were analyzed.



**Methods:** During January 2006 to July 2007, sixty seven cases of fistula-in-ano were operated with the LIFT technique in our institute. Primary healing rate, nonhealing rate, healing time, hospital stay and continent status were analyzed.

**Results:** There were 67 patients (53 males, 14 females), aged from 21-76 years (mean age 40). The most common type of fistula was low transphincteric(24). The other types included high transphincteric(9), intersphincteric(4), horseshoe(9), semihorseshoe(5), recurrence(8) and unidentified(8). The mean operative time was 28 minutes, ranging from 15 to 67 minutes. The mean length of stay was 2.2 days, ranging from 1-4 days. The mean healing time was 5.5 weeks (range 1.6-17 weeks). The healing rate was 89.5% (60/67 patients). Two cases had transient gas incontinence which resolved by the second post operative week.

**Conclusions:** Since our experience with the LIFT technique was promising, this technique has become the procedure of choice in our institute and we purpose this technique to be the choice of treatment of fistula-in-ano.

#### A Reconsideration of the Deep Postanal Space

(P46)

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**Purpose:** It is generally accepted that the deep post-anal space is the continuation of ischioanal spaces, lies above the anococcygeal ligament and below the levator ani muscle, and being the pathway by which purulent infection spreads from one ischioanal space to the other, results in the so-called horseshoe abscess. Clinically, the occurrence of semi-horseshoe fistula is more common than complete-horseshoe fistula, and horseshoe fistula always has internal opening at the posterior midline. These observations challenge the anatomical concepts of deep postanal space. This study aimed to study the gross anatomy of the deep postanal space with new approaches that differ from the literatures.

**Methods:** Thirty cadaveric pelvis were dissected by three different methods. The first-ten cadavers were dissected into the both ischioanal spaces toward the posterior midline, searching for the continuation between bilateral ischioanal spaces. The second-ten cadavers were transected in the coronal plane between the anus and tip of coccyx to demonstrate layers of anal sphincter muscles and the postanal spaces. The third-ten cadavers were dissected in layers of muscle from inside of the anus to the outside to delineate the boundary of the deep postanal space.

**Results:** From the dissection of the first group, we encountered the fascia that separate the ischioanal spaces from each other, and this fascia forms the lateral wall of deep post-anal space. No connection between these spaces was demonstrated. The combination of findings from the second and the third groups show the existence of the deep

post-anal space as a closed space with the boundary of puborectalis muscle superiorly, ligament and muscle of superficial external sphincter inferiorly and fascia which envelop the ischioanal space laterally.

**Conclusions:** We found that deep postanal space is a closed space which lies between ischioanal spaces, without the connection to both ischioanal spaces.

#### Dwelling Seton Treatment for Perianal Fistulas. Patience is a Must

(P47)

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**Purpose:** Transfincteric fistulas are often treated in a staged manner by first placing a seton followed by a mucosal advancement flap when perineal sepsis has subsided. The healing rate of a mucosal advancement flap is on average 65% and some patients experience soiling due to ectropion of mucosa when this is performed distally. As we noticed that some seton were migrating distally while awaiting the definitive surgical step we started delaying this step in order to see if we could treat these fistulas by simple fistulotomy. This study was done to evaluate this concept

**Methods:** We reviewed the patients treated between 2002 and 2005 for a transsphincteric fistula. In total 72 patients were treated but only 60 could be analysed in order to evaluate the results in follow up. All patients were operated under spinal anaesthesia. The fistula tract was laid open till reaching the sphincter muscles after which a loosely tied Vessel loop was passed through the internal opening. The second stage was scheduled when perineal sepsis was subsided and when it was felt that distal migration was taking place. Continence was graded according to the Park's score

**Results:** 35 male and 25 female, age range 16-84, were treated for a transsphincteric fistula. Of these 13 had a high opening and 47 an opening in the middle or lower third. Of the 13 patients with a high opening distal migration occurred in 7 ( 54%) so that the fistula tract could be laid open by fistulotomy after a mean of 39 weeks. None of these patients had impaired incontinence or recurrence. The remaining 6 were treated by mucosal advancement flap, in one a perianal abscess recurred. In the distal group of 47 patients distal migration was observed in 37 (79%) after a mean of 32 weeks. In 8 this was up to the skin level. all of these were treated by fistulotomy. No patients experienced fecal incontinence or recurrence. The remaining ten patients were treated by mucosal advancement flap or had the seton removed due to discomfort. No adverse sequelae were noticed in the follow up period

**Conclusions:** By using a dwelling seton in the treatment of transsphincteric fistulas for a prolonged period the definitive surgical treatment -fistulotomy- can be kept simple, safe and very effective

### Effectiveness of Primary Fistulotomy in the Treatment of Perianal Abscess

(P48)

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**Purpose:** Primary fistulotomy is considered an option for the treatment of acute anorectal abscess. However, controversies exist related to its effectiveness and safety. The aim of this study was to analyze the effectiveness of primary fistulotomy for the treatment of perianal abscesses.

**Methods:** Data were retrospectively collected of all patients with perianal abscess who underwent fistulotomy between January 1993 to June 2007. Patients with chronic or complex fistulas or inflammatory bowel diseases were excluded. Patients were divided into two groups: Group I: drainage with fistulotomy, and Group II: drainage without fistulotomy. Follow up included recurrence (new abscess or persistence of fistula) and continence, which was assessed by standardized incontinence score graded from 0-20 (20 = complete incontinence). Outcome was obtained by telephone questionnaire and medical record review. Statistical analysis was performed using the Student t-test and chi-square test.

**Results:** 217 patients of a mean age of  $44.8 \pm 13.9$  years were evaluated; 91 (41.9%) were in group I. There were no difference in age and gender between the two groups. Operative time, hospital stay and time to wound healing were the same in both groups. After a mean follow up of  $96.8 \pm 40.9$  months, the recurrence rate was significantly less in group I (6.5%) versus group II (23.8%) ( $p = 0.001$ ) but there were no differences related to continence.

**Conclusions:** Primary fistulotomy is a safe and effective procedure for the treatment of perianal abscess.

### Martius Flap Repair of Complex Rectovaginal Fistulas

(P49)

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..... Minneapolis, MN

**Purpose:** Complex rectovaginal fistulas are difficult problems whose repairs have high recurrence rates. Patients with associated sphincter injury and incontinence are usually treated with an overlapping sphincteroplasty, while the Martius or bulbocavernosus flap is generally reserved for patients with complex fistulas and an intact external sphincter. The aim of this study was to examine the outcomes and possible predictors of success of the Martius flap repair of rectovaginal fistulas.

**Methods:** A chart review was performed covering the period from 1992 through 2007, documenting age, etiology of fistula, previous repairs, tobacco use, body mass index (BMI), evidence of proctitis, immunosuppression use, surgical technique, length of stay, use of a diverting stoma, and recurrence.

**Results:** 14 patients with rectovaginal fistulas underwent Martius flap repairs. Mean age was 48 (range 27-69) years. Etiology included Crohn's disease ( $n=4$ ), cryptoglandular infection ( $n=3$ ), pouch-vaginal fistulas ( $n=2$ ), obstetrical injury ( $n=2$ ), radiation injury ( $n=2$ ), and previous rectocele repair ( $n=1$ ). At the time of repair, two patients were on immunosuppressive medications and one patient had active inflammation at the ileo-anal anastomosis. 10 out of 14 patients had previous failed repairs (range 1-8). 7 patients had a diverting stoma. Average length of stay in the hospital was 3.6 (range 2-6) days. Successful closure of the fistula was achieved in 7 patients (50%) at a mean follow-up of 24 (range 1-106) months. 5 out of 7 patients with a diverting stoma had a successful outcome and two out of 7 patients without a stoma had a successful outcome ( $p=0.28$ ). Age, tobacco use, and BMI did not differ between patients with failed and successful repairs.

**Conclusions:** Our results demonstrate that the Martius flap may be a valuable technique to repair complex rectovaginal fistulas. There was a trend toward improved outcome with diversion; however, it did not reach statistical difference. Further studies are needed to determine which factors influence success of the Martius flap.

### Short-Term Outcomes of the Ligation of Intersphincteric Fistula Tract (LIFT) Procedure for Treatment of Fistula-in-Ano: A Single Institution Experience in Singapore

(P50)

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Koh ..... Singapore, Singapore

**Purpose:** The ideal treatment for fistula-in-ano (FIA) should result in high healing rates, low recurrence rates, preservation of sphincter function and minimizing patient discomfort. The current surgical options available such as fistulotomy, seton insertion and endorectal advancement flaps (ERAF) seem suitable for simple FIA but not for complex fistulae like the intersphincteric FIA. We present our experience with a promising new technique, the ligation of the inter-sphincteric fistula tract (LIFT) procedure.

**Methods:** Our study period was between April 2006 to January 2007. We enrolled patients who required surgical intervention for fistula-in-ano prospectively into the study. Extra-sphincteric fistulae were excluded. During the pre-operative assessment, all patients underwent anal manometry and endoanal ultrasonography to delineate anal sphincter function and anal canal and fistula anatomy. Intraoperatively, under general anaesthesia, the LIFT procedure was performed. A partial core-out fistulectomy was also performed as part of this procedure. Patients were followed up every one to two weekly until healing occurred. Anal manometry and endoanal ultrasonography were repeated at least six weeks post-operatively, and when there were clinical indications. Our primary outcome of interest included operative time, healing rate, healing time, pain scores and complications.

**Results:** Seventeen patients were enrolled. The majority (11/17) had high fistulas as defined by ultrasonography. Mean operative time was 42.6 minutes (range: 15-95 minutes). Pain scores and complication rates were low. The healing rate was 76.5% and mean healing time was 6 weeks. There were four treatment failures, three of which were high fistulas. There was one late recurrence. The longest follow up was 13 months. Post-operative anal manometry did not show significant changes from baseline.

**Conclusions:** The LIFT procedure is a promising technique for treatment of fistula-in-ano, even in high intersphincteric fistula.

#### Elusive Course of Deep Postanal Space Abscess: A Need for Awareness During Initial Surgery

(P51)

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**Purpose:** Evaluation of the deep postanal space (DPAS) at the time of surgery for fistulous abscess disease is not routinely performed. To diminish the morbidity associated with multiple surgeries we hoped to demonstrate both the obligatory need to address the DPAS during surgeries for fistulous abscess when an internal opening is not identified and the efficacy of a modified Hanley procedure for this disease process.

**Methods:** All patients that underwent surgery for deep post-anal space abscess were prospectively entered into a database from August 2001 to September 2007. All patients with inflammatory bowel disease or on immunosuppression were excluded. The data was analyzed retrospectively with respect to age, gender, previous surgery for fistula-in-ano, number of external openings, diagnostic studies, operating time, healing time, complications and recurrence. The initial surgery after discovery of the DPAS abscess involved a modified Hanley procedure with a cutting seton in most instances.

**Results:** 67 patients underwent surgery for deep post-anal space abscess during the study period and 55 met the inclusion criteria. Thirty five of fifty-five patients (63%) had a previous surgery for fistulous abscess disease within two years. Twenty (57%) had multiple surgeries. 82% of the initial surgeries prior to discovery of the DPAS abscess were performed at outside institutions. 52% of patients presented with drainage alone, 27% with pain and drainage, and 21% with pain alone. Imaging modalities were utilized in 43% of cases. 93% of patients had a modified Hanley procedure with a cutting seton and the recurrence rate was 9.1%. 32% of patients experienced drainage and partial incontinence for a mean duration of 3 months. There were no reports of gross incontinence.

**Conclusions:** To our knowledge this is the largest series to date on the evaluation and management of DPAS abscess. We discovered that appropriate management of fistulous abscess requires a high suspicion of the DPAS during

initial evaluation. The prognosis of DPAS abscess can be favorable when the precise source of infection is identified and a modified Hanley procedure is performed.

#### Clinical Predictors of Tuberculous Fistula in Ano in an Indian Tertiary Care Center

(P52)

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**Purpose:** With the widespread use of effective anti tuberculous therapy, the prevalence and incidence of gastrointestinal tuberculosis has declined. However, tuberculosis continues to be a common specific cause for fistula in ano in developing countries. We analysed our data on 244 cases of fistula in ano to identify clinical predictors of tuberculous fistula in ano.

**Methods:** Prospectively collected data on 244 patients seen in a colorectal unit between Sept 2003 and March 2006 was analysed.

**Results:** Surgery for fistula in ano comprised 8.2% of all operations performed by the unit. Sixteen patients (6.6%) had histopathological evidence of tuberculous fistula in ano. The male female ratio was 8.03:1. All patients in the tuberculous fistula group were male with a mean age of 40.75 years (range 22-65 years). Eight of these had complex fistulae with multiple external openings. Two patients had systemic symptoms or signs suggestive of tuberculosis. Fifty percent had recurrent disease. Culture for Acid Fast Bacilli (AFB) was sent in five patients. This was positive in two. Both had histopathology conclusive of tuberculosis. Anti tuberculous treatment (ATT) was started for 11 patients. Follow up is available for 8. Three of these patients were cured, 2 had improved on treatment, 1 had recurrence while on anti tuberculous treatment. Two are still on ATT and are due for review. The only two statistically significant clinical predictors of tuberculosis were signs of tuberculosis on examination and multiple external openings. Factors such as duration of disease, history of tuberculosis, contact with tuberculosis, number of recurrences, and type of fistula were not significant predictors of tuberculosis.

**Conclusions:** Tuberculous fistula in ano, occurring in 6.6% of fistula in ano, is not uncommon in our population. Routine histopathological examination of curettings and/or the tract should be performed to make the diagnosis. Clinical evidence of tuberculosis and multiple external openings are clinical predictors of tuberculous fistula in ano.

# **Percutaneous Endoscopic Sigmoid Colostomy for Irrigation (PESCI) in Bowel Dysfunction for Central Neurological Disease: Long Term Outcomes**

(P53)

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 ..... Chichester, United Kingdom

**Purpose:** Bowel dysfunction can be a major problem in patients with central neurological disease. Antegrade Colonic Enema (ACE) procedures using a caecal conduit are effective but have a high long term failure rate. Percutaneous Endoscopic Sigmoid Colostomy for Irrigation (PESCI) has been approved by the UK National Institute for Clinical Excellence (NICE) as a method allowing antegrade irrigation of the distal colon and rectum to improve bowel function. This is the first study to assess the long term outcomes of PESCI.

**Methods:** A 12 French Percutaneous Endoscopic Colostomy tube (CORFLO PEC KIT Viasys MedSystems, Wheeling, IL, USA) is placed endoscopically in the colon under local anaesthesia, changed to a low-profile device (CORFLO-cuBBY VIASYS MedSystems, Wheeling, IL, USA) and

used for long-term antegrade irrigation. Prospective long term data has been collected on these patients.

**Results:** 19 patients (10 male, age 18-78 years) with PESCI for intractable neurogenic bowel dysfunction were followed for more than 12 months (14-87 months, mean 42 months). Irrigation was performed daily in 8 patients and on alternate days in 11 patients, using 250-750 (mean 489) mls tap water and taking 10-60 (mean 33) minutes with successful control of bowel function in all patients. No PESCI was lost due to technical problems. Minor complications occurred in 5 patients (4 superficial wound infections and 1 case of buried bumper). There have been no PESCI related deaths or major complications. In 18 out of 19 (95%) patients there was no loss of PESCI function over time. Bowel control was lost in only one patient whose progressive multiple sclerosis affected bowel function to such a degree that PESCI was removed and converted to an ileostomy. A successful PESCI was removed at 87 months and converted to an ileostomy in one patient who developed pressure sores from hoisting onto the toilet. Five patients have died due to their underlying condition.

## **P52 Clinical features in tuberculous and non tuberculous fistulae**

	Non specific inflammation(n=228	Tuberculosis(n=16)	p-value
Age			
Below 40yrs	97(43%)	9(56%)	0.42
Above 40yrs	131(57%)	7(44%)	
Sex			
Male	201(88%)	16(100%)	0.23
Female	27(12%)	0(0%)	
Duration of symptom			
Less than 12month	128(56%)	12(75%)	0.23
More than 12 month	100(44%)	4(25%)	
History of TB			
Yes	6(3%)	1(6%)	0.38
No	222(97%)	15(94%)	
Contact with TB			
Yes	3(1%)	0(0%)	0.99
No	225(99%)	16(100%)	
Type of Fistula			
Low	77 (33.8%)	3 (18.8%)	0.46
Intersphincteric	137 (60.1%)	12 (75.0%)	
Supralevator	14 (6.1%)	1 (6.2%)	
Recurrence			
Yes	91(37.2%)	8(50%)	0.45
No	153(62.8%)	8(50%)	
Evidence of TB on examination			
Yes	6(3%)	2(12%)	0.09
No	222(97%)	14(88%)	
External openings			
Single	173 (75.9%)	8 (50%)	0.04
Multiple	55 (24.1%)	8 (50%)	



**Conclusions:** Those patients who have a successful PESCI at one year can expect long term bowel control without the technical complications associated with caecal conduits.

#### **Rectal Irrigation (RI) is a Boon for Chronic Constipation – A Prospective Review**

(P54)

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**Purpose:** RI is used in faecal incontinence to relieve symptoms & improve quality of life. Literature on its role in constipation is limited. We aim to evaluate the causes for referral, efficacy & acceptability of RI using health outcome measures and assess effect on constipation.

**Methods:** Review of prospective database of RI between 2002 & 2005. Symptom quantification using general standardized questionnaire (GSQ) determined efficacy. SF-36 & FIQL determined acceptability.

**Results:** 175 patients' data is used. 111(63%) patients found RI useful & 64(37%) unhelpful. The median follow up is 20 months. 79 of 175 patients were referred for constipation. 39 (49%) had success with RI. The success/failure rate is significantly different for patients with constipation vs. other diagnosis (Chi Sq=12.28, p=0.000). For the patients presenting with constipation who had successful RI, 56% said that they were 'doing well' or 'good improvement' using RI, 26% said there had been a 'dramatic improvement' whilst 17% said there had been 'limited' improvement using RI. Up to one third of the patients had RI once a day. GSQ, SF 36 and FIQL were analyzed pre & post RI for the whole group. Analysis is done only on successful cases. GSQ: Showed significant improvement in symptoms of straining, incomplete emptying, wind & urinary leak on stress post RI (95% CI). Visual Analog Scales show reduction in the severity of the problem. SF36: 71 of 111 patients completed SF36 pre RI & 43 of these also completed it post RI. In the whole group the median value for MCS increased from 43 to 55 and PCS increased from 47 to 66. PCS is significant (p value of 0.03). In the group of patients with constipation the percentage increase in MCS & PCS is 20% and 33% respectively post RI. FIQL: Slight improvement in QOL is measured post RI but statistically insignificant.

**Conclusions:** Constipation accounted for nearly half of referrals. RI was successful in nearly half of the referred population. SF- 36 demonstrates a significant improvement in the PCS. Generally speaking, RI offers symptomatic improvement & most patients find it acceptable. Abbreviations: MCS – Mental Component Score, PCS: Physical Component Score

#### **Role of Sacral Nerve Stimulation in Chronic Constipation**

(P55)

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**Purpose:** Chronic constipation can be extremely difficult to treat affecting one's QOL. SNS has been tried when other treatments have failed. However, reports of this procedure are limited, so we reviewed our experience in order to determine whether it is a worthwhile procedure.

**Methods:** Patients who underwent SNS for chronic constipation were identified (Aug 2005 – Oct 2007). This is a retrospective review of a prospectively maintained SNS database and the notes reviewed.

**Results:** There were 12 patients with chronic constipation who were referred to be considered for SNS. The mean age was 39 years. All the patients were females. Under the category of constipation were also included 3(25%) patients who had constipation with overflow incontinence following laxatives and bowel movement. Majority of them were idiopathic slow transit constipation, with 2(16%) of them secondary to spinal traumatic neuropathy. Nearly 1/3rd of the patients complained of abdominal discomfort, pain, bloating, lack of motivation, embarrassment and depression impacting on their QOL and making them socially isolated. The average frequency of bowel movements were 3-5 /month assisted with enormous amounts of laxatives, bulking agents, suppositories, enemas, biofeedback, rectal irrigation and ante grade continent enema. Out of the 12 patients who were referred for SNS, there were 9 (75%) temporary and 6 (50%) permanent SNS procedures performed. 3 (25%) of them are awaiting a temporary SNS procedure. All the 6 (50%) who had permanent SNS procedures have had success. There was failure in 1(8%) following 2 temporary SNS procedures, refusal in 1(8%) without trial SNS and return to normal bowel habit in 1(8%) after a failed temporary SNS. Assessment of the bowel dairies among successful patients, showed an improvement in bowel movements to once/day – 3 times/week. They also demonstrated improvement in abdominal symptoms and QOL. One (8%) patient had pain on urination following the SNS procedure who had her settings changed and is awaiting to be reviewed.

**Conclusions:** We would conclude that SNS for chronic constipation in our experience offers an option, when other treatments have failed.

#### **The Impact of Dynamic Magnetic Resonance on Pelvic Floor Dysfunction**

(P56)

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**Purpose:** To asses the impact of dynamic magnetic resonance of the pelvic floor (DMRPF) by simultaneous evaluation of all pelvic floor compartments in a colorectal practice.

**Methods:** Prospective descriptive study on patients undergoing DMRPF in an University Hospital between April 2005 and October 2007. A total of 85 patients were evaluated by means of DMRPF. Four asymptomatic patients were studied as normal references (2 males and 2 females). Of the remaining 81 patients, 71 have been referred because of pelvic floor dysfunction, mainly obstructive defecation syndrome (ODS). Two patients had chronic pelvic pain and one a colo bladder fistula. Ten, were ODS surgery follow up.

**Results:** Patients with ODS had anterior rectocele, rectoanal intussusception, and /or paradoxical puborectalis contraction. Coexisting pelvic organ prolapse were found in 50 of them (70.4%), such as: cystocele, hysterocele, colpocele, sigmoidocele, epiplocele, peritoneocele, enterocele and a giant myoma. There was a high agreement between physical exam and imaging in diagnosing anterior rectocele, but several concurrent pelvic floor organ prolapse were diagnosed with DMRPF.

**Conclusions:** DMRPF allows a detailed visualization of pelvic organ prolapse in patients with ODS, making available the diagnosis of concurrent pathology on other pelvic floor compartments such as : cystocele, histerocele, sigmoidocele, epiplocele, peritoneocele, enterocele, giant mioma . Posterior compartment (rectum) and sphincter muscle response to defecation was up to now, evaluated by means of videodefecography . Supplementary imaging tests are frequently required to distinguish other anatomical abnormalities . With the advent DMRPF, coloproctologist have acquired a more integrated view of pelvic floor dysfunction, which allowed a best rational approach to treatment options. The added value of DMRPF is the finding of concurrent pathology on other compartments not suspected by previous examinations.



## Treating Levator Ani Syndrome: EGS is Still an Option

(P57)

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..... Cleveland, OH

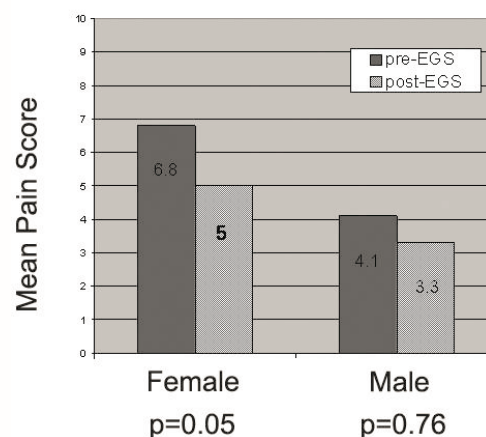
**Purpose:** Levator ani syndrome (LAS) is an elusive and challenging disease to treat. Electrogalvanic stimulation (EGS) is an option for treatment of LAS. However the efficacy remains in question. The aim of this study is to review the outcomes of EGS therapy and to evaluate its continued role in the treatment of LAS.

**Methods:** Patients who received EGS at a tertiary referral center between Jan 2004 and June 2007 were identified. A validated pain score (PS) was used to objectively measure patients' symptoms and ranged from 0 (no pain) to 10 (maximal pain). PS was recorded in the chart prior to treatment and at the time of follow-up phone survey.

**Results:** 31 patients received EGS therapy. Gender distribution was equal. The median age was 58 years (range 27-83). Median number of treatments was 2 (range 1-24) per patient. For 29 patients this was their first time getting EGS. PS at initial presentation was 5.7 (std dev 2.4). 26 of the 31 patients completed the phone survey. Median time since last treatment was 52 weeks (range 2-156 weeks). PS at the time of the phone survey averaged 4.2 (std dev 3.1). Patients were asked about symptom improvement immediately after treatment and also about their overall improvement. 57.6% reported having symptom improvement immediately after treatment, while 38.5% acknowledged sustained improvement. Patients who demonstrated improvement had a greater decrease in pain score. 42.3% of patients surveyed said they would recommend EGS to others. When examined by gender, females had a higher PS prior to EGS and showed a more significant decrease at follow up ( $p=0.046$ ) (Fig. 1). Female patients also had a greater percent of immediate relief and sustained improvement than males ( $p = \text{NS}$ ).

**Conclusions:** EGS is a reasonable option for the treatment of LAS particularly in women and should still be offered along with other medical management to control symptoms.

## Pre and Post EGS scores for Female vs. Male



# Quantification of the External Anal Sphincter Response to Rectal Distension: An Anorectal “Guarding Response”

(P58)

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**Purpose:** Quantifying external anal sphincter (EAS) function is key to explaining physiological control of defecation and continence. Bladder distension causes reflex external urethral sphincter contraction (the “guarding response”). We hypothesised that rectal distension could also augment the EAS, and provide a more reliable physiological measurement of EAS function.

**Methods:** Twenty asymptomatic men (mean age 67.5, range 51-77; Wexner incontinence score 0) with normal anal canal manometry and endoanal ultrasound underwent a rectal barostat study with simultaneous anal manometry. After determining the minimum distension pressure, stepwise 50ml distensions were performed every 2 minutes (to the limit of patient tolerance or 200mL) whilst anal maximum squeeze pressures (MSP) were recorded and compared to baseline MSP (with the barostat catheter in place but before rectal distension). EAS augmentation was quantified as the maximum percentage increase in MSP compared to baseline and termed the Guarding Response (GR). Rectal compliance, measured using the same distension protocol, was expressed as the change in rectal pressure per mL of rectal distension and correlated with the GR using Pearson’s correlation test.

**Results:** Nineteen of the 20 men showed an increase in MSP with rectal distension. An average increase of MSP of 13.5 cmH<sub>2</sub>O was seen with 50mL of rectal distension ( $p=0.001$  95% CI = 5.34 to 21.53 cmH<sub>2</sub>O) and at 100mL (MSP increase= 10.5,  $p=0.028$ , 95% CI = 0.27 to 21.17) but not at 150 or 200mL. The mean GR was 17.65% (SD 15.4, range -5.5% to 58.7%). Mean rectal compliance was 0.053mmHg/mL (SD 0.029, range 0.015 to 0.128) and correlated inversely with the GR ( $r = 0.496$ ,  $p=0.013$ ).

**Conclusions:** This study has shown that rectal distension augments EAS function confirming the presence of a guarding response similar to the bladder. This is inversely related to rectal compliance, suggesting tonic visceral input to this response which maybe aberrant in symptomatic patients with rectal sensory dysfunction. The GR may identify incontinent patients likely to benefit from sacral nerve stimulation.

# Impaired Rectal Sensation as a Unique Etiology of Functional Constipation

(P59)

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**Purpose:** Rectal hyposensitivity (RH) relates to diminished perception of rectal distention and is usually diagnosed on the basis of elevated sensory threshold volumes during balloon distention. It is most commonly noted during testing of patients with functional bowel disorders but its clinical significance remains unknown. The aim of this study is to assess associated physiologic abnormalities identified by anorectal testing in patients with RH.

**Methods:** Patients evaluated in a tertiary anorectal physiology lab between 2001 and 2007 were identified and their test results reviewed. Rectal volumes were measured in milliliters with a 4 channel air perfused anal manometer catheter with attached balloon. Measurements were taken at first sensation, urge sensation, and maximum tolerable volume (MTV). Normal values for each are <20ml, 160-200ml, and >200ml, respectively. Rectal hyposensitivity was defined by any volume greater than 240ml as this was the inflation limit of the balloon.

**Results:** 493 patients (410 female) had rectal volumes measured. RH was noted in 93 patients (18.8%). Of those with RH, 80.4% had constipation and 15.5% had fecal incontinence. Median age of the whole group was 47 (17-89), while those with RH were older (50 vs. 47,  $p=0.053$ ). Gender distribution was significant in that the proportion of men to women was increased in the RH group ( $p=0.001$ , OR=2.51). Compared to patients with MTV  $\leq$  240cc, the RH group was significantly more likely to have paradoxical strain induced sphincter relaxation ( $p<0.05$ ) and less likely to be able to expel a balloon ( $p<0.01$ ), both variables being independent of each other. Looking at only RH patients with constipation, decreased sensation and defecatory function appeared to be related. A significant decrease in ability to sense the balloon was noted for those patients who progressively failed expulsion ( $p<0.01$ ).

**Conclusions:** Rectal hyposensitivity is frequently associated with other physiologic abnormalities but may be an independent clinical entity in a small subset of patients with constipation.

**P59 Significant differences in RH versus non-RH**

	MTV $\leq$ 240cc N = 400(%)	MTV > 240cc N = 93(%)	P value
Age (yrs)	47	50	0.053
Female	344(86)	66(71)	0.001, OR=2.51
Male	56(14)	27(29)	
Paradoxical SIR	105(37.6)	38(52.8)	0.022
Unable to expel 50/100cc balloon	70(23.9)	28(39.5)	0.011

### Long-Term Results of Treatment with Botulinum Toxin Type A for Obstructive Outlet Constipation are Very Disappointing

(P60)

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**Purpose:** This study aimed to assess the long-term results in patients with outlet obstructive evacuation who underwent Botulinum Toxin type A injections.

**Methods:** Following IRB approval, a retrospective chart review was undertaken from 1992-2006 including all patients who received Botulinum Toxin Type A injections into the puborectalis muscle for obstructive outlet constipation. Charts with incomplete data were excluded. Age, gender, anal manometry, pudental nerve latency and EMG studies, defecography, previous pelvic surgery and other types of treatment were all examined. Patients were contacted by telephone and postal survey were asked to complete a questionnaire to assess the satisfaction with the result of the treatment.

**Results:** 55 patients (35 women) of mean aged 59.6 (range 25-94) year were identified as having obstructive outlet constipation who underwent Botulinum toxin injection. 29 patients replied to the questionnaire. Before the Botulinum toxin injection, 4 with neurological disturb; 4 with psychological problems; 9 with rectal pain Before the Botulinum toxin injection, 2 underwent ostomy; 1 STARR procedure; 1 sigmoidectomy with rectopexy; 4 total abdominal colectomy with ileorectal anastomosis. Paradoxical puborectalis contraction was noted in 20/29 EMG exams and in 19/23 defecographic evaluations. 25 of the 29 patients had failed 0-10 sessions of biofeedback therapy and 16 patients were laxative dependent. 24 patients underwent 1-2 injections of Botulinum toxin interim 5 patients received 3-5 injections. At a mean follow-up of 35.8 (range 1-103) months. 3 patients reported fecal incontinence, 3 had urinary incontinence and 14 continued to require laxatives to evacuate. Only 8/29 patients (28%) were satisfied with the results.

**Conclusions:** Despite initial enthusiastic results, long-term follow-up revealed very poor results. Between limited efficacy and the potential morbidity of both urinary and fecal incontinence. The role of Botulinum toxin type A injection for paradoxical puborectalis contraction is very limited.

### Multimodal Management of Obstructive Defecation Syndrome: A Single Center Experience

(P61)

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**Purpose:** Chronic constipation accounts for 2.5 million physician encounters yearly. This symptom is believed to be related to a family of diseases classified as Obstructive

Defecation Syndrome (ODS). Recent use of the dynamic MRI has helped elucidated its many etiologies. Introduced in 1999, Stapled Transanal Rectal Resection (STARR) has been described for the treatment of the rectal component of ODS. We've been utilizing a multimodality approach combining Colorectal Surgery, Urogynecology, and Gastroenterology to manage its anatomic and physiologic components. Here, we explore the efficacy and safety of our approach.

**Methods:** Recent use of dynamic MRI at our institution has revealed not only rectoceles(26) and internal intussusceptions(7) in patients with ODS, but also other anatomic contributors including cystoceles(5), enteroceles(9), paravaginal defects(3), and vaginal prolapse(3). Following an axiom of reconstructive pelvic floor surgery, and believing that apical support of the vagina is a key component of a successful rectocele repair, we've been repairing all discovered defects concurrently. This is a retrospective chart review of our data.

**Results:** At our institute, 26 patients have undergone STARR for ODS. They range in age from 42 to 87 years. Twenty two patients (85%) had secondary procedures performed concurrently (Table 1). Of the four patients that underwent STARR alone, two (50%) required subsequent pelvic floor surgery. At followup, 16 patients (62%) had regular bowel functions while 3(11%) required laxatives to defecate daily. Six patients (24%) had diarrhea and were diagnosed with IBS by our gastroenterologists. One patient (3%) continues to have severe ODS and has been diagnosed with pelvic myofascial spasms. Complications include one myocardial infarction, one reoperation for a staple-line hemorrhage, and one urethral sling erosion into the vagina, requiring extraction. One patient had rectotomies that were managed conservatively. There were no mesh infections, perineal, or pelvic abscesses.

**Conclusions:** Concurrent repair of all pelvic floor abnormalities along with STARR for ODS is safe and efficacious. It neither increases patient morbidity, nor the risk of wound or mesh infection.

**P61 Table 1: Secondary Procedures  
Type and Quantity**

Abdominal Sacrocolpopexy	8
Abdominoplasty	1
Adjustable Urethral Sling	8
Anterior Repair with Avaulta Mesh	1
Dilatation & Curretage	1
Sacral Nerve Stimulator	1
Levatorplasty	2
Paravaginal Defect Repair	2
Pubocervical Fascia Repair with mesh	1
Sacrospinous Vault Suspension	3
Uterosacral Vault Suspension	1
Vaginal Hysterectomy	2



### Slow Transit Constipation: Treatment with Sacral Nerve Modulation

(P62)

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..... Pisa, Italy

**Purpose:** Constipation is common clinical complaint with a broad range of causes. In case of functional reasons it's very hard find a correct therapy, especially for Slow-Transit Constipation (STC). STC is characterized by improvement of transit time through the colon, caused by either myopathy or neuropathy. After unsuccessful conventional treatment (diet) and before the major surgery (subtotal colectomy and ileorectal anastomosis) it can be useful the Sacral Nerve Modulation (SNM) for treat STC.

**Methods:** This study is retrospective analysis of a selected group of patients with STC, treated with SNM. All patients are evaluated with cinedefecography, colon transit time, Cleveland Clinic Wexner Score (CCS), SF-36 quality of life(QoL), bowel diary. Initially all patients underwent temporary implant for 4-5 weeks. The criteria of successful of temporary implant are disappearance of necessity of laxatives or enemas, appearance of necessity of evacuation, improvement of QoL.

**Results:** We treated with SNM 13 patients affected by STC from March 2003 to May 2006. 8/13 (61.5%) underwent permanent implantation SNM after reach criteria with temporary implant. After SNM, CCS improves of 11 points in media (from 22 in media to 11 in media) and the QoL improves of 6.18 points in media (from 93.92 in media to 100.1 in media). There isn't complications correlate with SNM. The follow-up medium is 18 months.

**Conclusions:** In the treatment of STC, before major surgery, it can be useful SNM with a good chance of successful. For improve the correct individuation of patients it need a Multicentric Randomized Study.

### Acupuncture in Chronic Functional Constipation

(P63)

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**Purpose:** Compare acupuncture in 4 different types of chronic functional constipation treatment and investigate the effect and safety.

**Methods:** According to the Rome II criterion of chronic functional constipation 59 cases were recruited. Firstly, they were inquired history and asked to fill the history form and SCL-90 form, secondly, passed the slow transit test, barium enema, cinedefecography and anorectal manometry etc, thirdly they were grouped Slow transit constipation (STC) group(n=13), Outlet obstruction constipation (OOC) group (n=16), MIX group (n=11) and IBS-C group (n=19). The acupuncture points are BAI HUI, TIAN SHU, FU JIE, DA HENG, GUAN YUAN, ZU SANLI, SHANG

JUXU, DACHANG SHU, BA LIAO. The treatment is divided into abdominal and leg points and the back or sacral points alternatively once a day and a session need 20 days. Patients should finish the defecation diary including stool hardness, duration, frequency and bloating, pain, awareness of defecation etc. and investigate the symptom score improvement.

**Results:** General effective rate is 69%. OOC group is 48%, STC group is 75%, MIX group is 68% and IBS-C group is 85% respectively. The accompany symptom and laxative use are all improved after treatment(P<0.05). There is no badness event in whole treatment sessions.

**Conclusions:** Acupuncture in chronic functional constipation is effective and safe. It can improve the capital and accompany symptoms of chronic functional constipation. Most of the patients are satisfied with the outcome. It is more effective in IBS-C group.

### Long-Term Results of Antegrade Colonic Enema in Adult Patients

(P64)

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**Purpose:** Antegrade continence enema performed through an appendicostomy can treat both constipation and incontinence. We report long-term follow-up.

**Methods:** Retrospective chart review identifying 80 patients (64 females, mean age 51) treated between 1993 and 2007. Thirty-nine appendicostomies, 13 tapered ileum, 3 cecal tube and 25 combined appendicocolo/neoappendicostomy and a colostomy. A questionnaire was posted considering bowel regime, complications, bowel function, social function and quality of life. Success was achieved if patients still used ACE or did not need it anymore.

**Results:** Sixty-nine patients were available for follow-up (mean 75 months). Thirty-eight percent had complications to surgery. Forty-three were still performing ACE and 8 did not need it anymore as symptoms had resolved. Accordingly treatment was successful in 74 %. Sixty-three percent reported side-effects with the procedure. Evaluation of bowel function, social function and quality of life on an arbitrary 0-100 scale (100 best) before and after the procedure all showed significant improvement. Treatment was successful in patients with neurological disabilities, anorectal injury, idiopathic fecal incontinence and idiopathic fecal constipation. Treatment was successful in patients with constipation, incontinence and mixed symptoms.

**Conclusions:** ACE can be of benefit in patients suffering from incontinence or constipation that cannot be managed conservatively. There was no difference in functional result or subjective evaluation between appendicostomy, neoappendicostomy and the combined appendicostomy/neoappendicostomy and colostomy.

# Defecating Proctography: The Key To Selecting Patients For Internal Prolapse Surgery

(P65)

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 ..... Oxford, United Kingdom; Rome, Italy

**Purpose:** Poor functional results with classical posterior rectopexy for internal prolapse have lead to a predominantly conservative approach to obstructed defaecation. Consequently there is a perception of a lack of usefulness of defaecating proctography (DPG) in distinguishing mechanical from functional causes. Anterior rectopexy promises superior functional results yet demands careful case selection. We aimed to assess the usefulness of DPG in distinguishing mechanical from functional obstructed defaecation.

**Methods:** Patients attending a pelvic floor clinic with obstructed defaecation underwent 2-phase DPG (rectal barium paste and small bowel opacification). Internal prolapse was graded using the Oxford Prolapse Grade (high/low recto-rectal intussusception = grade 1/2; high/low recto-anal intussusception = grade 3/4; external rectal prolapse = grade 5). DPG results were grouped as follows: A. No significant mechanical obstruction (normal, mucosal prolapse and grade 1 internal prolapse); B. Functional obstruction (paradoxical puborectalis contraction, internal sphincter spasm, rectal akinesia). C. Significant mechanical obstruction (grade 2, 3 and 4 internal prolapse and external prolapse). Degree of overlap of mechanical and functional findings was noted.

**Results:** 300 DPGs were evaluated. There were 26 patients (9%) in group A (normal), 50 patients (17%) in group B (functional) and 214 patients (71%) in group C (mechanical). There was a clear separation between mechanical and functional groups, with never more than trivial internal prolapse (grade 1) apparent in only one-quarter of functional cases.

**Conclusions:** Although a mechanical cause was the basis for most patients' complaints of obstructed defaecation in this series, a functional cause was found not uncommonly. This could not be predicted on clinical findings, and was an absolute contraindication to surgery. DPG is the key to patient selection for internal prolapse surgery because it so clearly distinguishes mechanical from functional causes of obstructed defaecation.

# Anorectal Three Dimensional Ultrasound (3D US): A Novel Imaging Method for Pelvic Floor and Anorectal Evaluation

(P66)

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**Purpose:** To evaluate the anal sphincters using a tridimensional probe and to compare with the usual bi-dimensional images

**Methods:** Patients with a history of anal incontinence and/or anal fistula were submitted to bi and tridimensional ultrasound using a 3D US 2202 type probe in the left lateral position. Sphincter integrity was quantified and bidi-

## P64 Aetiology, indications, therapies and result

	indication			therapy		
	constipation	incontinence	both	appendi- costomy	neoappen dicostomy**	appendicostomy/ neoappendicostomy + colostomy
total (n:80)	48	20	12	39	16	25
Chronic idiopathic constipation	19	—	—	7	7	5
Idiopathic fecal incontinence	—	3	5	5	—	3
Sequelae to ano-rectal disease/ surgery*	8	8	1	10	4	3
Mb. Hirschsprung	1	—	—	—	1	—
Spinal cord lesions	8	4	3	5	3	7
Sequelae from lumbar disc prolapse	3	2	—	5	—	—
Cerebral palsy	—	1	—	1	—	—
Spina bifida	3	2	—	3	1	1
Syringomyelia	1	—	1	1	—	1
Pudendus neuropathy	—	—	1	1	—	—
Multiple sclerosis	4	—	1	—	—	5
Scleroderma	1	—	—	1	—	—
Follow-up	41	19	9	35	16	18
Functional at f.u.	25	12	16	23	7	13

\* rectopexia 6, fistular surgery 4, vulva cancer (1), anal cancer (1), trauma (2), sphincter insufficiency from childbirth (3), \*\* tapered ileum (13) and cecal tube (3)

mensional and 3D images were compared. Images were reconstructed in midline longitudinal and transverse planes. Internal (IAS) and external (EAS) anal sphincters were compared in the two planes.

**Results:** Twenty three (21 female and 2 male) patients were evaluated by bidimensional and 3D US. The indications for US evaluation was: a) to assess sphincter integrity in the 21 female patients; b) to assess anal fistula in the male patients. IAS defects were demonstrated in 20 incontinent patients (95%) whereas EAS defects were observed in 17 (81%). Longitudinal images of 3D US was useful when images in the transverse plane were not clear to demonstrate a IAS defect. 3D US was useful in the detection of fistulous tract in both patients.

**Conclusions:** Anorectal tridimensional ultrasound is a novel and valuable method. The comparison and utilization of both planes improved the detection of sphincter defects.

#### Triple Contrast Defecography: Relationship Between Rectoanal Intussusception and Pelvic Floor Dysfunction (P67)

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..... Orlando, FL

**Purpose:** Triple contrast defecography is a useful tool in evaluating patients with obstructive defecation. Abnormal findings should correlate with severity of pelvic floor dysfunction (PFD).

**Methods:** 68 patients underwent both a triple contrast defecography study and an electromyography (EMG). Charts and reports were reviewed retrospectively. External anal sphincter EMG was performed using a concentric needle electrode. Non-invasive EMG was performed with surface electrodes. Dynamics at rest, squeeze and straining were measured and PFD was graded by comparing tracings during squeeze, rest and strain. Normal (0) was defined as pelvic floor activity with strain less than that of rest. Grades of 1, 2, 3, and 4 were defined as activity at strain which was equal to rest, greater than rest, equal to squeeze and greater than squeeze. Defecography was performed using oral, vaginal and rectal contrast and evaluated dynamically at rest, squeeze and strain. A dedicated radiologist read all studies. Reports were reviewed for comments concerning rectal emptying and internal recto-anal intussusception.

**Results:** 36 patients (56%) presented with constipation, 19 (28%) with incontinence, and 11 (16%) with both. No significant correlation between severity of PFD and rectal emptying (good, partial, poor) on defecography was seen. Patients without PFD were just as likely to have poor emptying as patients with severe PFD. However, when PFD was compared to presence of intussusception, a trend was noted. As PFD grade increased in severity, the

likelihood of intussusception also increased. This trend was more evident in constipated patients. In these patients, none of the six patients with normal pelvic floor had intussusception, while 22% of patients with grade 2 dysfunction and 33% of grade 3 and 40% of patients with grade 4 did have intussusception. In constipated patients with intussusception on defecography, 87% had a PFD grade 2 or greater.

**Conclusions:** There is a correlation between PFD and findings of intussusception on defecography. A similar correlation was not found between pelvic floor dysfunction and rectal emptying on defecography.

#### Hand-Assisted Laparoscopic Total Colectomy vs. Conventional Total Colectomy for Idiopathic Slow-Transit Constipation

(P68)

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**Purpose:** Refractory idiopathic slow transit constipation (ISTC) is a difficult clinical problem for physician. Surgical intervention may be the ultimate choice if medical efforts were futile. Mini-invasive colorectal surgery has practical applications to colorectal disease. However, few literatures ever compared the laparoscopic colectomy with conventional colectomy for ISTC. This study was designed to compare the outcomes of patients who underwent conventional total colectomy (CTC) or hand-assisted laparoscopic total colectomy (HALTC) for ISTC.

**Methods:** We reviewed our prospectively collected patient database from November 2001 to June 2005 and compared the intraoperative data and postoperative outcomes of patients who underwent HALTC or CTC for ISTC. Forty consecutive ISTC patients were enrolled, which were randomized in 2 groups (HALTC or CTC) of 20 each.

**Results:** The HALTC (mean age, 29.7 years; all female) and CTC (mean age, 28.7 years; all female) groups were similar with regard to age, gender and BMI ( $20.04 \pm 1.2$  vs.  $19.9 \pm 1.1$ ). Overall, patients who underwent HALTC vs. CTC had a significantly shorter length of surgical wound ( $7$  vs.  $17.3 \pm 1.65$  cm,  $P < 0.01$ ), shorter time of postoperative first flatus ( $2.1 \pm 0.30$  vs.  $3.2 \pm 0.69$  days,  $P < 0.01$ ) and hospital stay ( $7.3 \pm 1.26$  vs.  $9.8 \pm 1.10$  days,  $P < 0.01$ ). There was no conversion rate for the HALTC. The postoperative complication rate of HALTC and CTC were (7/20 vs. 6/20,  $P = 0.74$ ) no difference.

**Conclusions:** To our knowledge this is the first randomized study comparing the clinical outcome of ISTC patients underwent HALTC or CTC. Hand-assisted laparoscopic surgery provides an alternative means to conventional laparotomy of performing total colectomy for idiopathic slow transit constipation and gives a better short-term outcome, comparable complication rates, and similar life quality. These results needs to be completed by performing further controlled trials.

### Has a Decline in the Surgical Treatment of Diverticulitis Led to More Cases of Complicated Diverticulitis?

(P69)

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**Purpose:** Indications for surgical treatment in diverticulitis have become increasingly controversial. We longitudinally evaluated patterns of care of diverticulitis to determine if complicated diverticular disease (perforation and/or abscess) has increased with reduced surgical treatment of diverticulitis.

**Methods:** We used national data from the Nationwide Inpatient Sample (NIS), a 20% stratified random sample of patients admitted to US hospitals. Utilizing ICD-9 codes, we identified all patients with diverticulitis discharged from 1991 through 2005. We determined the rate of diagnoses (proportion of all admissions) for diverticulitis, complicated diverticulitis (both perforation and/or abscess), and the proportion of patients treated surgically. We used joinpoint analyses to evaluate trends.

**Results:** During the study period, 685,390 patients were identified with diverticulitis in NIS hospitals. The ratio of diverticulitis admissions increased from 5.1 cases per 1000 hospitalized patients in 1991 to 7.6 cases in 2005 ( $p < 0.0001$ ). The proportion of diverticulitis patients who underwent colectomy for uncomplicated disease declined from 17.9% to 13.7% in 2005 ( $p < 0.002$ ). During the same time period, the proportion of complicated diverticulitis patients who underwent surgery also declined, 69.1% to 51.7% in 2005 ( $p < 0.0001$ ). Although, the proportion of admissions for diverticular abscess increased from 5.9% to 9.6% in 2005 ( $p < 0.05$ ), the proportion of patients admitted for diverticular perforation remained unchanged (1.5%) throughout the study period ( $p = \text{NS}$ ).

**Conclusions:** We noted a significant rise in the proportion of diverticulitis admissions during the study period with a concomitant rise in the rate of diverticular abscess. Despite the significant decline in the surgical treatment of both uncomplicated and complicated diverticulitis, there was no adverse change in the rate of diverticular perforations.

### Laparoscopic Sigmoid Resection for Complicated Diverticular Disease is Associated with Better Outcomes

(P70)

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..... Atlanta, GA

**Purpose:** To compare the outcomes of open versus laparoscopic sigmoid resections for complicated diverticular disease in a large private colorectal practice with an ACGME-approved fellowship-training program.

**Methods:** A retrospective review of 169 consecutive patients undergoing sigmoid resection for complicated diverticular disease between January 2002 and June 2007 was done. These included patients with diverticular abscesses, phlegmon, recurrent diverticulitis, colovaginal and colovesical fistulas. The surgeries were performed by five experienced colorectal surgeons with or without a fellow. Follow up ranged from 2 months to 4 years. The primary outcomes evaluated were EBL, LOS and complications. Univariate and multivariate linear regression analysis was done using the SAS 9.1 (SAS Institute, Cary, NC) statistical software. Significance was set at a  $p$  value  $< 0.05$ .

**Results:** There were 169 consecutive sigmoid resections for diverticular disease (72 open and 97 laparoscopic). There were no significant differences between the groups with respect to age ( $p = 0.4925$ ), gender ( $p = 0.407$ ) and comorbidities ( $p = 0.546$ ). A fellow was present for 45.8% of the open cases and 70% of the laparoscopic cases ( $p = 0.001$ ). The laparoscopic group had significantly lower EBL ( $160.4 \pm 109.8$  vs.  $230.7 \pm 237.0$ ;  $p = 0.0359$ ) and a shorter length of stay ( $5.4 \pm 2.8$  days vs.  $7.1 \pm 2.9$  days;  $p = 0.0003$ ). Overall, there were no significant differences in complications between the two groups ( $p = 0.846$ ). The complications included seroma/wound infection, small bowel obstruction, incisional hernia, intraabdominal abscess and bleeding. There were no mortalities or anastomotic leaks. On multivariate analysis, the laparoscopic procedure ( $p < 0.0001$ ) and younger age ( $p = 0.0367$ ) were associated with a shorter length of stay. The presence of a fellow was associated with a lower EBL ( $p = 0.0623$ ). However, EBL did not affect the length of stay ( $p = 0.1830$ ).

**Conclusions:** Laparoscopic sigmoid resection for complicated diverticular disease is associated with better outcomes and is as safe as open sigmoid resection.

### P68 Comparison of overall short-term outcomes between HALTC and CTC groups

	HALTC overall (n=20)	CTC overall (n=20)	P Value
Operative time (min)	204±44	201±22	0.815
Incision length (cm)	7	17.3±1.65	<0.01
Estimate blood loss (ml)	102±37	119±27	0.192
Time to first flatus (days)	2.1±0.30	3.2±0.69	<0.01
Length of stay (days)	7.3±1.26	9.8±1.10	<0.01
Post-OP bowel frequency (per day)	2.1±0.7	2.5±0.5	0.042
Complications	7	6	0.74



### Laparoscopic vs. Open Reversal of Hartmann's for Diverticulitis

(P71)

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 ..... Weston, FL

**Purpose:** Hartmann reversal can be a technically challenging operation associated with significant morbidity. Laparoscopy has been associated with some definitive short term advantages and possibly long term advantages. The aim of this study was to determine whether laparoscopic Hartmann reversal provides any advantages as compared with the open technique.

**Methods:** After IRB approval, patients who underwent laparoscopic Hartmann reversal for diverticulitis were identified in our prospectively collected database. These patients were case matched by age, gender, body mass index and diagnosis to control patients who underwent the same operation through an open technique. Intraoperative data and postoperative outcomes were recorded.

**Results:** Thirty one laparoscopic Hartmann reversals were identified, 27 of which were performed for diverticulitis. These were case matched with 27 open Hartmann reversal operations for diverticulitis. The laparoscopic group (Mean age, 63; 52% Female; Mean BMI 27) were similar to the open group (Mean age, 62; 52% Female; Mean BMI 27). The conversion rate in the laparoscopic group was 37%; most conversions were due to failure to progress as a result of dense adhesions. Overall the operative time in the laparoscopic group ( $n=27$ ) was longer than the open group ( $n=27$ ) ( $235 \pm 11$  min vs.  $195 \pm 12$  min,  $P=0.02$ ). There were no significant differences between the groups in time to regular diet ( $5.0 \pm 0.4$  d vs.  $5.3 \pm 0.5$  d,  $P=0.73$ ), time to first bowel movement ( $5.3 \pm 0.4$  d vs.  $5.2 \pm 0.4$  d,  $P=0.92$ ), length of hospital stay ( $5.9 \pm 0.5$  d vs.  $7.1 \pm 0.5$  d,  $P=0.11$ ), or post operative morbidity ( $7/25$  vs.  $11/27$ ,  $P=0.34$ ).

**Conclusions:** Laparoscopic reversal of Hartmann operation for diverticulitis is equivalent to open technique in terms of postoperative morbidity. It is associated with longer operative times and does not seem to confer the short term gains afforded to patients who undergo laparoscopy for other colorectal pathology.

### Right-Sided Diverticular Disease in Asians: A Diagnostic Challenge

(P72)

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**Purpose:** Right sided diverticular disease occurs more commonly in Asians compared to the West where left sided diverticulosis predominates. This study aims to determine the various presentations, management strategies and outcomes of patients who underwent surgery for right-sided diverticular disease in a 1500-bed public hospital over a period of 5 years.

**Methods:** One hundred and twenty-four consecutive patients who underwent surgery for complicated diverticular disease between February 2001 and December 2005 in the Department of Surgery, Tan Tock Seng Hospital, Singapore were accrued from a log of all operative procedures. Of these, 52 patients had exclusively right-sided diverticular disease.

**Results:** Thirty-three patients (33/52, 63.5%) had acute diverticulitis, of which 7 (7/52, 13.5%) were uncomplicated, 21 (21/52, 40.4%) had perforation and 5 (5/52, 9.6%) had abscess formation. Eighteen patients (18/52, 34.6%) had bleeding diverticular disease and 1 (1/52, 1.9%) had intussusception. Fifty-seven percent (12/21) of patients with perforated diverticulitis and 80% (4/5) of patients with diverticular abscess were diagnosed pre-operatively as appendicitis. Forty-four (44/52, 84.6%) patients underwent emergency surgery compared to 8 (8/52, 15.4%) patients who had elective surgery. The median post-operative length of stay was 5 (2 to 62) days.

**Conclusions:** Right-sided diverticulitis, particularly those complicated by perforation or abscess formation, often mimics appendicitis and occurs more commonly in the younger age group. Surgical resection is the definitive treatment of choice for symptomatic right-sided diverticular disease and is associated with a low rate of recurrence.

### Laparoscopic Surgery for Diverticular Disease Complicated by Fistula

(P73)

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 ..... Hampshire, United Kingdom

**Purpose:** Colonic diverticulosis is a common disease in many parts of the world; is often asymptomatic, discovered incidentally and can be managed conservatively in most cases. Complicated diverticular disease often requires surgical intervention, and in approximately 20% the indication is fistulating disease. Laparoscopic diverticular resection is feasible, but major complicated disease, especially fistulation has been considered a relative contra-indication. In this study the feasibility and outcome of laparoscopic sigmoid resections for diverticular disease complicated by fistulae was assessed.

**Methods:** Data were collected prospectively from initiation of a laparoscopic colorectal program in 2003, and patient outcomes following laparoscopic sigmoid resections for diverticular disease complicated by fistulae together with those without fistulating disease were recorded.

**Results:** A total of 272 laparoscopic colorectal resections were carried out over the study period. Of those, 66/272 (24%) underwent laparoscopic sigmoid resection for diverticular disease. There were 15/66 patients (23%) with fistulating disease (8 colovesical and 7 colovaginal). Comparative details are given in Table 1. There was no anastomotic leak or mortality noted in either group.

**Conclusions:** Although there is a tendency towards high-

er conversion and stoma formation rate in the fistula group, this was not statistically significant. Laparoscopic sigmoid resection for diverticular disease complicated by fistula is technically feasible with similar outcomes to surgery for diverticular disease without fistulae.

#### Nonoperative Management of Right Colon Uncomplicated Diverticulitis

(P74)

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**Purpose:** Right colon diverticulitis is presented more commonly than left colon in eastern countries. Although no definite evidences are available, nonoperative management is the mainstay of therapy for right colon uncomplicated diverticulitis. We assessed the optimal treatment for symptomatic right colon diverticulitis.

**Methods:** During 7 years (2000-2006), 316 patients were admitted for symptomatic right colon diverticulitis. Of these, 297 patients had uncomplicated diverticulitis and 19 patients had pericolic abscess. All patients were treated with nonoperative management, such as bowel rest and antibiotics. The locations of diverticular disease were cecum (118), ascending colon (176), cecum and ascending colon (16), and appendix (6). The clinical diagnosis of diverticulitis was made by ultra-

sonography and/or computed tomography. We analyzed retrospectively the length of hospital stay, antibiotic use, failure of initial therapy and the incidence of recurrence.

**Results:** The mean age of patients was 37.8 (14 -75) years. The mean length of hospital stay and antibiotic use were  $6 \pm 2.1$ ,  $4.2 \pm 2$  days. All patients were successfully treated with initial medical therapy and hospital course was uneventful. Of 297 patients with uncomplicated diverticulitis, 1 patient (0.3%) had recurrence during follow up. Of 19 patients with pericolic abscess, 3 patients (16%) had recurrence.

**Conclusions:** Nonoperative management can be treatment of choice in patients with right colon uncomplicated diverticulitis. Right colon diverticulitis with pericolic abscess should be treated with additional care.

#### Laparoscopic Colectomy for Complex Diverticular Disease: Pushing the Envelope

(P75)

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**Purpose:** The objective of this study was to evaluate the safety and feasibility of laparoscopic colectomy for complex diverticular disease.

#### P72 Comparison between pre-operative and post-operative diagnoses of the 52 patients with exclusive right-sided diverticular disease who underwent surgery

Post-operative diagnosis	Pre-operative diagnosis						Intussusception	Total
	Appendicitis	Diverticulitis	Perforated viscus	Abscess	Intestinal obstruction	Bleeding diverticular disease		
Uncomplicated diverticulitis	1 (14.3%)	4 (57.1%)	1 (14.3%)	0	1 (14.3%)	0	0	7
Perforated diverticulitis	12 (57.0%)	6 (28.6%)	1 (4.8%)	1 (4.8%)	1 (4.8%)	0	0	21
Diverticular abscess	4 (80.0%)	0	0	1 (20.0%)	0	0	0	5
Bleeding diverticular disease	0	0	0	0	0	18 (100%)	0	18
Intussusception secondary to diverticulitis	0	0	0	0	0	0	1 (100%)	1

P73 Table 1

	Diverticular disease without fistulae (51)	Diverticular disease with fistulae (15)
Operative Duration (mins) Median 25-75 percentile)	180 (155-225)	180 (175-255)
Length of stay (days) Median (25-75 percentile)	6 (5-8)	7 (4.5-9.5)
Conversion	10 (20%)	4 (27%)
Defunctioning stoma	6 (12%)	5 (33%)

**Methods:** Consecutive patients undergoing laparoscopic colorectal procedures from 1991-2007 were analyzed from a prospectively-collected database. Patients with diagnoses of acute diverticulitis, chronic diverticulitis, and diverticulosis were included. Complex cases (CX) were defined as having abscesses, perforations, fistulae, or strictures, and were compared to uncomplicated cases (UN) which served as control. Patients with acute diverticulitis were operated on urgently or for failure of conservative therapy. All patients underwent straight laparoscopy; there were no hand-assisted cases. Summary statistics and univariate analyses were performed.

**Results:** A total of 183 patients were analyzed, of which 39 had CX and 144 had UN. Within the CX cohort, there were 15 (38.5%) abscesses/perforations, 17 (43.6%) fistulae, and 10 (25.6%) strictures. CX patients were older (63.7 vs. 53.3 years,  $p < 0.0001$ ) and were more likely to have had previous abdominal surgery (30.8% vs. 10.4%,  $p = 0.0015$ ). The vast majority of patients underwent left-sided colectomies (100% vs. 92.4%,  $p = 0.12$ ). Nevertheless, median operative times were longer (289 vs. 170 min.,  $p = 0.058$ ), and ostomies were fashioned more frequently (18.0% vs. 4.9%,  $p = 0.013$ ) in CX patients. Intraoperative complications were comparable between the two groups (7.7% vs. 9.7%,  $p = 1.00$ ), although CX cases were converted much more frequently (23.1% vs. 4.2%,  $p = 0.0007$ ). Postoperatively, rates of surgical complications were not significantly different for anastomotic leak, ileus, and wound infection, although medical complications were significantly more frequent in the CX group (33.3% vs. 4.9%,  $p < 0.0001$ ). There were no mortalities. Finally, the median time required to resume a normal diet (4 vs. 3 days,  $p = 0.036$ ) and to discharge from hospital (6 vs. 4 days,  $p = 0.0009$ ) were both significantly longer in the CX group.

**Conclusions:** Laparoscopic surgery for complex diverticular disease is safe and feasible. Despite a high rate of conversion to open surgery, laparoscopy is applicable to complex diverticular disease in the great majority of patients.

#### Evaluation of Ileostomy-Related Complications within 90 Days of Ileostomy Construction

(P76)

F. Vaince, M. Brand, T. Saclarides . . . . . Chicago, IL

**Purpose:** To assess the incidence and types of short-term complications associated with ileostomy construction and to identify predisposing conditions.

**Methods:** A retrospective chart review was conducted to evaluate short-term complications (within 90 days) associated with ileostomies between 2002-2007 at a tertiary care medical center. Variables studied were age, gender, ileostomy type, indication, diagnosis, previous abdominal surgeries, and comorbid conditions. Re-admission or delayed discharge secondary to the problems listed below were considered ileostomy-related complications.

**Results:** 116 ileostomy constructions were identified. Fifty (43%) had complications for a total of 61 complications

including fluid/electrolyte/nutritional (F/E/N) problems ( $n=35$ , 57%), stomal stenosis ( $n=3$ , 4.9%), parastomal skin problems ( $n=3$ , 4.9%), stomal retraction ( $n=1$ , 1.6%), small bowel obstruction ( $n=17$ , 27.8%), and parastomal abscess ( $n=2$ , 3.3%). Of these complications, 48% resulted in re-admission (62% were for F/E/N problems), and 51% resulted in delayed discharge. Of significance, 100% of small bowel obstructions were with loop ileostomies, and 49% of loop ileostomies vs. 35% of end ileostomies had complications. Advanced age, emergent surgery, and diabetes did not correlate with significantly increased complication rates.

**Conclusions:** The incidence of short-term complications with ileostomies is high when fluid/electrolyte problems and small bowel obstruction are considered, and these result in significantly high re-admission rates.

#### Five-year Prospective Analysis of Stoma-Related Complications

(P77)

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**Purpose:** Published stoma related complication rates vary between ten and seventy percent. This unit has previously published data looking at complications over time for a two year period. Here we update this to 5 years and have also looked at an additional 1046 patients by using the Lanarkshire wide colorectal data-base. The aim of this audit was to prospectively look at complication rates at different times during the follow up period.

**Methods:** A prospective study on 1454 consecutive patients with either colostomy or ileostomy was carried out over a 5 year period. Both emergency and elective procedures were included. Stoma related complications were analysed at 10 days, 3 months, 6 months, 1,2,3,4, and 5 years postoperatively.

**Results:** The complication rates were similar for both elective and emergency stomas. The percentage of stomas that had stenosis (0-5% or prolapse (0-5%)) did not significantly decrease with time. The complication rates for skin excoriation, leakage, soiling or night time emptying were higher amongst the ileostomy group. The rates of day soiling and leakage improved with time however the night rates were relatively constant with time. Parastomal hernias were more common in the colostomy group and their proportion increased with time (0-44% compared with 0-18% in the ileostomy group).

**Conclusions:** In the previously published data the night-time emptying in the ileostomy group worsened with time. Looking at this in the extended follow up group the rate increases and then decreases again. The rate of parastomal hernias in both the ileostomy and the colostomy group increases with time. It was previously believed that stoma-related complications would improve with time. This study has shown that in the case of most complications, the rate

is steady or actually increases with time (the exceptions being odour and day time-leakage/soiling which improve with time). Ileostomy patients continued to have a higher incidence of skin excoriation, leakage, soiling and night-time emptying and we suggest should receive extra support.

#### Robotic Colorectal Surgery: Surgical Outcome and Cost Analysis

(P78)

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**Purpose:** Laparoscopic robotic surgery is been increasingly used in urologic, gastrointestinal and gynaecologic surgery. We attempted to assess surgical outcome, and analyse the related costs.

**Methods:** From January 2003 to November 2007, 43 patients underwent colorectal surgery with the da Vinci robotic system. Clinical and financial data were prospectively collected. The costs analysis of robotic vs laparoscopic sigmoid resection (matched cases) for diverticular disease was compared using the Student t-test. They were 13 males (30%) and 30 females (70%) with a mean age of 60 years (32-84). 39 cases were benign (90%). Included were: diverticular disease (n=22, 51%), rectal prolapse (n=11, 25%), resection of adenomatous polyps (n=4, 10%), colorectal adenocarcinoma (n=4, 10%), Crohn's ileitis (n=1, 2%) and recto-vaginal endometriosis (n=1, 2%). One patient (2%) was lost to follow-up.

**Results:** There was no death, but 2 patients (5%) were re-operated for left ureter lesion and pelvic haematoma. Conversion to laparotomy was reported in 2 cases (5%) and to laparoscopy in another 3 cases (7%). Mean operative time was 166 minutes (50-330) and mean hospital stay was 10 days (3-24). Mean follow-up time was 9 months (22 days-33 months). The costs of robotic instruments were significantly higher than for conventional laparoscopy ( $p=0.0003$ ), while no statistical difference was found with respect to the costs of the length of stay, length of operative time, room costs and overall costs.

**Conclusions:** The da Vinci robotic system is safe for the patients with good surgical outcome. Colorectal robotic surgery is more expensive than laparoscopy.

#### In Vitro Motor Patterns and Excitatory and Inhibitory Neurotransmission in Human Sigmoid Colon

(P79)

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**Purpose:** To characterize the in vitro motor patterns and the neurotransmitters released by enteric motor neurons (EMNs) in human sigmoid colon.

**Methods:** Transmural sigmoid circular strips (3x10mm) from 71 patients who underwent surgery for rectal cancer (32-75 years, 45% women) were studied in organ baths. Enteric motor neurons (EMNs) were stimulated by electrical field stimulation (EFS) and through nicotinic receptors (nAChRs).

**Results:** a) Strips developed weak spontaneous rhythmic contractions (RPCs,  $2.54 \pm 0.15/\text{min}$ ) unaffected by the neurotoxin tetrodotoxin (TTX,  $1 \mu\text{M}$ ). b) EFS induced strong contractions during (on, 56%) or following a latency period after stimulus (off, 44%), both abolished by TTX. c) Nicotine inhibited spontaneous contractions ( $1-100 \mu\text{M}$ ), an effect reduced by TTX. Latency of off-contractions and nicotine responses were reduced by L-NNA ( $1 \text{mM}$ ) and blocked after further addition of apamin ( $1 \mu\text{M}$ ). The apamin-sensitive inhibitory response was antagonized by the P2Y1 receptor antagonist MRS 2179 ( $10 \mu\text{M}$ ), and unaffected by the P2X antagonist NF279 ( $10 \mu\text{M}$ ) or  $\alpha$ -chymotrypsin ( $10 \text{U/mL}$ ). Amplitude of on and off contractions was reduced by atropine ( $1 \mu\text{M}$ ) and the selective NK2 receptor antagonist (NK-2ra  $10 \mu\text{M}$ ). MRS 2179 reduced the amplitude of EFS on and off contractions without altering direct muscular contractions induced by acetylcholine (ACh,  $1 \text{nM}-1 \text{mM}$ ) or substance P ( $1 \text{nM}-10 \mu\text{M}$ ).

**Conclusions:** Circular strips of human sigmoid colon developed in vitro spontaneous contractions (RPCs) of nonneural origin and responded to EFS with two distinct patterns of contractile responses of neural origin: (a) on-contractions during EFS; and (b) off-contractions following a latency period after EFS. Latency of EFS-off contractions and inhibition of spontaneous RPCs by nicotine are caused by stimulation of inhibitory EMNs co-releasing NO and a purine acting at muscular P2Y1 receptors. EFS-on and off contractions are caused by stimulation of excitatory EMNs co-releasing ACh and tachykinins acting on muscular muscarinic and NK2 receptors. Prejunctional P2Y1 receptors might modulate the activity of excitatory EMNs.

#### Fibrin Glue May Be Better Than Surgery for Pilonidal Sinus: Results of a Prospective, Randomized, Controlled Trial and 2-Year Follow Up

(P80)

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**Purpose:** There is no consensus on the optimal treatment for pilonidal sinus disease. Treatment with fibrin glue is a novel minimally-invasive technique which we compared to conventional surgery.

**Methods:** 40 consecutive patients (M=27 F=13, median age 29 (15-45) with pilonidal sinus disease were randomized to either fibrin glue treatment (FGT) or Bascom's procedure. Patients with recurrent disease following previous surgery



were included (FGT=4 Bascom's= 6). Patients completed a validated Quality of Life questionnaire (QoL) daily for the first week post-operatively and at 6 weeks. End points included infection rates, healing, QoL scores, analgesic requirements, convalescence time, cost and long term recurrence.

**Results:** Pain scores (worst pain=10) were significantly reduced at day 1 in the FGT group compared to the Bascom's group (2.5 (1.30) versus 5.0 (1.15) (mean, 95% Confidence interval),  $p=0.04$ ), and on day 7 (1 (0.92) versus 4.47 (1.10),  $p=0.019$ ). Analgesic use scores were significantly less in the FGT group at day 1 and day 7 (2.5/10, 1/10 versus 5/10, 4.47/10,  $p<0.05$ ). Health scores (0= good, 10=bad) were significantly better at one week in the FGT group vs Bascom's group (0.7 versus 4.8,  $p=0.025$ ) and at 6 weeks (0.05 versus 1.8  $p<0.01$ ). Infection rates were similar: FGT=3 (15%) vs Bascom's =5 (25%),  $p=ns$ . Return to normal mobility was achieved by 19/20 of FGT patients by day 7 versus 5/19 of those randomised to surgery. This remained statistically significant at week 6,  $p=0.035$ . Median follow-up was 24 (range 16 -31) months with two recurrences in FGT group (10%) and one in the Bascom's group (5%),  $p=ns$ . An estimated direct cost reduction of £2205 (\$4539) per patient was achieved by reduced post-operative wound care requirements in the fibrin glue group.

**Conclusions:** Fibrin glue is a novel treatment for pilonidal sinus which may be equivalent to surgery in terms of healing, infection and long-term recurrence. Fibrin glue causes significantly less pain and allows significantly quicker return to normal activities and is cheaper compared to surgery. Fibrin glue may be a promising alternative to surgery for primary and recurrent pilonidal disease.

#### Sigmoid Colon Morphology in the Population Groups of Durban with Special Reference to Sigmoid Volvulus

(P81)

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..... Durban, South Africa

**Purpose:** To establish differences in morphological features of the sigmoid colon between the different population groups in Durban, South Africa, with particular reference to sigmoid volvulus.

**Methods:** This was a prospective autopsy study of sigmoid colons in the different population groups in Durban. Adult cadavers were examined in the Government Mortuary. Parameters assessed were length of the sigmoid colon, width and height of sigmoid mesocolon, shape and site of sigmoid loop. Other parameters were thickening of the mesocolon and splaying of the taenia coli. Mesocolic ratio was calculated by dividing the width by the height of the sigmoid mesocolon.

**Results:** There were a total of 590 cadavers examined at autopsy of whom 403 (313 males) were African, 91 were Indian (77 males) and 96 were White (70 males). The length of the sigmoid colon was  $29.6 \pm 12.1$ ,  $20.6 \pm 9.2$  cm and

$22.6 \pm 12.3$  cm among Africans, Indians and Whites respectively (Africans vs Indians and Whites  $p<0.0001$ , Indians vs Whites  $p=0.699$ ). The width of the mesocolon was  $8.3 \pm 2.5$  cm,  $9.6 \pm 2.8$  cm, and  $9.8 \pm 3.4$  cm among Africans, Indians and Whites respectively (Africans vs Indians  $p=0.002$  Africans vs Whites  $p<0.0001$  and Indians vs Whites  $p=NS$ ). The mean height of the mesocolon was  $8.9 \pm 4.8$  cm,  $6.4 \pm 2.9$  cm and  $6.5 \pm 3.9$  cm among Africans, Indians and Whites respectively (Africans vs Indians and Whites  $p<0.0001$ , Indians vs Whites  $p=NS$ ). The mesocolic ratio for Africans, Indians and Whites was  $1.1 \pm 0.8$ ,  $1.8 \pm 0.7$  and  $1.9 \pm 1.0$  respectively (Africans vs Indians and Whites  $p<0.0001$ ). Africans had a significantly high incidence of long-narrow shape and suprapelvic position and the significantly lower incidence of the classic shape compared to the other population groups ( $p=0.003$ ) and there was no difference between Indians and Whites ( $p=1$ ). There was no difference in measurements between males and female in all population groups.

**Conclusions:** Africans have longer sigmoid colons, longer mesocolon and narrower mesentery base. They tend to have long-narrow shape in the suprapelvic position. There were no marked gender differences. The differences shown in this study may explain geographical and racial differences in sigmoid volvulus.

#### A Systematic Review of the Benefit of Total Parenteral Nutrition in Enterocutaneous Fistulas

(P82)

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..... London, United Kingdom

**Purpose:** Enterocutaneous fistulas (ECF) are treated with Total Parenteral Nutrition (TPN) but the evidence on this is uncertain. We performed a systematic review to define indications and benefits of TPN on ECF management.

**Methods:** A systematic review of the literature from 1980 to 2007 was carried out by 2 reviewers. Only clinical trials using TPN as primary conservative treatment of ECF were included.

**Results:** A total of 9 clinical trials with 1233 patients was identified. ON 620 patients TPN was used as well as enteral nutrition and surgery. There were 500 spontaneous closures but it is unclear if TPN was a primary contributor. 107 patients (8.6%) had surgery as only treatment while 673 (55%) had combination of surgery and conservative treatment. There were 198 deaths (16% mortality). The studies were very heterogeneous and it was impossible to identify precise indications of TPN as well as timing and relation to output of fistula and overall benefit.

**Conclusions:** Although TPN is widely practiced in ECF there is very little evidence for its efficiency. The quality and comparability of available studies is poor and the benefit of TPN is poorly defined. Alternative forms of nutrition might be equally beneficial and less invasive.

# Hand-Assisted Laparoscopic Colectomy in the Morbidly Obese

(P83)

E. Grossmann, W. Peters . . . . . Columbia, MO

**Purpose:** Morbid obesity has become an epidemic in the United States. Neoplastic and diverticular diseases of the colon remain frequent indications for surgery in our country. Our purpose is to examine the outcome of morbidly obese patients treated with laparoscopic colectomy by the hand assisted technique.

**Methods:** Our practice has maintained a prospective database on all colectomies performed since June, 2005. We conducted a retrospective review of all hand assisted laparoscopic left, right, sigmoid, and low anterior colon resections for benign and malignant neoplasms, diverticular disease, bleeding and colon perforation from 6/2/2005 through 9/20/2007. We compared outcomes for patients with a body mass index (BMI) less than 40 (Group 1), with outcomes for patients with a BMI greater than or equal to 40 (Group 2). Continuous variables were analyzed by the students T-test, and qualitative data was analyzed by the chi-squared method.

**Results:** There were 219 patients in Group 1, and 21 in Group 2. The mean BMI in Group 1 was 27, and the mean BMI for Group 2 was 45 (with a range of 40 to 59). When comparing Group 1 with Group 2, there were no significant differences in conversion rates (0.9% vs. 0%), mean operating time (104 minutes vs. 129 minutes), 30-day morbidity rates (15% vs. 19%), 30-day mortality rates (0.9% vs. 0%), or mean length of stay (4.1 days vs. 4.7 days).

**Conclusions:** Laparoscopic colectomy by hand assisted technique is feasible in morbidly obese patients, and appears to have similar outcomes to procedures performed in the non-morbidly obese.

# Laparoscopic Restorative Proctocolectomy and Ileal Pouch-Anal Anastomosis; Have We Progressed?

(P84)

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**Purpose:** Restorative proctocolectomy and Ileal pouch anal anastomosis (IPAA) is the procedure of choice for patients with ulcerative colitis. Laparoscopy has been applied to this procedure. This study set out to report our short-term results with laparoscopic restorative proctocolectomy and IPAA and compare it with a matched group of patients undergoing open surgery.

**Methods:** All patients who underwent laparoscopic restorative proctocolectomy and IPAA were retrospectively reviewed using our prospectively maintained database. Charts were reviewed for demographics, operative time, blood loss, length of hospitalization, morbidity, and mortality. A group of 60 patients who underwent open restorative proctocolectomy and IPAA and were selected for comparison to the laparoscopic group. The patients were well matched for BMI, ASA, diagnosis, and age.

**Results:** All 61 patients underwent laparoscopic restorative proctocolectomy and IPAA between 1991 and 2007.

## P82

Study	No of Pt No of fistulas	Surgery	TPN	Spontaneous Healing	Death
Stigges-Serra 1982	75 pt 87 F	29/75 = 39%	75/75=100%	62/87 =71%	16/75 = 21%
Allardye 1983	52 pt	25/52 = 48%	47/52 = 90%	19/44 = 43%	20/52 =38%
Zera 1983	50 pt 68 F	35/68 =51%	47/50 =94%	49/68 = 72%	11/50= 22%
McIntyre 1984	114 pt 117 F	77/117 =44%	48/132 =36%	32/132 =24%	6/114 =5.2%
Rose 1986	108 pt 114 F	56/108 =52%	98/108 =91%	69/114 =61%	16/108 =15%
Levy 1989	335 pt	200/335 =60%	71/285 =25%	213/335 =64%	113/335 =34%
Lynch 2004	205 pt	203/205 =99%	74/205 =36%	—	—
Chaudhry 2004	17 pt	14/17 =82%	17/17 =100%	1/17 = 1%	2/17 =12%
Hollington 2004	277 pt	167/277 =60%	143/277 =52%	55/277 =20%	30/277 = 18%

Comprehensive summary of main results of systematic review on the role of TPN in the management of enterocutaneous fistulas.

## P83 Hand Assisted Laparoscopic Colectomy in the Morbidly Obese

	n	BMI (mean)	Converted	Mean Op-time (min)	30-day Morbidity	30-day Mortality	Mean LOS (days)
BMI less than 40	219	27	2/219 (0.9%)	104	33/219 (15%)	2/219 (0.9%)	4.1
BMI equal to or greater than 40	21	45	0/21 (0%)	129	4/21 (19%)	0/21 (0%)	4.7

Including 5 patients in whom an operation was performed hand assisted. There were 4 conversions to laparotomy and fecal diversion was employed in all cases. The operative time in the matched group of 60 patients was significantly shorter than in the laparoscopic group (208 minutes vs. 276 minutes,  $P < 0.05$ ). However the major morbidity rate was similar (7.2% vs. 6.2%) and the length of hospitalization was significantly longer (7.6 vs. 5.9;  $P < 0.05$ ). There were no mortalities in either group.

**Conclusions:** Laparoscopic IPAA may decrease the length of hospitalization and without increasing the morbidity. As technology improves and laparoscopic skills are refined this procedure may prove to be the treatment of choice for select patients. Further study is needed to evaluate the laparoscopic approach in a prospective randomized fashion.

### Internal Sphincter Morphology in Scleroderma

(P85)

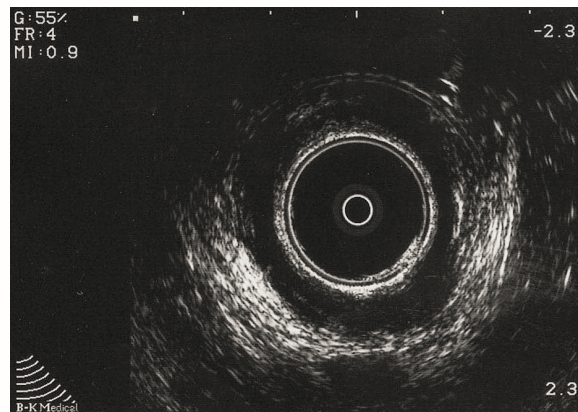
C. Koh, C. Young, J. Young, C. Wright, C. Byrne  
..... Sydney, NSW, Australia

**Purpose:** Faecal incontinence in scleroderma can occur either due to fibrous replacement of the internal sphincter or ischaemic myopathy of internal sphincter secondary to vasculitis. These changes can alter the appearance of internal sphincter on endoanal ultrasound (EUS). The purpose of this study was to document morphological changes of internal sphincter as a result of scleroderma.

**Methods:** A retrospective study of consecutive patients with scleroderma presenting with faecal incontinence between 1999 and 2006 was performed. EUS was performed using a 10MHz Bruel and Kjaer endoprobe. Internal sphincter thickness and echogenecity were assessed at mid anal canal using prospectively collected images. Sphincter thickness was measured at 3,6,9 and 12 o'clock positions and averaged. Sphincter quality was assessed as hyperechoic, normoechoic and hypoechoic by an experienced colorectal surgeon. Sphincter thickness was compared with females of similar age without faecal incontinence using Mann Whitney test.

**Results:** Over the 8 year study period, there were eleven patients with scleroderma who presented with faecal incontinence. Two were excluded from the study as there were internal sphincter defects. All patients were female. The average age was 66 (range 61-73). All patients have documented scleroderma for at least 5 years. The average sphincter thickness in scleroderma patients was 1.6mm with a range of 1.0 mm to 3.0 mm (reference for females > 55 years at our institution = 2.4-2.8mm). This difference was statistically significant ( $p = 0.028$ ). All internal sphincters were rated hypoechoic. All patients have dramatically reduced maximum resting pressures with an average maximum resting pressure of 16mmHg (normal= 40-60mmHg).

**Conclusions:** Morphological changes of the internal sphincter in scleroderma have only been documented in two previous case reports involving three patients. This series of women with scleroderma suggests that scleroderma is associated with altered internal sphincter morphology.



### Long-Term Clinical and Physiological Assessment of Anorectal Function after Pelvic Radiotherapy

(P86)

R. Kushwaha, D. Hayne, H. Payne, P. Boulos. . . London, United Kingdom

**Purpose:** It has previously been demonstrated that there is clinical and anorectal physiological disturbance after pelvic radiotherapy (RT), which extends up to two years. Up to 68% of patients have proctitis, and resting anal canal pressures are diminished. The aim of this study was to investigate the outcome after a longer period.

**Methods:** Patients who had conventional pelvic RT 5 years previously for prostate cancer were assessed by proctitis and incontinence scores and anorectal physiology. Comparison was made with an age-matched group using the Mann-Whitney U test.

**Results:** Fourteen men, median age 73 (63-79) were compared with 31 men, median age 70 (55-82), who had not received RT. A higher proportion in the RT group had symptoms of proctitis (13/31 [42%] vs 8/14 [57%];  $P < 0.3$ ) and incontinence (7/31 [22%] vs 6/14 [43%];  $P < 0.2$ ) after RT but this was not significant. After RT the median proctitis symptom score increased (0 vs 1;  $P < 0.1$ ) but the incontinence score did not change (0 vs 0;  $P < 0.4$ ). There was a reduction in median resting (83 vs 76;  $P < 0.2$ ), squeeze (152 vs 106;  $P < 0.08$ ) and endurance increment (100 vs 79;  $P < 0.2$ ) pressures, but these were not significant. A non-significant reduction in threshold (50 vs 45;  $P < 0.09$ ) and maximum rectal (245 vs 190;  $P < 0.5$ ) volumes were noted.

**Conclusions:** Notwithstanding the clinical and physiological disturbance demonstrated up to two years after RT, beyond this time anorectal function recovers and other causes should be considered in symptomatic patients.

### Clinical and Physiological Assessment of Anorectal Function after Three-dimensional Conformal versus Conventional Pelvic Radiotherapy

(P87)

R. Kushwaha, D. Hayne, H. Payne, P. Boulos  
..... London, United Kingdom

**Purpose:** Three-dimensional conformal radiotherapy (3-D CRT) for pelvic malignancy aims to localize radiation to the target organ, and restrict scatter, minimizing normal tissue injury. The aim of this study was to compare anorectal symptoms and physiology after 3-D CRT with conventional (CRT).

**Methods:** Two groups of men undergoing either CRT or 3-D CRT for prostate cancer were prospectively investigated with proctitis and incontinence scores, and anorectal physiology, before and 6 weeks after radiotherapy. The results were compared by the Mann-Whitney U test.

**Results:** Thirty-one men had CRT, median age 70 (55-82) and 40 men had 3-D CRT, median age 72 (59-81). More men in the CRT group had symptoms of proctitis (80% vs 32%;  $P<0.01$ ) and incontinence (68% vs 22%;  $P<0.01$ ). The median proctitis (2 vs 0;  $P<0.01$ ) and incontinence (4 vs 0;  $P<0.01$ ) scores at six weeks were significantly higher in the CRT group. There was no change in the resting (79 vs 78;  $P<0.4$ ) or squeeze increment (162 vs 132;  $P<0.6$ ) pressures. The median cough (101 vs 119;  $P<0.01$ ) and median endurance (85 vs 127;  $P<0.05$ ) increment pressures were significantly lower in the CRT group. No significant change was seen in the maximum tolerated rectal (194 vs 175;  $P<0.2$ ) volume nor rectal (22 vs 18;  $P<0.01$ ) electrosensitivity.

**Conclusions:** With the advent of 3-D CRT fewer patients are likely to present with anorectal symptoms commonly seen among patients receiving conventional pelvic radiotherapy.

### Transanal Endoscopic Proctectomy

(P88)

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..... Chichester, United Kingdom

**Purpose:** This is the first description of Transanal Endoscopic Proctectomy (TEP); a new minimally invasive technique of perineal proctectomy using Transanal Endoscopic Microsurgery (TEM) equipment in the principles of Natural Orifice Transluminal Endoscopic Surgery (NOTES). Emergency surgery in colitis usually involves colectomy and ileostomy leaving a rectal stump which can cause distressing symptoms and carries a risk of malignant change. Reconstruction is not always feasible and some patients will undergo proctectomy without reconstruction or suffer a long-term symptomatic stump with annual surveillance sigmoidoscopy. Traditionally proctectomy is performed by abdominoperineal excision which is associated with significant morbidity and is not feasible in unfit patients or those with a hostile abdomen.

**Methods:** Transanal Endoscopic Proctectomy (TEP) was performed on six patients who had previously undergone urgent colectomy 5-18 years previously with preservation of a symptomatic rectal stump. Abdominal surgery was contraindicated in three because of hostile abdomen or cardiac disease. After intersphincteric anal dissection, close rectal ultrasonic dissection was performed from the perineum to the top of the rectal stump under endoscopic vision with TEM equipment and CO<sub>2</sub> insufflation.

**Results:** The six procedures were completed successfully in 95-135 minutes without blood loss or other operative complication. The rectal stumps were 10-19 (median 14) cms long. To access the top of the stump, the peritoneal cavity was entered in four patients. This caused no complication apart from short-lived bowel obstruction in a parastomal hernia. Postoperative stay was 1-6 (median 2) days. Two perineal wounds were slow to heal. There were no other postoperative complications. The procedure cost is equivalent to seven annual flexible sigmoidoscopies.

**Conclusions:** TEP is a safe, minimally invasive method of removing even a long rectal stump without abdominal surgery. It removes symptoms and the risk of malignancy. It is cost effective if seven or more annual surveillance sigmoidoscopies are expected.

### Presentation and Treatment Outcomes of Anal Condyloma

(P89)

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**Purpose:** The prevalence of human papilloma virus (HPV) infection has been reported to be as high as 45% in men and 75% in men who have sex with men. HPV, the cause of anal condyloma, is a known risk factor for anal dysplasia. In this study, our purpose was to assess presenting symptoms, efficacy of treatment, risk factors for recurrence and frequency of dysplasia in men with anal condyloma.

**Methods:** A retrospective chart review was conducted on 206 consecutive male patients presenting to a single surgeon for treatment of anal HPV over a three-year period. Patients were treated with excision and fulguration. The following information was collected: HIV status, presenting symptoms, frequency of dysplasia and recurrence.

**Results:** Two hundred six men referred for symptoms, risk factors or positive anal pap smears were found to have anal condyloma with standard anoscopy. Two-thirds of these men were referred for symptoms and one-third were referred for evaluation of an abnormal anal pap smear. The most common symptoms included the presence of a mass, bleeding, pain and itching. Of individuals referred following an abnormal anal pap smear, 41(59%) had gross condyloma identified on initial anoscopy. The frequency of dysplasia was 42% in HIV-positive men and 27% in HIV-negative men, ( $p<0.001$ ). Of the 206 men evaluated and treated for anal condyloma, 133 had at least one follow-up exam



with the mean follow-up time being 14 months  $\pm$  1.0. Ninety-two (69%) patients developed recurrent lesions following the initial treatment. The average interval from treatment to recurrence was 4 months (range 1-35 months). Those who developed recurrent lesions had a median of 2 recurrences (range 1-7) during the follow-up period. This frequency of recurrence was similar in HIV-positive and HIV-negative men.

**Conclusions:** The treatment of anal condyloma in men is associated with high recurrence rates. Dysplasia is common in HIV-positive and HIV-negative individuals. This study illustrates the importance of ongoing surveillance after treatment for anal condyloma.

#### Laparoscopic Adhesiolysis for Postoperative Small Bowel Obstruction

(P90)

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**Purpose:** Adhesional small bowel obstruction (SBO) is one of the common postoperative complications after laparotomy. Recently minimally invasive laparoscopic adhesiolysis for SBO has been reported. The aim of this study was to evaluate the feasibility of laparoscopic adhesiolysis for postoperative SBO.

**Methods:** Between 2000 and 2006, elective laparoscopic surgery was performed in 32 patients with postoperative SBO, which was recurrent or non-resolving by conservative treatment. The bowel was decompressed by a long intestinal tube preoperatively in all cases.

**Results:** The patients consisted of 22 men and 10 women, and their median age was 55 (range, 17-79) years old. The median number of their previous laparotomies was 1 (range, 1-3). There were 16 patients with recurrent SBO, the median number of hospitalization for SBO was 4 (range, 2-20) and the patients with non-resolving SBO were 16. The operation was completed laparoscopically in 13 (41%) patients, and with laparoscopic-assisted procedures in 15 (47%) patients, 4 (13%) patients required conversion to open laparotomy because of dense adhesions. The procedures were as follows: adhesiolysis alone, 20 (63%) patients, adhesiolysis with bowel resection, 4 (25%) patients, adhesiolysis with strictureplasty, 3 (13%) patients. The median operative time was 145 (range, 75-465) min, and the median blood loss was 10 (range, 5-413) g. Intra-operative complications occurred in 7 (22%) patients, which were enterotomies. Postoperative complications developed in 10 (33%) patients, including prolonged ileus in 4 patients, wound infection in 5 patients, port-site bleeding in 1 patient, and enterocutaneous fistula in 1 patient. None of the complications were severe, and there were no mortalities. The median postoperative periods until flatus and oral intake were 2 (range, 1-9) days and 3 (range, 1-59) days respectively. The median postoperative length of hospital stay was 11 (range,

4-64) days. At median follow-up of 13.9 (range, 1-93) months, 31 (97%) patients remained asymptomatic.

**Conclusions:** Laparoscopic adhesiolysis for recurrent or non-resolving postoperative SBO is safe and feasible with favorable outcome.

#### Local Recurrence, Complications and Risk of Malignant Transformation in Tailgut Cysts: Surgical Outcomes in 21 Patients

(P91)

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**Purpose:** Tailgut cysts are rare congenital lesions of the presacral space. This study describes the surgical outcomes following tailgut cyst resection.

**Methods:** The records of all patients undergoing resection of a tailgut cyst between 1985 and 2007 at our institution were reviewed. A survey to determine long-term disease status was mailed to all patients. Data extracted included demographics, clinical presentation, postoperative complications, recurrence and presence of malignancy.

**Results:** Twenty-one patients (82% female; median age: 52 years) were identified. In 9 patients (43%) the tailgut cyst was found incidentally, and the remaining (57%) were symptomatic. A tumor mass was palpable by digital rectal exam in 86% of the patients. One patient (5%) developed a fistula to the rectum. Preoperatively, diagnostic percutaneous biopsy was performed in 4 patients, while incision/drainage procedures were attempted in 5. The median cyst size was 4 cm (range, 1.5-13). Complete cyst removal was achieved in all patients. Proctectomy was required in the patient with a malignant cyst and rectal fistula. Concomitant coccygectomy was performed in 6 patients (28%) and one patient underwent distal sacrectomy. Short-term complications included urinary retention (n=1) and urinary tract infection (n=1). Late complications occurred in 5 patients and included pelvic floor dysfunction (n=2), rectosacral fistula (1), chronic wound drainage (1), and sexual dysfunction (1). At a median followup of 4.3 years, both patients with malignancy have died and one patient developed a recurrent cyst which was subsequently resected.

**Conclusions:** Tailgut cysts are often discovered incidentally and can frequently be palpated on digital rectal exam. Surgical resection is safe with a low recurrence rate. Malignant transformation is rare and may be associated with rectal fistulization.

### Perineal Injuries at a Large Urban Trauma Center: Injury Patterns and Outcomes

(P92)

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**Purpose:** Perineal trauma is rare with a high variety of injury patterns, diagnostic evaluations, and treatment options. The aim of this study is to describe the characteristics of this unique patient population, their clinical presentations, and outcomes.

**Methods:** The LAC+USC Medical Center Trauma Registry was utilized to retrospectively identify patients who sustained perineal injuries. Information recorded included gender, age, vital signs, trauma scores, mechanisms of injury, studies performed, as well as types of surgery, complications, and outcomes. Follow-up visits were also recorded. Pediatric patients and injuries related to obstetric trauma were excluded.

**Results:** Sixty nine patients were identified during a 165-month-period (2/1/1992-10/31/2005); one patient was excluded due to death on arrival. Out of 68 remaining patients, 58 (85%) were males and 10 (15%) were females; mean age 30-years (range: 16-68). Vital signs were: SBP 119 mmHg (range: 0-176), heart rate 94 /minute (range: 0-165), respiratory rate 20 /minute (range: 0-40). Mean trauma score were: Glasgow Coma Scale (GCS)-13, Revised Trauma Score (RTS)-7.57, Injury Severity Score (ISS)-10. The mechanism of injury was penetrating in 56% versus blunt in 44%. CT scan was used in 23 (33%) patients. The most frequently associated injuries were lower extremity and pelvic fractures (24 and 22 cases, respectively). Surgical management included a wide variety of procedures. Debridement and drainage was the most common. Colostomy was performed in 5 patients (7%). Sixty one (88%) survived, and seven (10%) died. Mortality group mean scores were: GCS-6, RTS-5.74, ISS-34; survival group mean scores were: GCS-14, RTS-7.7, ISS-8. There was a statistically significant association between mortality and worse GCS, RTS, and ISS scores ( $p < 0.001$ ).

**Conclusions:** Mortality in patients with perineal injuries is low, mostly due to exsanguination related to associated

injuries. Blunt trauma was associated with bone fractures. The colostomy rate in patients sustaining perineal injuries is low and depends on the grade and extent of rectal injuries. Mortality was associated with lower GCS and RTS, and higher ISS.

### A Tale of Two Chambers: Cecal and Rectal Polyps Compared

(P93)

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**Purpose:** There are structural and functional similarities between cecum and rectum: both are large chambers without regular throughput of stool and without constant peristalsis. The main differences are in the thickness of their walls and the nature and composition of their contents. Both organs develop large sessile polyps that may be difficult to treat. Here we compare large cecal and rectal polyps to see if the differences and similarities between the organs are reflected in their polyps.

**Methods:** Patients with cecal and rectal polyps at least 3 cm in size were abstracted from a prospective endoscopy database. All polyps were evaluated and treated by a single endoscopist. Details of patients and polyps, and outcome of treatment were reviewed.

**Results:** Results are shown in the table. No patient had both cecal and rectal polyps. Demographics were similar between groups. Rectal polyps had larger diameter 60 mm (32.5 - 67.5) compared to cecal polyps 35 mm (30 - 45). Flat polyps are more common in the cecum whereas sessile polyps are more common in the rectum. Similar numbers of patients needed surgery although only 2 rectal polyps needed proctectomy (the rest had transanal excision). Advanced histology was more common in the rectum, including 93% with villous components, and 3 cancers. There were no cecal cancers and 73% had villous histology. Cecal polyps were the only polyps with serrated histology. Recurrence rates were similar. Complication of cecal polypectomy is 22% vs 12% in the rectum.

**Conclusions:** Cecal polyps are more difficult to treat than rectal polyps, but have less aggressive biology, possibly because of a different fecal environment.

#### P93

	N	Gender	Age	Shape	Pathology	Dysplasia	Surgery	Follow up (m)	Recurred
Cecum	41	F=46%	67 ± 15	Sessile= 80% Flat =18%	VA=12% TVA=61% TA=15%	Severe=27% NS=73%	Yes=27% No=73%	10 (0-35) No=50%	Yes=50%
Rectum	42	F=57%	67 ± 17	Sessile= 95% Flat=5%	VA=24% TVA=69% TA=7%	Severe=48% NS=43% Cancer=7%	Yes=36% No=64%	14.5 (4 - 30) No=55%	Yes=45%
P value		0.32 C	0.88 T	0.048 F	0.043 F	0.010 F	0.38 C	0.21 W	0.71 C

C = Chi-square test F = Fisher's exact test T = T - test W = Wilcoxon rank sum

### Variations in Perioperative Steroid Management Among Surgical Subspecialists

(P94)

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**Purpose:** A previous analysis of the practice patterns of colon and rectal surgeons demonstrated consistency in perioperative steroid dosing regimens. In this study, we expanded our focus to physicians of multiple specialties to determine whether practice patterns have evolved and if dosing schedules differ across multiple specialties.

**Methods:** Questionnaires were mailed within the US to members of the American Society of Colon and Rectal Surgeons (CRS) (n=1523), the American Society of Transplant Surgeons (TS) (n=988), the American Society of General Surgeons (GS) (n=2750), and the American Association of Endocrine Surgeons (ES) (n= 278). Survey items addressed age, gender, geographic region, practice type, and practice experience with corticosteroid-dependent patients. We also explored clinical factors considered in steroid dosing, whether perioperative steroids are managed by the surgeon alone or in collaboration with medical colleagues, and the most common intravenous and oral taper regimens used.

**Results:** Four hundred and fifty surveys were returned for analysis. Sixty-four respondents had either retired or answered <50% of the questions, leaving 386 (211 CRS, 116 GS, 45 TS, and 14 ES) for analysis. While the majority of all respondents managed both the perioperative (85.5 %) and oral steroid tapers (77%) themselves, TS and ES were significantly less likely to utilize other physicians than GS or CRS (p<0.001). The pre-operative steroid dose used most frequently was hydrocortisone or solucortef 100mg IV (76% of CRS, 64% of GS, 22% of TS, and 93% of ES). Most CRS (44.5%) and GS (24.1%) taper IV steroids over 3 days, while TS (33.3%) and ES (50%) return patients to prednisone within 1-2 days. There was a significant difference between the groups in the number of regimens used (p<0.001). Also, discharge steroid use was inconsistent, with the majority of CRS (46.4%) tapering prednisone over >21 days post-discharge; GS (19%) over <21 days, and TS (20%) and ES (21.4%) taper over 21 days to pre-operative prednisone doses (p< .001).

**Conclusions:** In the absence of standard guidelines for perioperative corticosteroid administration, significant variations exist in the regimens utilized by surgeons in multiple specialties.

### A National Study on the Association of Social Deprivation with Poor Clinical Outcomes in Diverticular Disease

(P95)

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**Purpose:** Diverticular Disease (DD) is increasingly prevalent in the West with little data on epidemiology. The present study aims to evaluate the effect of social deprivation on disease presentation, operative management and short term outcomes at a National level.

**Methods:** This was a population based study of patients admitted with DD in England from 1996-2006. Data was extracted from a national Hospital Episode Statistics (HES) administrative database of all hospital admissions. Social deprivation was categorised using Carstairs quintiles of deprivation. Logistic regression was used to identify independent factors of 30-day mortality, 28-day readmission and prolonged length of stay (LOS).

**Results:** Over the study period there were 565315 patients with DD as the primary diagnosis and documented social deprivation score amongst 321 hospitals. Individual hospital annual case-load was 160 admissions/year. A laparotomy was undertaken in 12.5% and 4.1% of patients following emergency and elective admissions respectively. The admissions from the most socially deprived group were more likely to be older (18.4% vs 15.6% in 70-80 group, p<0.001), female (18.7% vs 16.7%, p<0.001), black ethnicity, (53.3% vs 3.4%, p<0.001), emergency admissions (19.8 vs 15.9%, p<0.001) but were marginally less likely to undergo laparotomy (17.6 vs 17.8%, p=0.017). 30-day mortality decreased significantly from 2.3% to 1.3% during the study period (p<0.001), as did 28-day readmission from 5.2% to 5.0% (p<0.001) and extended in-patient LOS (greater than 75th percentile of 12 days) from 12.1% to 6.8% (p<0.001). Independent predictors of 30 day mortality were the most deprived socioeconomic group (OR=1.12, p=0.007), increasing age (age>80, OR=29.89, p<0.001), emergency admission (OR=19.48, p<0.001) and having a laparotomy (OR=6.72, p<0.001). Emergency readmission within 28 days and extended in-patient LOS were also predicted by the same factors.

**Conclusions:** Although 30 day mortality, 28 day readmission and extended LOS improved significantly over the study period, the most socially deprived patients were associated with poorer short term outcomes, possibly reflecting inequality of care across the UK. Additional resources may be required to improve quality of care.

### Anastomotic Strictures of the Colon and Rectum

(P96)

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**Purpose:** We sought to assess characteristics and contributing factors of the anastomotic stricture and to evaluate the therapeutic efficacy and complications of balloon dilatation.

**Methods:** We recruited 67 subjects with anastomotic stricture from among 3737 patients who were diagnosed with colorectal cancer (except right colon cancer) and subjected to surgery between February 2002 and February 2007. Anastomotic stricture was defined as a "inability to pass a 13.2mm colonoscope through the anastomotic site." Clinical variables including age, sex, comorbidity, type of operation, radiotherapy, postoperative complications (bleeding, leaks), and the presence of diverting stoma were evaluated between patients with stricture and without stricture. Anastomotic stricture and its associated factors were analyzed with a median follow-up of 12.4 months after surgery (range 1 to approximately 56 months) and strictures were dilated with balloon endoscopically or fluoroscopically.

**Results:** Anastomotic stricture occurred in 67 patients (1.8%), and its associated factors were analyzed. From univariate analysis, anastomotic leakage (1.7% vs. 8.7%,  $P = 0.009$ ), and the presence of diverting stoma (1.3% vs. 5%,  $P = 0.007$ ) were identified as associated factors, and from multivariate analysis anastomotic leakage (hazard ratio(HR), 4.41; 95 percent confidence interval (CI), 1.30-14.96;  $P = 0.017$ ) and the presence of diverting stoma (HR, 8.62; 95 percent CI, 3.31-22.49;  $P < 0.001$ ) were significant. Balloon dilations were performed in 35 patients, 23 patients endoscopically and 12 patients fluoroscopically. There was no complication during the procedure but one patient (4.3%) in endoscopic dilations and two patients (16.6%) in fluoroscopic dilations were dilated repeatedly due to restructre.

**Conclusions:** Anastomotic colorectal strictures are not uncommon complications and anastomotic leakage and presence of diverting stoma were associated with them. Balloon dilatation is effective and relatively safe procedure in anastomotic colorectal strictures.

### Colonoscopy for Rectal Bleeding: What's the Yield?

(P97)

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**Purpose:** The primary aim of this study is to determine the yield of pathological findings in patients who have colonoscopy for rectal bleeding.

**Methods:** Patients were identified from a prospectively maintained database on colonoscopy. A retrospective review of all patients who underwent colonoscopy for rectal bleeding either in the hospital or at our outpatient endoscopy suite were reviewed from June 04 to Aug 06. Data for date

of colonoscopy, age, sex, medications, location, completeness, bowel prep, findings and pathology were reviewed.

**Results:** 1352 patients underwent colonoscopy for evaluation of rectal bleeding during the study period. There were 735 (54.3%) men and 617 (45.7%) women, median age was 65years (16-97years). 300 (22.2%) patients underwent colonoscopy as an in-patient procedure. 536 (39.5%) patients were on anticoagulants or antiplatelet therapy; of these 333 (24%) were on aspirin only, 74 (5%) were on warfarin only, and 25 (1%) patients were on both warfarin and antiplatelet medication. The colonoscopy was complete to the caecum or TI in 1223 (90.4%) patients. Bowel prep was rated good in 794 (58.7%) and fair in 504 (37.3%) patients. The findings were polyps in 414 (30.6%), diverticular disease in 321 (23.7%), hemorrhoids in 229 (16.9%), inflammatory changes in 102 (7.5%), radiation proctitis in 33 (2.4%), arterio-venous malformations (AVM) in 25 (1.8%), ulcer in 19 (1.4%), others in 41 (3.0%) and normal colonoscopy in 145 (10.7%) patients. Review of pathology revealed adenomatous polyps in 232 (17.2%), hyperplastic polyps in 103 (7.6%), cancer in 27 (2%), inflammatory changes in 60 (4.4%), ischemic changes in 25 (1.8%), ulcerative colitis in 14 (1%) and crohn's in 7 (0.5%) patients. 336 (24.9%) patients were under the age of 50. Of these 77 (22.9%) had normal colonoscopies, 65 (19.3%) patients had polyps of which 50% were adenomatous, 6 (1.8%) had AVM's and inflammatory changes in 28 (8.3%). No cancers were seen in patients under the age of 50.

**Conclusions:** Based on our review, colonoscopy performed for rectal bleeding identified significant pathology in 40% of the patients. We, therefore, feel colonoscopy is indicated for the symptom of rectal bleeding.

### Salvage Coccygectomy for Refractory Coccydynia is a Safe and Effective Treatment

(P98)

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..... Minneapolis, MN

**Purpose:** Coccydynia is a difficult problem to address with its vague characterization and multifactorial etiology. Conservative treatment options include non-steroidal anti-inflammatory agents, injections of steroids or local anesthesia. The present study evaluated the outcomes for surgical coccygectomy for refractory coccydynia.

**Methods:** Retrospective review of all patients undergoing coccygectomy, from 1995 through 2007. Demographic data, prior treatments for coccydynia, etiology, complications and outcomes were collected. Patients who had coccygectomy for specific lesions or in conjunction with other procedures were excluded from analysis.

**Results:** 23 patients (mean age 42; range 24-66) who underwent primary coccygectomy for coccydynia were identified. 74% of patients had undergone previous attempts at treatment, including enteral analgesics and local anesthetics.



Trauma was identified as the inciting etiology in 11/23 (48%) patients. Two patients experienced complications; one transient bladder dysfunction and one wound infection. 18/23 (78%) patients experienced improvement with treatment and of these, 9 reported complete resolution of symptoms. 10/11 (91%) of patients with traumatic coccydynia reported improvement in symptoms with 5 experiencing complete resolution. No patients reported worsened symptoms.

**Conclusions:** Coccydynia is a rare and difficult entity to diagnose and treat. Most patients presenting to a colorectal specialist for treatment have already failed conservative measures. The present study demonstrates that coccygectomy is a safe and effective procedure for refractory coccydynia with minimal complications. Over 90% of patients with traumatic coccydynia experienced symptomatic relief with surgery. Regardless of etiology, almost half of all patients reported complete resolution of pain.

#### Sexually Transmitted Infections (STI's) as a Cause of Proctitis in Men Who Have Sex with Men (MSM)

(P99)

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**Purpose:** STI's are increasing in MSM and increase HIV transmission. Many MSM have anoreceptive sex (AR) and may not tell physicians. They can present with nonspecific symptoms, and STI's can be missed unless testing is done. The CDC advises at least yearly screening for MSM for gonorrhea (GC) Chlamydia trachomatis (CT) and syphilis. We endeavored to determine the incidence of STI's in MSM referred by primary care physicians for treatment of proctitis and the effect of empiric treatment.

**Methods:** We performed a retrospective chart review of all MSM seen in 2007 referred by primary care physicians for evaluation of anorectal complaints. All MSM had anoscopy and were included in the analysis if the presumptive diagnosis was proctitis as evidenced by inflamed rectal mucosa, with or without exudate. We routinely test MSM for anal, oral and urethral GC and CT and anal herpes simplex virus (HSV). Syphilis testing and swabs for lymphogranuloma venereum (LGV) were obtained as indicated. MSM were empirically treated according to CDC guidelines for LGV, GC and HSV pending results. Syphilis was treated only if positive.

**Results:** 22 MSM were enrolled (mean age 38 yrs) and 13 (59%) were HIV+. Most common presenting complaint was rectal bleeding 15 (68%) and pain 12 (55%). All MSM had AR sex a mean of 15 days before presentation. 5 were monogamous and 8 had only protected sex. The most common anoscopy findings were, exudate 9 (41%), ulceration 8 (36%) and blood 7 (32%). Test results showed GC 7 (32%), HSV 6 (27%), LGV and CT 3 each (14%) and syphilis in 1 (5%). 3 MSM (14%) had multiple site infections with different organisms. No etiology was identified in 2 MSM but 1 had oral GC and negative anal cultures. All but 2 MSM

responded within 1 wk of therapy and were found to have ulcerative colitis (1) and rectal lymphoma (1). All MSM who had protected sex and 80% who were monogamous had proctitis from STI's. No MSM had adverse reaction to empiric therapy.

**Conclusions:** In MSM, STI's are a very common cause of proctitis and appropriate testing is imperative. Surgeons cannot rely on patient history or primary care clinicians when evaluating MSM. Empiric treatment leads to rapid resolution and diminishes chance for spread.

#### Impact of Smoking on Perioperative Outcomes in Crohn's Disease Patients Undergoing Surgery

(P100)

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**Purpose:** Although smoking is associated with the development of Crohn's disease and its recurrence after surgery, there is little data examining the effect of smoking on perioperative outcomes in Crohn's patients. We compare 30 day complications for smokers(S) and nonsmokers(NS) undergoing abdominal surgery.

**Methods:** Retrospective review of data from a prospectively maintained database of Crohn's patients undergoing surgery. Demographics, disease characteristics, complications and quality of life (QOL) were compared using Fisher's exact, chi-square, and Wilcoxon Rank Sum tests where  $P < 0.05$  was considered statistically significant.

**Results:** From 2001-2007, 691 patients (mean age 41, 44.7% male) underwent an abdominal operation (96.4% elective, 81.6% open). 601 patients had bowel resected. Other procedures included abscess drainage (38), fistula repair (43), LOA (272), peristomal hernia repair (13), ventral hernia repair (25), and stricturoplasty (81). S(n=361) and NS (n=330) had similar gender ( $p=0.6$ ) but NS were significantly younger at diagnosis and operation than S ( $p < 0.001$ ). Comorbidity including cardiopulmonary conditions ( $p=0.06$ ) was similar between groups. Disease phenotype (fistulous or fibrostenosing) was similar between groups ( $p > 0.99$ , 0.32). S however had a significantly higher proportion of patients with  $\geq 3$  fistulae than NS ( $p=0.01$ ) and a lower rate of stricturoplasty ( $p=0.02$ ). Site and extent of bowel resection (Table 1), stoma creation, revision or reversal was also similar ( $p=0.39$ ). The most frequent complication in both groups was sepsis (13%) especially wound infection (8.2%). 30 day complications including cardiopulmonary ( $p=0.66$ ), readmissions (12.5 vs 10.9%,  $p=0.53$ ), reoperation (2.8 vs 2.7%,  $p=0.97$ ) and long-term reoperation rates (29.9 vs 26.7%,  $p=0.34$ ) were similar. QOL scores were significantly greater in NS than S throughout 5 years of follow-up ( $p < 0.05$ ).

**Conclusions:** Smokers appear to develop more severe penetrating disease than nonsmokers. Although 30 day complications and early and delayed reoperations were sim-

ilar, smokers had significantly worse QOL when compared with nonsmokers. There appear to be significant disease characteristics associated with active smoking which may warrant further investigation.

**P100 Table 1: Individual bowel segments percent resected**

	Smokers N = 361(%)	Non-smokers N = 330(%)	P value
Stomach	0(0)	1(0.3)	0.48
Duodenum	2(0.55)	0(0)	0.25
Jejunum	14(3.9)	19(5.8)	0.25
Ileum	262(72.6)	235(71.2)	0.69
Terminal Ileum	197(54.6)	159(48.2)	0.09
Colon	235(65.1)	220(66.7)	0.66
Rectum	56(15.5)	49(14.8)	0.81

#### Fecal Diversion in the Management of Perianal Crohn's Disease

(P101)

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**Purpose:** Severe perianal Crohn's disease remains an uncommon but important indication for fecal diversion. The advent of biological therapy such as infliximab for Crohn's disease is considered to have improved the outcome of these patients. The aim of this study was to assess the outcome of patients undergoing fecal diversion for perianal Crohn's, in particular restoration of continuity, and the impact of biological therapy (infliximab).

**Methods:** A retrospective chart review was undertaken at 2 tertiary centres of all patients with Crohn's disease who underwent fecal diversion for management of perianal Crohn's disease between 1990-2007. Patient demographics, disease extent, and use of biological therapy were recorded. Restoration of continuity, administration of biological therapy, and subsequent surgery were assessed. Patients were divided into groups based on whether or not they had received biological therapy (infliximab). Relative rates of proctocolectomy and restoration of intestinal continuity in these groups were compared with Fisher's exact test.

**Results:** Twenty-one patients (1 male, 20 female), median age 34 yrs. (range 21-67), underwent fecal diversion for perianal Crohn's disease (rectovaginal fistula 10; perianal fistula 23; anovaginal fistula 4; anal fissure 3). At median follow up 22 month (range 4-121), 4 patients have undergone stoma closure, 11 patients have undergone proctocolectomy, and 6 patients still have a stoma in situ, with 3 of these awaiting proctocolectomy. The effect of the procedure on severity of perianal disease was no effect in 4 (19%), temporary symptomatic improvement in 6 (29%), initial improvement with

later plateau in 7 (33%), and healing in 4 (19%). Eleven patients (52%) received biological therapy (infliximab): 2 at more than 6 months prior to surgery, 5 within a month, and 4 at median 15 months post fecal diversion. Overall in this group, 4 underwent proctocolectomy and 2 had intestinal continuity restored. This was not significantly different from the non-biological therapy group (p=NS in both cases).

**Conclusions:** Patients undergoing fecal diversion for perianal Crohn's disease have less than 20% likelihood of restoration of intestinal continuity. This is not improved with biological therapy.

#### Intestinal Carcinoma in Crohn's Disease: Clinicopathological Features and Surgical Outcome

(P102)

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**Purpose:** Relatively few reports that detail intestinal carcinoma complicating Crohn's disease exist. This study was designed to investigate clinicopathological features and surgical outcome of carcinoma in Crohn's disease.

**Methods:** Medical records of 2,621 patients undergoing intestinal surgery for Crohn's disease between 1995 and 2005 were reviewed to identify patients who had intestinal carcinoma. Demographic data, clinical presentations, histopathological findings and surgical outcome were examined.

**Results:** Twenty-three patients (0.9%) developed intestinal carcinoma. There were 6 females, and the median age at surgery was 46 (24-82) years. The median duration of Crohn's disease was 19 (0-36) years. Preoperative diagnosis of carcinoma was obtained in 12 patients (52%). According to the Vienna classification, behavior of Crohn's disease was nonstricturing nonpenetrating (B1) in 13 patients, stricturing (B2) in 6, and penetrating (B3) in 4, and disease location was terminal ileum (L1) in 2 patients, colon (L2) in 9, ileocolon (L3) in 9, and upper gastrointestinal (L4) in 3. In 21 patients (91%), cancer developed in the area of Crohn's disease. Seven patients (30%) had associated mucosal dysplasia. Carcinoma was located in the colon in 8 patients (35%), anus in 6 (26%), rectum in 4 (17%), small bowel in 3 (13%), and cecum in 2 (9%). According the TNM classification, tumor stages were stage 0 in 4 patients (17%), stage I in 3 (13%), stage II in 5 (22%), stage III in 10 (44%), and stage IV in 1 (4%). Eleven patients (48%) had a poorly differentiated adenocarcinoma, and 5 patients (22%) a moderately differentiated adenocarcinoma. Eighteen patients were regularly followed up postoperatively, and the median follow-up duration was 29 (3-85) months. Five patients (28%) died during the follow-up; 3 from intestinal carcinoma, 1 from sepsis, and 1 from gall bladder carcinoma.

**Conclusions:** Delayed diagnosis of carcinoma is associated with the assumption that tumor stage and survival will be worse. Surveillance examinations for early diagnosis and treatment of carcinoma are essential to improve survival.

### Surgical Site Infection Following Surgery for Inflammatory Bowel Disease. Result of Prospective Surveillance

(P103)

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**Purpose:** During surgical procedures for inflammatory bowel disease (IBD), represented by ulcerative colitis (UC) and Crohn's disease (CD), steroids and immunosuppressant agents are frequently used. The incidence of surgical site infection (SSI) is considered to be high in patients with IBD. In the present study, the incidence of SSI was compared between patients who underwent surgery for IBD and those who underwent surgery for colon cancer (CA).

**Methods:** Instances of SSI were compared by surgical type, colonic surgery (COLN) and rectal surgery (REC), between 262 patients who underwent surgery for IBD (189 UC cases, 73 CD cases) and 242 who underwent surgery for CA in the period from March 2006 to June 2007.

**Results:** SSI was observed in 15.5% of the patients. There was no significant difference in infection rate for type of disease (14.3% for UC, 16.4% for CD, 13.6% for CA). Steroids were given to 57.1% of the UC, 4.1% of the CD, and 1.7% of the CA patients. There was no significant difference in regard to SSI incidence (OR: 1.598, 95%CI: 0.843-3.031,  $p=0.659$ ). Further, no significant differences were observed for BMI, blood sugar level, surgical time, and amount of bleeding. Risk factors for developing SSI was only ostomy creation. By surgical site, REC had a greater risk (OR: 2.540, 95%CI: 1.36-4.939). However, comparisons by surgical sites and kinds of disease revealed no significant differences in the incidence of SSI among diseases in the COLN group. In the REC group, SSI incidence was 16.5% for UC patients and 18.5% for CA patients, which was not significantly different ( $p=0.67$ ). As for CD patients, the incidence of SSI was significantly high at 63.6% ( $p<0.01$ ). By site, an incisional SSI was performed in the majority of the UC (88.9%) and CD (66.6%) groups. In contrast, organ/space SSI accounted for 60% in the CA group. Thus, significant differences in SSI incidence were observed among the groups in regard to site.

**Conclusions:** Steroid administration had no relevance in regard to the risk of SSI. Even in the UC surgery group, favorable results were obtained. In the CD surgery group, a rectal surgery was shown to be a risk factor for SSI incidence.

### Does Perioperative Immunosuppressive Medication Affect Outcome of Abdominal Surgery in Crohn's Disease Patients?

(P104)

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..... Phoenix, AZ

**Purpose:** Previous studies have demonstrated increased complications in patients undergoing ileal

pouch surgery for ulcerative colitis with immunosuppressive medication. Our aim was to examine early post-operative complications in patients undergoing intestinal resection for Crohn's disease (CD) while on immunosuppressive medication.

**Methods:** A retrospective review was performed of patients with Crohn's disease undergoing intestinal surgery at Mayo Clinic, Arizona from Jan1999-May2007. Demographics, surgical details, blood loss, and a specific drug history for corticosteroids, immunomodulators (azathioprine, 6-mercaptopurine) and anti-TNF $\alpha$  antibodies used for CD were extracted from patient charts, along with the occurrence of 30-day post-operative complications. Statistical analysis was performed using Fischer's exact test.

**Results:** One hundred and twelve patients with Crohn's disease underwent intestinal resection. Forty-six were male (age 21-85) and 66 female (22-89). Seventy nine patients were taking perioperative medication, 47 patients corticosteroids, 39 immunomodulators, and 17 taking anti-TNF Abs. There were no deaths. Median blood loss was 137mls (20-1800mls). 33 (29%) patients had complications. Twenty two were taking perioperative medication of whom 11 had a major complication (requiring surgery or treatment in an intermediate care unit): pneumonia (3), anastomotic leak (2), flap necrosis, enterocutaneous fistula, intra-abdominal abscess, rectal stump leak, post-operative bleeding requiring exploration (2). Two patients who were not taking medications had a major complication: anastomotic leak, pneumonia. Complications were experienced by 7 patients taking 1 drug type (odds ratio OR=4.5), 14 patients taking 2 drug types (OR=2.9), and 1 taking 3 drug types (OR=1.9). Being on at least one medication had an OR=1.5 for having a major complication. Intra-operative blood loss >500mls had a higher risk for any complication ( $p=0.036$ ) and for a major complication ( $p=0.003$ ).

**Conclusions:** In this small series, though two thirds of patients who experienced complications were on perioperative medication for CD, the occurrence of complications was not associated with the use of immunosuppressive medication.

### Potential Cost Benefit and Outcomes Following One-Stage Restorative Proctectomy: One Centers Experience

(P105)

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..... Cambridge, United Kingdom

**Purpose:** Restorative proctectomy remains an established procedure for the treatment of ulcerative colitis. Controversy persists regarding the routine omission of a temporary diverting ileostomy. The aims of this study were to assess the outcomes and cost effectiveness of hand sewn W-pouch and endo-anal anastomosis with no covering ileostomy.

**Methods:** Between January 1999 and September 2006, 45 patients were identified for this study. Data was collected prospectively, with long-term outcomes derived from case-note review retrospectively. Costing analysis was performed by the use of National Health Service costing codes.

**Results:** Median age at time of operation was 44 years and mean length of follow-up was 2.4 years (see Figure 1). The median in-patient stay was 13 days. The total complication rate directly attributable to the surgery was 22.2%; there were no post-operative deaths. One patient developed an anastomotic leak (2.2%). At last follow-up mean total daily pouch emptying was 5 with one patient developing nocturnal incontinence (which settled with pharmacological therapy). 3 patients developed chronic pouchitis (6.7%) and 4 patients (8.9%) developed anastomotic stricture, all successfully treated by digital dilatation. Using costing analysis the total saving to the institution using this one-stage approach as routine was calculated as £135,630 (\$271,260).

**Conclusions:** Our experience shows that restorative proctectomy can be performed safely without a covering stoma. This technique is associated with low overall complication rates and good peri and post-operative outcomes. In addition this technique offers significant savings, both financial and in preventing readmission for ileostomy closure and its associated complications.

**P105 Figure 1**

Variable	Mean±SD (Range)	
Age	44.0 ± 11.5 (19-68)	
Post-Operative Days (POD)	13.2 ± 6.8 (9-20)	
Day Pouch Emptying (at last FU)	4.3 ± 1.4 (2-8)	
Night Pouch Emptying (at last FU)	0.7 ± 0.6 (0-2)	
Total Daily Pouch Emptying (at last FU)	5.0 ± 1.4 (2-9)	
	Frequency	%
Gender		
Male	34.0	75.6
Female	11.0	24.4
Diagnosis		
FAP	4.0	8.9
UC	40.0	88.9
Indeterminate Colitis	1.0	2.2
Complication		
Anastomotic Leak	1.0	2.2
Post-operative Haemorrhage	3.0	6.7
Prolonged Ileus	3.0	6.7
UTI	1.0	2.2
MI	1.0	2.2
Tension Pneumothorax	1.0	2.2

# **Does Cyclosporine Increase Postoperative Septic Complications after Laparoscopic Restorative Proctocolectomy for Ulcerative Colitis?**

(P106)

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 ..... Tokyo, Japan

**Purpose:** Laparoscopic restorative proctocolectomy (LAP-RP) has been reported to be feasible in patients with ulcerative colitis (UC). Recent advances in the medical treatment of immunosuppressants in patients with UC have been reported. The aim of this study was to evaluate the safety and feasibility of preoperative immunosuppressant in patients with UC.

**Methods:** Between 1994 and 2006, elective LAP-RP was performed in 71 patients. Of these 40 patients underwent LAP-RP before June 2004, and since then 31 underwent hand-assisted laparoscopic RP (HALS-RP). The patients were divided into three groups: group A (n=33), cyclosporine was used preoperatively, group B (n=18), PSL was used within three months preoperatively, group C (n=20), no PSL or cyclosporine was used within three months preoperatively.

**Results:** There were no significant differences in the age, gender, body mass index, performance status, ASA score and procedures among the three groups. There were no conversions to open procedures in either group. Patients in group C, the operative time was significantly longer and the blood loss was significantly more than those of patients in group A and B. 18 patients developed postoperative complications, including anastomotic leakage in 9 patients, abscess formation in 2 patients, bowel obstruction in 2 patients, wound infection in 3 patients, and deep venous thrombosis in 2 patients. There were no significant differences in the incidence of overall complications (A: B: C=5(15.2%):7(38.9%):6(30%), p=0.147). The incidence of septic complications did not differ among the three groups (A: B: C= 2(6.1%): 1(5.6%): 2(10%), p=0.85). There were no significant differences in the re-operation or the length of hospital stay among the three groups.

**Conclusions:** It was suggested that the preoperative immunosuppressant did not affect on the surgical outcomes of LAP-RP or HALS-RP for UC.

# **Use of Acellular Dermal Matrix for Parastomal Hernia Repair in IBD Patients**

(P107)

T. Taner, R. Cima ..... Rochester, MN

**Purpose:** Parastomal hernias (PH) present a challenge in patients with IBD. Multiple abdominal operations and the use of immunomodulatory medications predispose to poor tissue healing and hernia recurrence in these patients. Common PH repair techniques, including the use of per-



manent prosthetic mesh, are associated with high recurrence rates and infectious complications. We report the first series of PH repairs in IBD patients with human acellular dermal matrix (ADM).

**Methods:** We reviewed all PH repairs with ADM, performed at our institution between 3/2006-3/2007 in IBD patients. In our technique, the ostomy is disconnected, and both the anterior and posterior rectus fasciae are reconstructed with ADM. The stoma site is reconstructed by suturing both anterior and posterior sheets of ADM. The ostomy is matured in the original location. Patients were seen every 6 months following repair, with abdominal CT. Main outcome measures were postoperative complications, radiologic and symptomatic hernia recurrence, and patient satisfaction.

**Results:** 13 consecutive IBD patients (5 men, 8 women; 7 Crohn's disease, 6 ulcerative colitis) underwent open PH repair during the study period. All patients had previous history of immunomodulatory drug use and multiple abdominal operations. Three patients had previous attempts at PH repairs with permanent prosthetic mesh. In 5 cases, at least one bowel resection was performed at the time of PH repair. Operative mortality was nil. Postoperative complications included 2 subcutaneous seromas requiring percutaneous drainage and 1 superficial wound infection. Two patients with midline wound separation were treated with dressing changes. All complications resolved completely. None of the patients required re-operation or removal of the ADM. Patients were then followed for an average of  $290 \pm 119$  days. There was no symptomatic hernia recurrence, 2 patients (15%) had radiologic evidence of a recurrent small PH. Patient satisfaction was 100%.

**Conclusions:** Reconstruction of the abdominal wall and stoma site with hADM is a novel technique used for PH repair. In our series of PH repairs in IBD patients, this technique appears to be effective, well-tolerated and is associated with a low recurrence rate.

#### Acellular Dermal Matrix in Surgical Management of Enterocutaneous Fistulas in IBD Patients

(P108)

T. Taner, R. Cima . . . . . Rochester, MN

**Purpose:** Enterocutaneous fistulas (ECF) are uncommon but serious complications after gastrointestinal surgery. IBD patients represent a high risk group related to both their disease process and the need for multiple surgeries. Often, the abdominal wall is significantly involved with the ECF and requires partial resection. The use of synthetic prosthetic material to reconstruct the abdominal wall after ECF surgery is associated with increased risk of infection and recurrent fistulas. We report the use of human acellular dermal matrix (hADM) in abdominal wall reconstruction after ECF surgery in IBD patients.

**Methods:** Eleven IBD patients (3 UC and 8 Crohn's) underwent ECF takedown and abdominal wall reconstruction using hADM between 12/2005-2/2007. A retrospective review of their charts for preoperative characteristics, operative events, post-operative complications, and fistula recurrence was performed.

**Results:** The group included 7 men and 4 women, with a mean age of 46 ( $\pm 15$ ) and BMI of 24 ( $\pm 5.6$ ). All patients had multiple previous abdominal surgeries (range 1-10). Preoperative risk factors included the use of systemic immunosuppressants (n=9), smoking history (n=6), perioperative systemic infection (n=2) and diabetes (n=2). Contamination of the operative field with enteric contents occurred in 2 cases. In all cases, after resection of the ECF and involved abdominal wall, a single layer of hADM was used to close the defects. Mortality was nil. Three patients (27%) developed subcutaneous seroma and there were two cases (18%) of superficial wound infection. All resolved without surgical intervention. In long-term follow-up (mean: 360 days) only 1 patient required reoperation for a complication of the repair. On postoperative day 237, the patient presented with recurrent ECF; a loop of small bowel distal to previous fistula site was found fistulized to the skin at a separation site between the hADM and native fascia. The ECF was taken-down and defect was repaired with hADM. No further complications have occurred.

**Conclusions:** In a high-risk IBD patient population with multiple perioperative risk factors, use of hADM during ECF takedown is an effective, well-tolerated and low morbidity treatment option.

#### High Incidence of Osteoporosis in Patients Over 50 Following Restorative Proctocolectomy with Ileal Pouch-Anal Anastomosis Suggests Need for Routine DXA Screening

(P109)

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. . . . . London, United Kingdom

**Purpose:** The incidence of osteoporosis in IBD patients is 14%. Corticosteroids and age are known risk factors. The current AGA guidelines do not recommend performing DXA in patients following restorative proctocolectomy (RPC) for ulcerative colitis. Some studies have suggested that bone density may increase following RPC, however there are no studies of bone density in patients over 50. We hypothesised that following RPC patients over 50 would be at increased risk since they are likely to have had worse disease and received higher doses of corticosteroids than an average population of UC patients. We sought to establish whether DXA should be routinely performed in this group.

**Methods:** All RPC patients over 50 seen in an outpatient clinic from August 2006 to August 2007 underwent a DXA bone scan of the hip and vertebral spine unless recently per-

formed. Osteoporosis and osteopenia were diagnosed according to the WHO definitions. The hospital notes were then reviewed.

**Results:** 40 patients were screened. 18% of all patients had osteoporosis present either at the hip or vertebral spine. 42% of all patients had osteopenia. Further details are given in Table 1.

**Conclusions:** The results of this study reveal that osteopenia and osteoporosis in RPC patients over 50 is at least as common as that in the general UC population. We therefore recommend that the standard AGA guidelines for osteoporosis screening should be extended to include RPC patients; the results of this study have important implications for clinical practice.

#### Is Stapled Ileal Pouch-Anal Anastomosis (IPAA) a Safe Option in Ulcerative Colitis (UC) Patients with Dysplasia or Cancer?

(P110)

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**Purpose:** Ileal pouch-anal anastomosis is the procedure of choice for patients requiring surgery for UC. The role of stapled IPAA in the setting of UC complicated by colorectal cancer or dysplasia is not clear. The aim of the study was to explore the oncological and clinical outcome of UC patients with coexisting colorectal cancer or dysplasia that underwent stapled IPAA.

**Methods:** Between 1994-2006, 206 UC patients underwent IPAA. 135 patients were followed prospectively in the comprehensive pouch clinic and were divided into 3 groups: cancer, dysplasia and the no cancer-no dysplasia group. Demographic parameters, clinical data and functional outcome were compared. For cancer and dysplasia patients

oncological outcome was analyzed.

**Results:** The study cohort included 13 patients with carcinoma (7 colon; 6 rectum), 14 with dysplasia (8 colon; 6 rectum) and 108 with no cancer or dysplasia. Of all patients diagnosed with cancer, 58% had stage 2 or 3 disease. Nine patients were treated by chemotherapy (2 prior and 7 following IPAA) and 2 received pelvic irradiation (1 adjuvant; 1 neoadjuvant). Functional outcome is demonstrated in table 1. The 2 patients with rectal cancer that received radiotherapy did not maintain a functioning pouch. The overall pouch failure rate in the cancer patients was 18% compared with 7% for the dysplasia patients and 4% in the no cancer-no dysplasia group ( $p=0.129$ ). Two cancer patients died due to metastatic disease. All other patients were free of dysplasia or cancer at last follow up. The 5-year survival rate of patients with cancer was significantly lower than that of all other patients, 85% vs. 100%, respectively ( $p<0.0001$ ).

**Conclusions:** Stapled IPAA is a safe and successful option for UC patients with cancer or dysplasia. Prognosis seems to be related to cancer stage. Chemotherapy can safely be given to these patients; nevertheless, the effect of radiation therapy on pouch outcome is worrisome, especially if given post pouch surgery. We recommend close follow up for all UC patients with cancer or dysplasia.

#### Obesity and Restorative Proctocolectomy: Mutually Exclusive?

(P111)

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**Purpose:** Restorative proctocolectomy (RPC) has been established as the gold standard for the surgical management of chronic ulcerative colitis. Because of the technical difficulties that can be encountered when operating on the obese, RPC has been used selectively in this group of

**P109 Table 1.**

	Mean age (SD)	Mean years UC (SD)	Mean years since RPC (SD)	Males n (%)	Females n (%)	Total n (%)
Osteoporosis	55 (5)	9 (6)	9 (7)	5 (22)	2 (12)	7 (18)
Osteopenia	60 (7)	8 (7)	8 (7)	9 (39)	8 (47)	17 (42)
Normal	58 (8)	10 (9)	14 (5)	9 (39)	7 (41)	16 (40)
Overall	58 (7)	9 (7)	12 (7)	23 (57)	16 (43)	40

**P110 Functional outcome**

	Carcinoma (N=11)	Dysplasia (N=14)	No cancer no dysplasia (N=108)	P value
Length of follow-up (months, mean)	55	45	57.5	NS
Functioning pouch	9 (82%)	13 (93%)	104 (96%)	0.129
Pouchitis	1 (11%)	3 (23%)	62 (60%)	0.001
Number of stools (24 h)	7	5	8	NS

NS= not significant

patients. We have hypothesized that RPC can be performed safely and successfully in patients who are obese.

**Methods:** A retrospective review of all patients undergoing surgery for chronic ulcerative colitis at our institution from 2000-2007 was performed. Obese patients were defined as those patients with body mass index (BMI) > 30 (Group 1). Control patients in group 2 had a BMI <25. Significant differences between continuous and categorical variables were identified using the Wilcoxon rank sum and Chi square tests, respectively.

**Results:** A total of 313 patients underwent RPC for ulcerative colitis in the time period of the study. Of this total, 42 patients were in group 1 and 78 patients were in group 2. The average BMI was 35 (range 30-43) and 22 (range 18-25) in Groups 1 and 2, respectively. All patients in this series underwent the planned operation of a RPC with ileal S-pouch construction. A laparoscopic approach was undertaken more frequently in Group 2 (10% v 55%). Operative times for patients in group 1 were longer for open (359 v. 310 minutes,  $P < 0.05$ ) and laparoscopic operations (505 v. 447 minutes,  $P = 0.03$ ). A hand-sewn anastomosis was used less often than other anastomotic techniques in the obese patients (12% v. 47%,  $P < 0.05$ ) resulting in longer mucosal remnants in the obese patients (1.4 cm v. 1.0 cm,  $P = 0.04$ ). Complication rates between the two groups were similar at 35% and 32%, respectively.

**Conclusions:** We have hypothesized that restorative proctocolectomy can be performed safely and successfully in the morbidly obese. In our series, obesity did not reduce the rate of successful completion of a RPC and did not adversely affect complication rates. Not surprisingly, the obese patients were less likely to have a hand sewn anastomosis and more likely to have a longer mucosal remnant. These data have led us to conclude obesity is not a contraindication to successful RPC in patients with ulcerative colitis.

#### Limitations of Quality of Life Measurements in Inflammatory Bowel Disease

(P112)

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**Purpose:** Increasing importance is being placed on inflammatory bowel disease (IBD) patients' assessment of quality of life (QoL). The UK version of the Short Form Health Survey (SF-36v2) is a generic assessment of health status and the UK Inflammatory Bowel Disease questionnaire (IBDQ) is disease specific. In conjunction these have been used to study IBD patients and how disease severity affects QoL. This study aims to investigate whether the SF-36 and IBDQ can accurately assess QoL in the extremes of disease – a previous criticism of these measures.

**Methods:** In association with the UK National Association of Colitis and Crohns disease society, IBD

patients were invited to take part in an online questionnaire including IBDQ, SF-36 and patient demographics. All IBD patients' SF-36 data were compared to UK Norms. IBDQ severity was stratified around the median and interquartile ranges and the two extremes used for analysis. These two groups then had their general health status assessed.

**Results:** A total of 535 IBD patients replied (UC: Crohns,  $N=236:299$  respectively). The median age was 42 years and the female: male ratio was 2:1 ( $N=357:178$ ). Increasing disease severity was reflected in worsening SF-36 scores in all domains when stratified into disease severity by IBDQ, however when UK Norms were compared the patients in the group with the mildest IBD had significantly better QoL across all domains (except general health) than controls without disease (see figure 1)

**Conclusions:** The SF-36 is a well established assessor of general health. In this study it was able to demonstrate the effect of IBD on QoL. The IBDQ does help stratify severity of disease but appears to incorrectly identify the extremes. Better generic and disease specific questionnaires are needed to investigate QoL in these difficult groups for planning therapy.

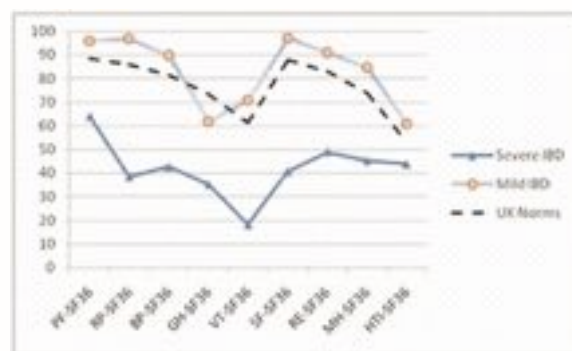


Figure 1 Line graph comparing UK norms to patients with lowest and highest IBDQ scores

#### VSL3 Probiotic Can Improve Quality of Life in Patients with Chronic Pouchitis

(P113)

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**Purpose:** Chronic pouchitis is a long-term complication after ileal pouch-anal anastomosis (IPAA). Recent studies have suggested that dysbiosis within the pouch may be a contributing factor. VSL3, a probiotic, has been shown to influence the ecology of gastro-intestinal flora. We aimed to assess the role of VSL3 patients with chronic pouchitis.

**Methods:** We reviewed patients who have had an IPAA at our institution between 1991 and 2006. 12 patients had chronic pouchitis ( $\geq 4$  episodes per year). These patients received standard antibiotic therapy (ciprofloxacin and/or metronidazole) and then continuous VSL3. The McMaster IBD Questionnaire was sent to patients to record quality of

life scores (global score and subscores) before and after VSL3 therapy and these scores were compared using a paired Wilcoxon's test.

**Results:** 6 of the 12 patients (50%) were unresponsive to antibiotic therapy and 9 patients (75%) had six or more episodes of pouchitis prior to commencement of VSL3. The median length of time to commencement of VSL3 was 54 months (range, 11-183) and the median length of time on VSL3 was 3 months (range, 2-17). 10 out of the 12 patients have returned their questionnaires. Median quality of life scores in all subscales and total quality of life score improved after VSL3 ( $P=0.018$ ).

**Conclusions:** VSL3 significantly improved quality of life in patients with chronic pouchitis. Further studies to determine the changes in histology, microbiological flora and endoscopic appearances of the pouch after VSL3 may be useful to explain the aetiology of this improved quality of life.

#### Prospective Evaluation of the Single Trocar Site Laparoscopic-Assisted Ileal-Pouch Anastomosis

(P114)

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**Purpose:** Ileal pouch-anal anastomosis (IPAA) is the most common surgical option chosen by patients with ulcerative colitis (UC) or indeterminate colitis (IC). Minimally invasive procedures are commonly being used in colorectal surgery, with the potential advantages of quicker return of bowel function, shorter hospital stay and improved cosmesis. As cosmesis is of utmost importance in this often young patient population, we have performed laparoscopic-assisted IPAA (LA-IPAA) using both a single trocar site and a low Pfannenstiel incision. The aim of this study was to evaluate the surgical morbidity of this novel laparoscopic approach.

**Methods:** Using a prospectively collected database, the charts of UC or IC patients undergoing either a two-stage or three-stage LA-IPAA between January 2005 and October 2007 were reviewed. The technique involves placement of a hand port through a low Pfannenstiel incision two finger breaths above the pubic bone. A 12mm trocar is used at the umbilicus, and another 11mm trocar is used at the site of the previ-

ously marked stoma site. Upon completion of the procedure, only the stoma and the 12mm trocar site are visible when wearing normal attire. All surgical procedures were performed by one attending surgeon. Postoperative complications were classified as either medical or surgical, and were further characterized as being either major or minor in nature.

**Results:** The study cohort comprised 40 patients, including 17 males and 23 females. Median age was 36 years (range, 9-68). Although 32 (80%) patients had a two-stage LA-IPAA, 8 (20%) patients had a three-stage LA-IPAA. Surgical outcome is shown in the Table.

**Conclusions:** The single trocar LA-IPAA in UC or IC patients can be performed safely with no mortality and acceptable postoperative morbidity. Moreover, this procedure provides an excellent cosmetic result, a feature extremely important in this patient population.

#### Laparoscopic Intestinal Resection for Crohn's Disease: The Tough Stuff

(P115)

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**Purpose:** To examine perioperative outcomes in patients undergoing intestinal resection for complicated Crohn's disease including abdominal abscess and complex fistula disease.

**Methods:** Consecutive patients from 1991 to 2005 were included that underwent laparoscopic colorectal resections for Crohn's disease. Cases were unselected, as all patients referred underwent a laparoscopic approach. Patients undergoing resection for uncomplicated Crohn's disease were utilized as a control group for comparison. Data were obtained from a prospectively collected database. Summary statistics and univariate analyses were performed.

**Results:** 84 patients were studied including 19 patients with disease complicated by abscess and fistula (group A) and 65 patients with uncomplicated Crohn's disease (group B). A right-sided colectomy was performed in 89% of patients in group A and 62% of patients in group B. Other procedures included laparoscopic proctocolectomy ( $n=9$ ),

#### P114

	Study Cohort	2-stage LA-IPAA	3 stage LA-IPAA
N	40	32	8
Overall Complications (n)	20 (50)	18 (56)	2 (25)
Mortality	0	0	0
Medical Complications (n)	1 (3)	1 (3)	0
Major	1 (3)	1 (3)	
Minor	0	0	
Surgical Complications (n)	19 (48)	17 (53)	2 (25)
Major	12 (30)	11 (34)	1 (13)
Minor	7 (18)	6 (19)	1 (13)

Parentheses denote percentage



proctectomy (n=8) and total colectomy (n=7). Patients in group A were more likely to be on preoperative steroids (47 vs 25%,  $p=0.056$ ). The rate of previous intra-abdominal surgery was identical in the 2 groups (17%). There were no intra-operative complications in group A; however, 4 patients (5%) in group B experienced an intraoperative complication. Conversion rates were similar in groups A and B (11 vs 6%, NS). Median operative time for patients undergoing laparoscopic right colectomy in group A was 175 min (IQR 130-195), and was not significantly different than patients in group B [140 min (120-210)]. A stoma was more commonly fashioned for patients in group B (34 vs 16%), as more patients in this group underwent proctectomy or total colectomy/proctocolectomy. The overall postoperative complication rate was 21% (n=18). Postoperative complications were more common in group B (28 vs 5%,  $p=0.06$ ). The 30-day mortality rate was zero for the cohort. Median postoperative length of stay was 4 days (4,7) in group A and 5 days (4,7) in group B (NS).

**Conclusions:** Laparoscopic intestinal resection for fistulizing Crohn's disease and abdominal abscess is feasible and as safe when compared to patients undergoing laparoscopic surgical resection for medically refractory uncomplicated Crohn's disease.

#### The Impact of Restorative Proctocolectomy on Fecundity: Predictors of a Successful Pregnancy

(P116)

D. Chessin, S. Gorfine, D. Bub, A. Royston, D. Wong, H. Salinas, J. Bauer . . . . . New York, NY

**Purpose:** Restorative proctocolectomy (RPC) is the most

commonly performed operation for patients with familial adenomatous polyposis (FAP) and chronic ulcerative colitis (CUC) requiring surgery. Recent evidence suggests that this surgery negatively impacts female fecundity. We evaluated our female patients who underwent RPC to determine predictors of successful conception following RPC.

**Methods:** We queried our prospectively maintained database of patients who underwent RPC for demographic, clinical, and pathologic data. A questionnaire was sent to all RPC patients to evaluate postoperative reproductive status. Three groups (attempted pregnancy-successful, attempted pregnancy-unsuccessful, did not attempt pregnancy) were compared to determine predictors of successful pregnancy following RPC.

**Results:** Of 500 women entered in the RPC database, 387 (77.4%) were located. Sixty-nine pregnancies were recorded among 428 women younger than 50 at the time of RPC. Questionnaires with reproductive data were returned by 166 (42.9%) women. The median time from RPC was 106 months. Forty-seven women attempted pregnancy and 34 (72%) were successful. Five women were pregnant twice and two women were pregnant three times after RPC. One woman had triplets during her second pregnancy. There was one unplanned pregnancy, one tubal pregnancy and one miscarriage. Fifteen (44%) women required in vitro fertilization. Mean age at first delivery was 33.6 (range: 21-44) years. Ten women had vaginal deliveries. Univariate analysis did not identify any significant factors associated with conception. (Table)

**Conclusions:** Following RPC, 72% of women who desired pregnancy were able to conceive, however, 44% required in vitro fertilization. No factors were identified which predict the ability to conceive following RPC.

**P116 Predictors of Pregnancy Following Restorative Proctocolectomy**

Predictor of Pregnancy	Attempted Pregnancy-Successful n=34	Attempted Pregnancy-Unsuccessful n=12	Did Not Attempt Pregnancy n=120	p-Value
CUC	31 (91.2%)	9 (75.0%)	111 (92.5%)	NS
FAP	2 (5.9%)	3 (25.0%)	5 (4.2%)	NS
Indeterminate Colitis	0 (0)	0 (0)	3 (2.5%)	NS
Crohn's Disease	1 (2.9%)	0 (0)	1 (0.8%)	NS
Mean Age at RPC (range)	27.6 (12-40)	26.6 (16-35)	41.3 (12-67)	NS
LAPA	4 (11.0%)	0 (0)	19 (16.0%)	NS
Ileostomy	16 (45.7%)	4 (33.3%)	21 (17.6%)	NS
Pouch Removed	0 (0)	3 (25.0%)	4 (3.3%)	NS
Septic Complications	8 (22.9%)	5 (41.7%)	19 (16.0%)	NS
SBO	7 (20.0%)	3 (25.0%)	21 (18%)	NS
Enterolysis	2 (5.7%)	3 (25.0%)	21 (18.0%)	NS
Pouchitis	25 (75.8%)	6 (50.0%)	71 (61.7%)	NS

CUC- Chronic Ulcerative Colitis, FAP- Familial Adenomatous Polyposis, LAPA- Laparoscopic-assisted RPC, SBO- Small Bowel Obstruction, NS- not significant

### Single-Stage Restorative Proctocolectomy: A Review of 350 Cases

(P117)

D. Chessin, J. Bauer, D. Bub, S. Gorfine . . . New York, NY

**Purpose:** The aim of this study was to assess the clinical outcomes in patients with ulcerative colitis who underwent restorative proctocolectomy without diverting ileostomy.

**Methods:** Data was kept in a prospectively maintained database. Patients were entered into the database at the time of restorative surgery. The database was updated by hospital admissions, office visits, and telephone interviews.

**Results:** Between 1992 and 2007, 350 patients underwent single-stage restorative proctocolectomy for chronic ulcerative colitis. The median age of this group was 37 years (range: 5-74). There were 188 men. Median follow-up was 95 months (range 3-183 months) Median duration of preoperative disease was 7 (range 0-45) years. Failure of medical therapy was the most common indication for surgery. All procedures were performed electively. One hundred seventy one (49%) patients were taking steroids; at a mean dose of 16.8 (range 0-60) mg of prednisone. One hundred thirteen (32.3%) patients were taking 6-mercaptopurine and 30 (8.6%) were taking cyclosporine. Three hundred twenty had mucosectomies and hand-sewn anastomoses, Thirty had stapled anastomoses without mucosectomy. There were two (0.56 percent) perioperative (<30 postoperative days) deaths one from sepsis and one from pulmonary embolus. Three patient (0.86%) required urgent re-exploration for peritonitis. Perioperative anastomotic leakage occurred in 27 (7.7%) cases, of whom 18 (5.1%) required secondary ileostomy. Sixty-seven (19.1%) patients were readmitted with small bowel obstruction, and 43 (12.3%) required enterolysis. Pouch excision was performed in 9 (2.6%) patients. Median length of stay for RPC was 9 days. Median total number of hospital days was 11.5.

**Conclusions:** One stage restorative proctocolectomy can be safely accomplished in the setting of chronic ulcerative colitis. Rates of early septic complications, secondary diversion and pouch loss are acceptable.

### Right Colon Cancer: Has Laparoscopic Surgery Influenced the Outcome?

(P118)

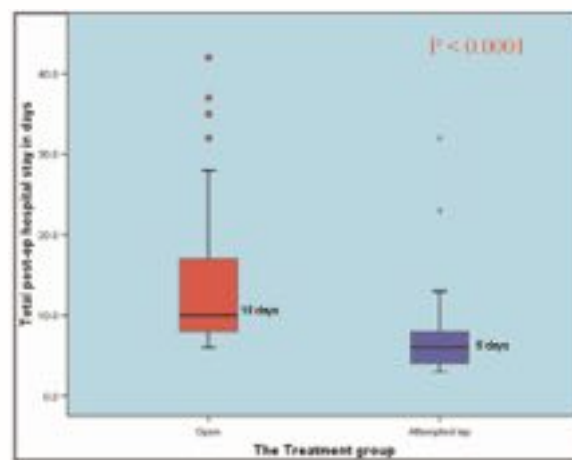
M. Abdel-Halim, H. Moore, P. Cohen, J. Cousins, P. Dawson, G. Buchanan . . . . . London, United Kingdom

**Purpose:** Large trials have demonstrated safety of laparoscopic colectomy for cancer; however, studies are needed to elucidate its advantages. Most comparisons have collectively assessed different segmental resections and few have specifically examined right colonic resections. As surgeons often start elective laparoscopic colorectal practice with right colon resection, this study aimed to determine its early impact in a teaching hospital.

**Methods:** 56 patients undergoing open (n=34) and attempted laparoscopic (n=22) elective right hemi-colectomy between November 2003 and March 2007 were compared on an intention-to-treat basis. Post-operative length of stay was the primary outcome. Secondary outcomes included analgesic requirements and bowel recovery post-operatively, morbidity and mortality, recurrence and survival.

**Results:** Conversion to open surgery was required in 2 of 22 patients. The attempted laparoscopic group had a shorter post-operative stay (6 versus 10 days,  $P<0.0001$ ), decreased analgesic requirement and faster bowel recovery compared with open operations. Groups' demography, tumour characteristics, morbidity and mortality were comparable. Multivariate regression analysis identified decreased age, attempted laparoscopic surgery, use of enhanced recovery protocols and absence of complications as independently shortening post-operative stay.

**Conclusions:** Short-term advantages for laparoscopic surgery and enhanced recovery protocols, even early in a surgeons' experience, suggest this could be the preferred mode for elective right colon cancer resection.



Box plot showing the median post-operative hospital stay in the two groups of the case-control study.  $P<0.0001$  (Mann Whitney U test).

### Improved Early Patient Outcomes Following Laparoscopic Right Hemicolectomy in a UK Hospital with Five Years Experience

(P119)

D. Coull, R. Smith, L. Wear, I. Jourdan, A. Gudgeon . . . . . Frimley, United Kingdom

**Purpose:** Previous UK laparoscopic colorectal studies, with surgeons at an early stage of their learning curve, have failed to show sizeable benefits over open surgery, in terms of early patient outcome. We present the results of right hemicolectomy in our unit from the previous seven years, including five years of laparoscopic resections.

**Methods:** Case note review was performed on 147 consecutive patients (77 male) who underwent right hemicolectomy for neoplasia between 2000-2007.

**Results:** 83 patients were booked for open right hemicolectomy and 64 for laparoscopic surgery. Both groups were well matched for age, sex and comorbidity. Eight attempted laparoscopic resections (12.5%) required conversion to open procedure and three (5%) underwent laparoscopic-assisted operations. Two dedicated laparoscopic colorectal surgeons performed 68% of their resections laparoscopically since 2003, preferring open surgery for patients with large tumours and/or bulky nodal disease, and those who had previously undergone complex laparotomies. Patients who underwent laparoscopic right hemicolectomy had less morbidity (15% vs. 30%  $p < 0.001$ ) and less mortality (1.9% vs. 2.4% - not significant) compared to open surgery. One patient suffered an anastomotic leak following open surgery and subsequently died. There were no leaks in the laparoscopic group. Laparoscopic resection took slightly longer to perform but was associated with a shorter postoperative length of stay, shorter time to oral-only analgesia and shorter time to post-operative defaecation. These results are illustrated in table 1.

**Conclusions:** Within our hospital, after five years experience performing laparoscopic right hemicolectomies, worthwhile advantages were seen when compared to open surgery. Post-operative length of stay was almost half as short following laparoscopic resection. Other advantages included; less time to using oral-only analgesia, faster return of bowel function and less morbidity and mortality. We recommend laparoscopic right hemicolectomy as an optimal surgical technique for right-sided colon cancer when conditions allow.

#### "Incisionless" Laparoscopic High Anterior Resection

(P120)

H. Quah, B. Ooi, C. Fu, K. Eu . . . . Singapore, Singapore

**Purpose:** Surgical techniques in colorectal surgery have made tremendous progress over the last 2 decades. A standard anterior resection require a long midline incision. Recently, laparoscopic surgery used a much smaller incision. Laparoscopic colorectal surgery has since become feasible and more widely accepted. We describe a novel technique for laparoscopic resection of an early stage upper rectal cancer without making any abdominal incision except for the insertion of ports.

**Methods:** Pneumoperitoneum is created, medial to later-

al mobilization of the sigmoid colon, including take down of the splenic flexure laparoscopically. Division of the inferior mesenteric vessels. The upper rectal tumor is transected both proximally and distally, and retrieved trans-anally via an opening in the rectal stump. The proximal colon is also delivered trans-anally and the anvil of the circular stapler inserted before returning it to the peritoneal cavity. Rectal stump is transected again below the opening, and colorectal anastomosis is then completed intracorporeally.

**Results:** Histology confirmed that it was a T1 upper rectal tumor (2.5 x 1 cm), lymph nodes negative. Postoperative recovery was uneventful.

**Conclusions:** In the relentless effort to minimize surgical trauma and postoperative pain, natural orifice surgery has been experimented. It remains to be determined if this described procedure is generally applicable to most colorectal cancer, but it may be an intermediate step between laparoscopic and natural orifice surgery.

#### Hand-assisted Laparoscopic Resection for Rectal Cancer with Curative Intent: A Prospective Analysis of 100 Consecutive Cases

(P121)

A. Saharia, M. Torres, T. Pickron, E. Haas  
..... Houston, TX; Galveston, TX

**Purpose:** There is a paucity of published literature regarding the utility of hand-assisted laparoscopic (HAL) resection for rectal cancer with curative intent. We report our initial experience with 100 consecutive HAL resections for rectal cancer.

**Methods:** All patients presenting for elective surgery with a diagnosis of rectal cancer were entered into our prospective database. Our initial 100 cases of HAL resection for rectal cancer with curative intent were analyzed. Patient demographic data, operative pathology, operative times, conversion rate, length of hospital stay and complications were reviewed.

**Results:** The mean age was 67 years. Fifty-eight percent of patients presented with upper rectal cancer and underwent HAL site specific mesorectal excision with colorectal anastomosis. Forty-two percent of patients had mid or low rectal cancer and received neoadjuvant chemoradiation therapy. The majority of these patients (85%) went on to HAL low anterior resection with total mesorectal excision and divert-

P119 Table 1

	Laparoscopic Right Hemicolectomy Median(Inter-Quartile Range)	Open Right Hemicolectomy Median(Inter-Quartile Range)	p value (two sample t test)
Length of Stay (days)	5(3-6)	9(6-12)	<0.01
Time to oral-only analgesia(days)	1(1-2)	2(2-3)	<0.001
Time to bowels open(days)	3(2-3)	5(4-6)	<0.001
Operating time(mins)	120(90-150)	95(75-120)	<0.01

ing loop ileostomy while 15% required HAL abdominoperineal resection. Mean operating room time was 149 minutes and there were no major intra-operative complications. A total of 6 cases were converted to an open procedure. The most common reason was the findings of a bulky tumor not amenable to laparoscopic techniques. Mean and median discharge was post-operative day 4.4 and 3.5, respectively (range 2 to 17). The overall complication rate was 19% with 9% having major complications. These included 4 cases of a pelvic abscess from suspected anastomotic leak. All of these patients were successfully treated with percutaneous drainage alone. There were no mortalities. The pathology revealed nodal positivity in 25% of patients with an average of 14.6 lymph nodes examined. There were no reported positive distal or proximal margins.

**Conclusions:** Hand-assisted laparoscopic resection of rectal cancer with curative intent is a safe and effective procedure in regards to short term outcomes. The data reported compares favorably with published reports of both open and conventional laparoscopic resection with mesorectal excision

#### Laparoscopic Resection of Rectal Cancer Facilitates Simultaneous Surgery of Synchronous Liver Metastases. A Preliminary Experience

(P122)

Y. Panis, C. Hatwell, F. Bretagnol, O. Farges, A. Alves, J. Belghiti . . . . . Clichy cedex, France

**Purpose:** In patient with rectal cancer and synchronous liver metastases (LM), beside the oncologic outcome, the main surgical problems for both combined rectal and LM resection is first the necessity of an adequate abdominal approach which is usually a large midline infra and supra umbilical incision with right subcostal insision and on the other hand the higher risk of morbidity. We argue that laparoscopic rectal approach could be beneficial in such patients in terms of operative results and could facilitate surgically this combined procedure.

**Methods:** From 2005 to 2007, 12 patients (7 men) were treated for rectal cancer and synchronous LM. All patients underwent a one-step resection with in 2 patients a two-step resection for liver procedure (tumorectomy and controlateral portal vein ligation then liver resection). LM were bilobar in 5 patients (42%). Morbidity was compared to a cohort of 27 patients undergoing laparoscopic rectal resection only.

**Results:** All patients underwent a laparoscopic total mesorectal excision (TME). Liver resections were: right hepatectomy (n=1), bi or tri segmentectomy (n=5) and tumorectomy (n=6). The rectosigmoid specimen was extracted through a right subcostal or short midline incision used for open liver resection, except for 4 patients who underwent a totally one-step laparoscopic procedure (3 liver tumorectomy and 1 left lobectomy). There was no mortality. Three patients (25%) experienced postoperative compli-

cations, including 1 patient requiring reoperation for colorectal anastomotic leakage (8%). Concerning liver resection morbidity, one patient had a bile leakage with pelvic abscess and pleural effusion requiring both radiologic drainage. The median hospital stay was 12 (5-40) days. Overall morbidity (25% vs 29%, NS) and hospital stay (12 vs 12 days, NS) were similar than those observed in the 27 patients undergoing laparoscopic TME only.

**Conclusions:** This study suggests that laparoscopic rectal resection with synchronous LM is feasible without increasing morbidity nor hospital stay. Moreover, laparoscopy seems facilitate surgical abdominal approach in case of simultaneous hepatectomy.

#### Laparoscopic Colorectal Cancer Surgery for Elderly Patients

(P123)

K. Murata, Y. Tomimaru, Y. Ide, K. Okada, H. Ohta, K. Maruyama, H. Yokouchi, M. Kinuta . . . . . Suita, Japan

**Purpose:** The aim of this study was to evaluate whether elderly colorectal cancer patients over 80 benefit by laparoscopic surgery.

**Methods:** Medical records of patients who underwent elective colorectal cancer surgery were retrospectively reviewed.

**Results:** Between July 2004 and October 2006, a total of 168 patients underwent colorectal cancer surgery. They were divided into four groups based on the age and operative procedures. Of the 168 patients, there were 28 patients who were aged 80 years or older. In those elderly patients, nineteen (68%) underwent LAC for colorectal cancer (elderly LAC group) and nine (32%) underwent open colectomy (elderly OC group). In 130 patients younger than 80, ninety-five patients (68%) underwent LAC (non-elderly LAC group) and forty-five (32%) open colectomy (non-elderly OC group). The incidence of preoperative medical diseases and previous abdominal surgery in the elderly patients was higher than those in the non-elderly patients. ASA score of elderly patients was higher than that of non-elderly patients while no significant differences between LAC and OC groups. In elderly LAC group, operative time was significantly longer ( $p=0.0324$ ), and intra-operative blood loss was significantly less ( $p=0.0489$ ) than those in elderly OC group. Conversion rate was 21% in elderly LAC group and 15% in non-elderly LAC group. The time to the first passage of flatus in LAC groups was significantly shorter than that in OC, in both the elderly ( $p=0.0291$ ) and the non-elderly ( $p<0.0001$ ). Postoperative hospital stay of LAC was also significantly shorter than that of OC, in both the elderly ( $p=0.0071$ ) and the non-elderly ( $p=0.0056$ ). There was no operative mortality in the all four groups. The incidence of postoperative morbidities was similar between LAC and OC groups both in the elderly and the non-elderly patients.



**Conclusions:** Laparoscopic surgery for colorectal cancer was safe for the elderly patients in this series. Since similar benefits in early postoperative period were observed both in the elderly and the non-elderly, laparoscopic surgery can be offered to all colorectal patients regardless of age.

#### Laparoscopic-Assisted Endoscopic Polypectomy of Difficult Colon Polyps

(P124)

R. Ochoa, R. Joseph, T. Pickron, E. Haas . . . Houston, TX

**Purpose:** We report our initial experience with a combined laparoscopic and endoscopic approach to facilitate polypectomy in patients with polyps deemed unsuitable for removal during conventional colonoscopy.

**Methods:** During the one year study period, a total of 44 patients were referred to our clinic for polyp removal following conventional colonoscopy. The majority underwent polyp removal either by repeat colonoscopy (13) or segmental resection (16). The remaining 15 patients underwent laparoscopic-assisted endoscopic polypectomy and were analyzed in a prospective database. The procedures were performed under general anesthesia. Patients underwent laparoscopic mobilization of the involved segment followed by colonoscopy. Polyps were removed in piecemeal fashion using hot snare following submucosal elevation with saline. Laparoscopic oversew of the colon wall was performed for suspected areas of thermal injury. Intraoperative frozen section was performed to confirm benign pathology.

**Results:** The mean age was 56 years. The indications were lesion too large for endoscopic resection (11) and inaccessibility due to mucosal fold (4). The pre-operative pathology was adenomatous polyp (73%), hyperplastic polyp (13%), serrated adenoma (7%), and inflammatory polyp (7%). The location of the polyp was cecum (3), ascending colon (4), hepatic flexure (3), descending colon (1) and sigmoid (4). In 13 patients the polyps were completely removed using this combined technique. Four patients required laparoscopic oversew of the colon wall. There were no intraoperative complications or post-operative morbidities. Most were discharged the same day (11) or following 23 hour observation (2). Two patients required segmental resection as the polyps were not amenable to polypectomy due to wide base in one patient and inaccessibility in the other.

**Conclusions:** We describe the safe and effective use of combined laparoscopy and endoscopy to facilitate endoscopic polypectomy in patients who might otherwise had required a segmental colon resection. This approach allows external monitoring, mobilization of the colon to facilitate polypectomy and laparoscopic techniques to oversee any impending perforation.

#### Laparoscopic Right Hemicolectomy: Safe for Patients and Good for Training?

(P125)

T. Linn, M. Cartmell, B. Moran, T. Cecil . . . Hampshire, United Kingdom

**Purpose:** Open right colon resection has traditionally been considered as excellent core training in general and colorectal surgery. It has been suggested however that laparoscopic right sided resection (RR) is more technically challenging than laparoscopic left sided resection (LR), and also that advantages such as early recovery are less pronounced for laparoscopic RR than LR. Our experience with laparoscopic colonic resection surgery is presented.

**Methods:** Prospective data were recorded on all laparoscopic colonic resections undertaken since the initiation of a laparoscopic programme in 2003. This period included the learning curve of the trainer. Conversion rates, complications, length of stay (LOS) and grade of surgeon performing the majority of the procedure were compared in patients having RR and LR and primary anastomosis.

**Results:** Comparative details in 189/242 laparoscopic colorectal resections with primary anastomosis are given in Table 1.

**Conclusions:** The conversion rate for RR was significantly less than for LR ( $p=0.033$ ), and there were no significant differences between trainees and consultant with regard to operation time, conversion rate, morbidity, mortality or length of stay. In this series the trainee was the main operator in a greater proportion of RRs. Our experience suggests that laparoscopic right colon resection is safe, feasible, and suitable for laparoscopic training with good patient outcomes.

P125 Table 1

	RR (n=63)	LR (n=126)
Conversion	10 (16%)	38 (30%)
Mortality	0	1
Anastomotic leak	1	4
Median LOS (days)	6 (interquartile range 5-10)	6 (interquartile range 5-8)
Trainee as main surgeon	32 (51%)	55 (44%)

### Outcomes Following Laparoscopic Colectomy for Cancer: Not All Sides are Created Equal

(P126)

G. Martel, A. Bouchard, C. Schlachta, E. Poulin, J. Mamazza, R. Boushey  
 . . . . . Ottawa, ON, Canada; London, ON, Canada

**Purpose:** The objective of this study was to compare the outcomes of right- and left-sided laparoscopic colectomies for cancer.

**Methods:** Consecutive patients undergoing laparoscopic colorectal procedures from 1991-2007 were analyzed from a prospectively-collected database. Cases were unselected, as all referred patients were offered laparoscopy. Inclusion criteria from the COST trial were applied, limiting the analysis to right- and left-sided colectomies for cancer. To standardize bowel function recovery, all conversions and defunctioning ostomies were excluded. Summary statistics and univariate analyses were performed.

**Results:** A total of 336 cases of laparoscopic colectomy for cancer were identified, including 161 right- (RT) and 175 left-sided (LT) resections. Both groups were well-matched for gender, weight, comorbidities, previous abdominal surgery, and perioperative steroid use. The RT cohort was slightly older (69.9 vs. 66.2 years,  $p=0.016$ ). There was no significant difference between the two groups in the distribution of AJCC stages, with stage 2 disease being the most frequent (37.3% vs. 32.0%,  $p=0.31$ ). The median operative time was significantly shorter within the RT group (147 vs. 180 min.,  $p<0.0001$ ), although both cohorts had comparable rates of intraabdominal adhesions (11.8% vs. 13.7%,  $p=0.6$ ) and intraoperative complications (5.0% vs. 5.7%,  $p=0.76$ ). Postoperatively, the RT cohort had more frequent medical complications (21.7% vs. 12.0%,  $p=0.017$ ), and demonstrated a trend toward greater overall complication rates (35.4% vs. 25.7%,  $p=0.054$ ). Median times to resumption of a normal diet and to discharge were not significantly different between the two groups. Surprisingly, the RT group showed an excess postoperative mortality rate (8/161, 5.0% vs. 1/175, 0.6%,  $p=0.016$ ). Among mortalities, only one case was attributable to a surgical complication, whereas others were medical complications (6/9) or unknown (2/9).

**Conclusions:** Stage for stage, right-sided laparoscopic colectomy for cancer may be associated with a greater rate of morbidity and mortality compared with left-sided resections. The observed difference in postoperative outcomes does not appear related to surgical complications.

### Are Laparoscopic Colorectal Resections Safe in the over 80's?

(P127)

M. Jarrett, J. McCloud, T. Arulampalam, R. Austin, R. Motson . . . . . Colchester, United Kingdom

**Purpose:** The laparoscopic approach for colorectal resec-

tions is rapidly becoming accepted as having significant advantages in terms of reduced morbidity. However, this is technically demanding surgery that involves a prolonged pneumoperitoneum, head down operating positions and longer operating times than conventional procedures. There are concerns that these factors make the laparoscopic approach less suitable for the elderly patient. The purpose of this study was to assess the suitability of laparoscopic colorectal resectional surgery for patients over 80 years of age.

**Methods:** A retrospective review of consecutive patients over 80 years of age at time of surgery undergoing laparoscopic colorectal resectional surgery between Feb 2004 and September 2006 under the care of 3 laparoscopic colorectal specialists within an experienced and busy laparoscopic unit was performed. Particular attention was paid to 30-day morbidity and mortality rates

**Results:** 56 patients (27 male) with a median age of 83 (80-96) years were included, representing 11% of all patients undergoing laparoscopic resectional surgery. Operations lasted a median of 180 (75-420) minutes. Three patients had diverticular disease, one had an adenomatous polyp and the remainder had colorectal cancer for which 16 right hemicolectomies, 13 sigmoid colectomies, 21 anterior resections and 6 abdomino perineal resections were performed. 9 (16%) were converted to open procedures. There were 4 deaths (7%), 3 due to cardiac failure and 1 following a pulmonary embolus. In addition there were 20 complications including 4 superficial wound infections, 2 developed pseudomembranous colitis, 3 had post operative bleeds, 1 required stoma revision following parastomal herniation and one following stoma necrosis, 3 developed cardiac failure, 1 had a pulmonary embolus and 5 had urinary dysfunction. 33 patients (59%) had an uneventful recovery from surgery.

**Conclusions:** Laparoscopic colorectal surgery is feasible in this elderly and high-risk group of patients. Patient age should not be the sole determining factor for declining a laparoscopic approach to colorectal resection.

### Optimum Timing of Laparoscopic Total Mesorectal Excision Following Long Course Chemoradiotherapy for Poor Risk Rectal Cancer

(P128)

E. Fine, T. Arulampalam, B. Sizer, N. Lacey, R. Austin, R. Motson . . . . . Colchester, United Kingdom

**Purpose:** Laparoscopic total mesorectal excision (LTME) of locally advanced rectal cancer following long course neoadjuvant chemoradiotherapy (LCRT) is surgically and oncologically challenging. We assess feasibility, timing and short term oncological outcome of LTME following LCRT. Particular emphasis was placed on delaying definitive surgery following LCRT based on the optimum response to the ongoing effects of radiotherapy judged on MRI criteria and clinical examination.

**Methods:** Between 2004 and 2006, 24 patients were selected for LCRT based on clinical examination (fixed tumour) and MRI (threatened or actual circumferential resection margin (CRM) involvement, T4 tumour, T3 > 5mm into perirectal fat and mesorectal lymphadenopathy). Patients received 3/4 field radiotherapy, 45-50.4Gy in 25-28 fractions/5weeks with either 5-Fluorouracil or Uftoral and clinical assessment after 4 weeks then fortnightly with sequential 4 weekly MRI, to individualise the timing of surgery at maximal response. LTME was performed using a standard technique.

**Results:** 24 patients (19 men) with a median age 59 years underwent LTME at 11 weeks (median) following the end of LCRT. Median operating time was 270 minutes (1 conversion, 9 abdominoperineal resections, one death (within 30 days) and 37% morbidity). There were 23 R0 resections with complete response seen in 5(21%) cases, microscopic tumour in lakes of mucin (Tmic) in another 6(25%). One patient (4%) developed local recurrence (follow up of 24 months). There were 3 anastomotic leaks.

**Conclusions:** LTME following LCRT is feasible and safe both oncologically and surgically. Serial MRI helps determine the optimum timing of surgery with no apparent disadvantage to increasing the time between the end of LCRT and definitive surgery to nearly 3 months.

#### Preoperative Prediction of Conversion in Patients Undergoing Laparoscopic Rectal Surgery for Cancer: A CT-Scan Based Model

(P129)

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**Purpose:** Laparoscopic rectal resection can be technically challenging given the bony confines of the pelvis. Difficult angles and limitations with laparoscopic instruments often necessitate conversion. The aim of the present pilot study is to develop a CT based model, using simple metrics, to predict conversion accurately and reproducibly in straight laparoscopic rectal cancer surgery.

**Methods:** We undertook a retrospective review of 30 consecutive cases of laparoscopic proctectomy for rectal cancer located below 15 cm from the anal verge. Preoperative staging CT scans and reconstructed pelvic images were reviewed for each patient. Eight pelvic measurements (including pelvic volume) were obtained by two independent observers and analyzed. The charts of all patients were reviewed and reasons for conversions were identified. Descriptive statistics were obtained, and Spearman correlation coefficients were calculated.

**Results:** Five out of 30 patients (16.7%) were converted to open surgery, including 0/9 anterior resections, 4/10 low anterior resections and 1/11 abdominoperineal resections. The recorded reasons for conversion were "narrow pelvis" in all cases and difficulty in obtaining adequate

margins in two cases. Two of eight recorded metrics were independently associated with conversion: the "sacral deepest point" measuring greater than 35.6 mm, and the "lumbar to coccyx" angle greater than 10.5°. These two variables were also significantly inversely correlated with one another (Spearman correlation= -0.574, p=0.0017). Finally, a plot graph analysis demonstrated that the combination of both cut-off metrics was the strongest predictor of conversion.

**Conclusions:** Two simple CT scan metrics can be used to accurately and reliably predict conversion in patients undergoing straight laparoscopic resection for rectal cancer.

#### Combined Laparoscopic-CO2 Colonoscopic Complex Polyp Resection to Avoid Bowel Resection

(P130)

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**Purpose:** Benign appearing colonic polyps are ideally resected endoscopically, but size and anatomic features may necessitate formal bowel resection. This study evaluates whether combined laparoscopic and CO2 colonoscopic polypectomy(CL-CP) can safely and effectively remove complex benign colorectal lesions not amenable to colonoscopic resection.

**Methods:** 43 pts(25 males)age 68/29-90(median/range) with previous colonoscopy demonstrating unresectable, benign polyps were considered for CL-CP, from December 2003 - October 2007. All pts consented to CL-CP or colectomy if necessary. Initial evaluation was done endoscopically with laparoscopic mobilization of the colon. When necessary, sutures or staplers were placed to close full thickness excision.

**Results:** 28 pts(65%) were candidates for CL-CP (3 isolated cecectomy, 1 full thickness ascending colon resection, 2 colotomy and polypectomy) in OR. Location of polyps were cecal(9), right(10), transverse(2), sigmoid(6), and rectosigmoid(1). 2 complications were repaired laparoscopically at the initial procedure(ureter injury, seromuscular tear of sigmoid). Pathology was benign in 27 pts; 1 had a questionable T1 lesion. LOS was 3d/2-8d, with no postop complications. In follow up 8.5mo/1-45mo, 2 pts had recurrent adenoma, treated with endoscopic resection. 15 pts underwent segmental resection after laparoscopic and endoscopic evaluation. Resections were performed secondary to difficulty passing colonoscope(1), malignant appearing lesion(3), extensive scarring at polyp site(3), unresectable due to size or visualization(8). No patient had significant bowel distension preventing endoscopic resection. Distribution of polyps in segmental colectomy group were cecal(5), right (5) and transverse(5). Pathology was benign adenoma(8), lipoma(1), Haggitt level I (1), invasive carcinoma(5). There was 1 port site hernia, 1 anastomotic leak, no other complications. LOS was 7d/4-21.

**Conclusions:** In selected pts, CL-CP can safely and effectively remove benign colonic lesions unresectable by colonoscopy alone, avoiding bowel resection. This combined approach may provide a viable alternative to segmental resection for complex benign colon lesions and warrants further investigation.

#### Effect of Prednisolone on Local and Systemic Response in Laparoscopic vs. Open Colon Surgery. A Randomized Double-blind Study

(P131)

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**Purpose:** To assess if preoperative treatment with a single high-dose of Methylprednisolone (MP) could influence local and systemic response in patients undergoing laparoscopic (LPS) or open elective resection for colon cancer.

**Methods:** Fifty-two consecutive patients were randomised in double-blind placebo-controlled fashion into 4 different groups including 13 patients each : group 1; MP+LPS, group 2; MP + open, group 3; placebo + LPS, group 4; placebo + open. Methylprednisolone or placebo were administered intravenously at a dose of 30 mg/kg, 90 minutes before surgery. Before and after surgery pulmonary function (spirometry and blood gas), C-reactive protein, interleukin 6, 8 and TNF- $\alpha$  were measured as were as intraoperative variables, postoperative pain and patient outcome

**Results:** The four groups were similar with respect to demographics as were for operative variables. No adverse effect related to glucocorticoid administration occurred. No differences in morbidity rate, or anastomotic leak were observed among groups. In patients treated with steroids (group 1,2) a significant postoperative improvement in pulmonary function ( $p=0,01$ ), pain control ( $p=0,001$ ) and a shorter length of stay ( $p=0,03$ ) was observed independently from the surgical technique used (LPS vs open). On postoperative day 1 and 3, interleukin 6,8 and TNF- $\alpha$  were significantly higher in placebo + open group when compared to the other groups ( $p=0,03$ ).

**Conclusions:** Preoperative treatment with a single high-dose of glucocorticoid may improve postoperative pulmonary function and pain control. Our preliminary data show that patients in the open groups treated with MP have similar results to LPS patients in term of pulmonary performance, pain control and length of stay, with no adverse effect .

#### Multivisceral Resection in Colon Cancer. Prognostic Factors

(P132)

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**Purpose:** 5%-12% of all patients with colon cancer will

have locally advanced tumor infiltrating or adherent surrounding organs at surgical intervention. The aim of the current study is to analyze the outcome of surgical treatment of patients with colon cancer with multivisceral resection and identify potential predictive factors associated with survival.

**Methods:** From November 1998 to July 2007, 2395 colorectal tumors were operated in our unit (1766 were located in the colon). A retrospective review of all patients with locally adherent colon cancer was carried out. Inclusion criteria were tumor location above 15 cm of the anal verge and a potentially locally curative procedure (en bloc resection of the tumor and involving structures). Survival was analyzed by the Kaplan-Meier test; differences were analyzed with the log-rank test. Cox regression analysis was performed to find predictive factors associated with survival.

**Results:** 113 patients were found (51, 3% women). Mean age was 68,8 years (SD 11,8). Anemia was found in 70 patients (61,95%). Almost all patients had had a CT scan only in 40 (44,9%) an infiltrating mass was described. Sigmoid colon was the most common tumor localization (46,02%). Small bowel (42,4 %) or pelvic organs (uterus, ovaries and/or bladder - 58,4 %) were the most common resected organs. Postoperative complications were observed in 54 patients (47 %), and mortality in 7,1 % (8 cases). Postoperative chemotherapy was administered to 77 patients (68,14%) and radiotherapy to 6 (5,31%). At follow up (median: 36 months), there were 35 deaths (30,4 %). Of the 70 live patients (62,5%), 48 (42,9%) had no signs of disease (DFS). After statistical study, factors related with an improved survival rate were: rectal bleeding and postoperative chemotherapy. Factors related with a worse survival were: poorly differentiated tumors (G3) and stages III and IV.

**Conclusions:** Although multivisceral resection is associated with an increase of morbidity, it's low mortality and an acceptable survival rate justify this procedures. Rectal bleeding and use of chemotherapy are associated with a better survival rate, and poor differentiation, nodal involvement and distant metastases are associated with a worse survival.

#### Ovarian Metastasis from Colorectal Cancer: A Clinicopathologic Analysis of 103 Cases

(P133)

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. . . . . Seoul, South Korea

**Purpose:** We sought to improve management of ovarian metastasis through assessment of clinicopathologic features and treatment outcomes associated with ovarian metastasis from colorectal cancer.

**Methods:** We recruited 103 subjects from among 3142 colorectal cancer patients who were diagnosed with ovarian metastasis and subjected to surgery between June 1989 and December 2005. Clinical variables including age, presenting symptoms, location of the primary tumor, and the pres-



ence of combined metastasis were evaluated, and pathologic findings were assessed to verify the histologic diagnosis, tumor size, nodal status, presence of synchronous metastases, and lymphovascular or neural invasion. Survival and its associated factors were analyzed with a median follow-up of 31 months after ovarian surgery.

**Results:** Synchronous ovarian metastasis occurred in 68 patients, and metachronous ovarian metastasis in 35 patients. The primary tumor was more commonly associated with the colon rather than the rectum (84/1608, 5.2% vs. 19/1534, 1.2%,  $P < 0.001$ ). Combined metastases occurred in 69 patients (67%) and included peritoneal seeding (42.7%), liver metastasis (9.7%), peritoneal seeding and liver metastasis (9.7%), and para-aortic lymphadenopathy (1.9%). All the patients had locally advanced tumors and 71.8% of patients had positive nodes. Lymphovascular invasion (38.5%) and neural invasion (15.6%) were also present with ovarian metastasis. Complete resection was achieved in 34 (33%) patients without other metastases. Adjuvant chemotherapy was administered post-operatively to 66 patients (64.1%). The estimated overall 5 year survival rate was 26.6%. From univariate analysis, lymphovascular invasion (35.6% vs. 12.8%,  $P = 0.034$ ), combined metastasis (50.9% vs. 15.6%,  $P = 0.0035$ ) and bilaterality of ovarian metastasis (36.4% vs. 10.6%,  $P = 0.015$ ) were identified as significant poor prognostic factors, and from multivariate analysis combined metastasis and bilaterality of ovarian metastasis were significant ( $P = 0.034$  and  $P = 0.015$ , respectively).

**Conclusions:** These findings suggest a role for regular follow-up CT scans and tumor marker assays for early detection of ovarian metastasis, especially in cases with poor prognostic factors.

#### Natural History of Small 'Indeterminate' Hepatic Lesions in Patients with Colorectal Cancer

(P134)

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**Purpose:** Colorectal cancer is the commonest cancer in Singapore. The initial staging computed tomographic (CT) scan for patients diagnosed with colorectal cancer may reveal small 'indeterminate' hepatic lesions of <1cm in diameter. The significance of these lesions is often unknown at the time of diagnosis. Follow up of these lesions is required as it may have potential impact on the subsequent management. Aims: To determine the prevalence and significance of small 'indeterminate' liver lesions (<1cm on CT scan) in patients diagnosed with colorectal cancer and also to determine if further surveillance imaging of these findings is required.

**Methods:** Data was collected retrospectively from 1st January 2002 to 31st December 2005. All patients who were surgically treated for their colorectal cancer and noted to have small 'indeterminate' liver lesions on their initial staging CT were analyzed. These lesions were reported as being

too small to be characterized. Subcentimetre hepatic lesions, which were characterized definitively by the radiologists as a cyst or metastases were excluded. All subsequent imaging of the liver were reviewed to assess the natural history of these small 'indeterminate' liver lesions.

**Results:** 419 patients underwent surgery for their colorectal cancer and had a staging CT done. 70 patients (16.7%) had small 'indeterminate' liver lesions on their initial staging CT which could not be definitely characterized. 46 (65.7%) had subsequent follow up imaging for their liver lesions. 41 (89.1%) of these were shown to be stable lesions which were likely to be benign in nature. Only five patients (10.9%) showed evidence of progression, suggestive of early metastases, on subsequent liver imaging done with a mean follow up of 8.8 months after the initial staging CT. These patients either died from advanced malignancy or received palliative treatment.

**Conclusions:** Small 'indeterminate' liver lesions may occur in up to 16.7% of colorectal cancer patients. Although most of these lesions remain quiescent, surveillance imaging may be recommended as a small but not insignificant number of patients with such lesions actually harbor early metastases.

#### Multivisceral Resections in Locally Advanced Colon Carcinoma

(P135)

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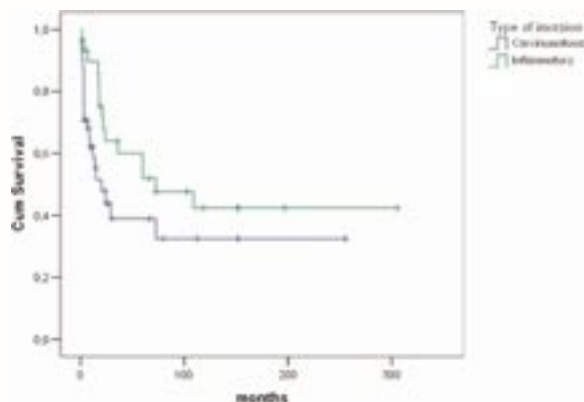
**Purpose:** It is unfortunate that in the present era of multimodality treatment for colorectal cancer, the compelling evidence to perform multivisceral resection (MVR) in patient with locally advanced colon carcinoma is limited. Concerns arise from misdefinition of the adequacy of surgical resection and patient heterogeneity of the studies, and from the increased morbidity and mortality. The aim of this study was to evaluate a single-center experience with MVRs for pure primary colon cancer to determine the accuracy of potential curability and examine the effect of en bloc radical resection on oncological outcomes.

**Methods:** Patients undergoing MVR for primary colon cancer between 1994 and 2006 were identified from a prospective database.

**Results:** MVR was performed in 77 patients with primary advanced colon cancer. The overall operative morbidity and mortality were 26.5% and 7%, respectively. Radical curative resection was achieved in 72 (93.5%) patients. Restoration of continuity was obtained in 74 patients. A total of 94 additional organs or surrounding structures were resected together with the index tumor. Macroscopic adhesions were confirmed histologically as carcinomatous in 54.5% of the patients. Lymph node involvement was detected in 35 (45.5%) of patients. The local recurrence, distant metastasis, and local and distant metastasis rates were 10%, 13%, and 9%, respectively. The overall and disease-free 3-year survival rates were 61% and 48%, respectively. The overall 3-

year survival rate for node-negative and node-positive patients was 56% and 67%, respectively. Disease-free survival for patients with 'upper abdominal organ involvement' was shorter than patients with 'lower abdominal organ involvement' (34 vs. 150 months, respectively;  $p=0.002$ ). Histopathologically confirmed tumor invasion had a significant association with poor survival (Fig. 1) and increased recurrence ( $p=0.01$ ;  $p=0.05$ , respectively).

**Conclusions:** It is difficult to differentiate malignant invasion from inflammatory adhesion intraoperatively by gross inspection and palpation. Curative MVR should be performed whenever possible for patients with locally advanced colon carcinoma.



Kaplan-Meier estimate of survival between patients with carcinomatous and inflammatory adhesions.

#### The Value of Self-Expanding Metallic Stent for Palliative Treatment of the Malignant Colonic Obstruction and the Predictive Factors Associated with Reobstruction (P136)

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**Purpose:** Self-expanding metallic stent (SEMS) is widely used in the palliative treatment of the malignant colonic obstruction. In this study, we assessed the value of stent insertion for palliative treatment and the predictive factors associated with reobstruction.

**Methods:** The retrospective analysis was performed in 55 patients who were treated with SEMS for palliative treatment in the malignant colonic obstruction with distant metastasis or locally advanced lesion that are unresectable from February 2004 to April 2006. The subject was divided into those with reobstruction (reobstruction group) and those without reobstruction (patency group).

**Results:** The causative diseases before the procedure included primary colon cancer in 42 patients and secondary malignant lesion in 13 patients. In all cases, non-converged stent was used and the technical success rate of the stent insertion was 92.7% and the clinical success rate was 85.5%. After the stent procedure, the complication was observed in

total 18 cases (32.7%), reobstruction in 10 cases (18.2%), stent migration in 6 (10.9%), bowel perforation in 1 and fistula formation in 1 case. Out of 10 cases with reobstructions, the additional stent insertion was performed in 8 cases. The mean survival time was  $295 \pm 39$  days in 41 patients who were dead. In the reobstruction group, the mean patency period was 106 days. In the comparison of reobstruction group and patency group, with higher performance scale ( $p=0.026$ ) and the better degree of stent expansion in 48 hrs after the procedure ( $>70\%$ ;  $p<0.001$ ), the less occurrence of reobstruction was present. In the multivariate analysis for the predictive factor for reobstruction using Cox proportional risk model, the degree of stent expansion after 48 hrs ( $<70\%$ ) was statistically significant ( $p=0.018$ ).

**Conclusions:** SEMS is useful treatment modality which can improve symptoms by relieving colonic obstruction from malignant diseases. After SEMS of palliative treatment, the degree of stent expansion after 48 hrs of procedure was significantly related with the maintenance of the stent patency for predictive factor of stent reobstruction.

#### Brain Metastases from Colorectal Cancer

(P137)

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**Purpose:** Brain metastasis is infrequent in colorectal cancer patients. And the prognosis of brain metastasis is known to be poor. The purpose of this study is to analyze the survival and the prognostic factors in patients with brain metastasis from colorectal cancer.

**Methods:** Between 1997 and 2006, we retrospectively identified 39 patients with brain metastasis from colorectal cancer and who were survived longer than 1 month. The data were collected with regard to patient characteristics, location and stage of primary tumor, extent and location of metastatic diseases and the type of treatment.

**Results:** The mean age of the 16 women and 23 men was 59 years (40-81). Rectum was more frequent primary tumor site than colon (22 vs 17). The stages of primary tumor were stage 2 in 2 cases, 3 in 17 cases and 4 in 9 cases. The mean interval from the time of primary cancer surgery to the diagnosis of brain metastases was 32.3 months. Most of the patients (87.2%) had pulmonary metastases before brain metastasis and brain was the only metastatic site in only one patient. The most frequent symptoms were weakness (18/39), headache (11/39) and dysarthria (4/39). Lesions were solitary in 22 cases, unilateral in 26 cases, and located in cerebral in 26 cases. Overall mean survival was 7.95 months; the 1-year and 2-year survival rates were 21.76% and 9.07%, respectively. Survival was not affected by gender and age, location or stage of the primary tumor, and size or location of metastatic disease. But serum CEA level greater than 5 ng/ml ( $p=0.0082$ ) and multiple metastatic lesions in brain ( $p=0.0302$ ) were the poor prognostic factors. And the

mean survival time after the diagnosis of brain metastasis was longer significantly in patients who underwent surgical excision (18.70 months) than who were treated with whole brain irradiation, stereotactic radiosurgery, and conservative care (6.42, 6.34 and 2.78 months) ( $p=0.0039$ ).

**Conclusions:** The results of the present study indicate that aggressive surgical resection in patients with brain metastases from colorectal cancer may increase the survival. And analysis of prognostic factors in these patients shows that multiple metastatic lesions in brain and serum CEA level greater than 5 ng/ml were also associated with a poorer survival.

#### Outcomes of Resection and Nonresection Strategies in Patients with Advanced Colorectal Cancer

(P138)

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**Purpose:** The management of patients presenting with surgically incurable bowel cancer is controversial. It has been believed that the most effective palliation is achieved by resection of the primary cancer. The aim of this study was to compare the outcomes of patients with surgically incurable bowel cancer managed by resection and non-resection strategies over a 7-year period in a single centre.

**Methods:** Patients with surgically incurable bowel cancer at presentation were identified from a prospective database. Survival, stoma rates and operative mortality were compared between 3 subgroups: 1. Patients managed by resection of the primary. 2. Patients managed by non-resectional intervention (surgery, stent & oncological treatments) and 3. Those patients managed with supportive care only. Survival was compared using Kaplan-Meier and log-rank methods.

**Results:** Of 646 consecutive newly diagnosed bowel cancer patients over a 7-year period 154 (24%) were surgically incurable at presentation. Survival, stoma rate and operative mortality data is presented in the table. Survival was not significantly different between surgical resection and non-resection intervention groups ( $p=0.21$ ), survival was however significantly longer in both resection and non-resection intervention groups when compared with supportive care alone ( $p<0.01$ ). Only 1 patient initially managed by non-resection intervention subsequently required surgery for primary tumour related complications.

**Conclusions:** This non-case matched prospective study has shown that the surgical treatment of advanced bowel cancer is associated with a significant risk of in hospital mortality and high stoma rates with no significant survival advantage. Non-resection strategies should be considered whenever possible in the management of stage IV bowel cancer.

#### Pathologic Validation and Clinical Prognosis of T4b Adenocarcinoma of the Colon

(P139)

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**Purpose:** The pathologic assessment and clinical significance of transmural extension of colon cancer is currently undergoing reevaluation. Several studies have subclassified T4 tumors into those that extend into adjacent organs or structures (T4a) and those that penetrate the parietal peritoneum (T4b), but the precise pathologic definition of T4b has varied. Peritoneal penetration has been shown to portend independent adverse prognostic significance. Our aim was to evaluate the prognostic value of the T4a/T4b subclassification in terms of survival.

**Methods:** We performed a retrospective review of resected T3 and T4 colon cancers between 1997 and 2001. Pathology slides were reviewed and distance of tumor from the closest serosal surface was measured. Tumors were reclassified as T3 (tumor  $>1$  mm from serosa), T4a (tumor invading adjacent structure), or T4b (tumor  $<1$  mm from or at serosal surface). Patient age, T stage, N stage, chemotherapy administration, and survival data were recorded. Differences between groups were evaluated using ANOVA, patient survival was modeled using Kaplan Meier, and multivariate models for survival were developed using Cox-Proportionate Hazards Models.

**Results:** We sampled 134 patients from our tumor registry who had tumor and serosal surface in the same slide. These were reclassified as T3 ( $n=61$ , no staging change), T4a ( $n=8$ , one originally staged T3), and T4b ( $n=65$ , 54 originally staged T3). Median follow-up time was 37.5 months (range 0.5-120.4). When controlled for age, N stage, and the administration of chemotherapy, there was a significant

#### P138

	Surgical primary resection (n=45)	Non resection intervention (n=52)	Supportive treatment (n=57)
Median survival (IQ range)	11 months (3-18)	7 months (2-15)	2 months (1-8)
Stoma rate	40% (18/45)	19% (10/52)*	0%
Operative mortality	16% (7/45)	36% (5/14)	0%

\* only 14 cases had surgical treatment

effect of T stage on overall survival ( $p=0.007$ ). Specifically, there was decreased survival for T4b patients with tumor cells at serosal surface compared to T4b patients without tumor cells at serosal surface (RR 2.77, 95% CI 0.172-0.759;  $p=0.007$ ) and when compared to this T4b group and T3 patients (RR 2.05, 95% CI 0.259-0.917;  $p=0.026$ ). Actual distance (estimated in mm) was not associated with survival ( $p=.903$ ).

**Conclusions:** T4b colon cancers, when strictly defined as those that invade the serosa, are associated with decreased survival. Following the current AJCC guidelines, these tumors should be staged T4 (not T3) and considered for adjuvant chemotherapy.

#### Treatment Outcomes in Peritoneal Malignancy of Appendiceal or Colonic Origin are Influenced by the Site and Grade of the Primary

(P140)

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**Purpose:** Complete macroscopic tumour removal (complete cytoreduction) and heated intraperitoneal chemotherapy (HIPEC) is considered optimal treatment for pseudomyxoma peritonei originating from low-grade tumours of the appendix. Controversy persists however regarding the benefits of cytoreduction and HIPEC for high-grade appendiceal tumours or carcinomatosis of colorectal origin, especially if complete cytoreduction is not achieved. The experience of a tertiary referral centre with cytoreduction and HIPEC in peritoneal malignancy of colonic or appendiceal origin is reviewed.

**Methods:** Prospective data have been collected since 1994 on all patients undergoing surgery for peritoneal malignancy. Operations were classified as complete (all macroscopic tumour removed) or incomplete. Appendiceal tumours were categorised histologically as low or high grade and colonic tumours as high grade.

**Results:** Between March 1994 and December 2006, 269 consecutive patients with peritoneal malignancy underwent surgery. There were 259 appendix and 10 colonic primary tumours, and all have been followed up for more than 1 year. Complete cytoreduction was achieved in 170/259 (66%) appendiceal tumours, with 144/170 (85%) having low grade tumours. Predicted 5 year tumour free and overall survival for the 144 patients was 67% and 82%, compared with 54% and 71% for the 26 high grade tumours. Cytoreduction was incomplete in 89/259 patients with appendiceal tumours; 69 low and 20 high grade. Five year survival was 15% and 0% respectively. Of the 10 patients with colon cancer 6 had complete cytoreduction but none are expected to survive 5 years (median survival of 0.9 years).

**Conclusions:** Cytoreduction for peritoneal malignancy is most commonly achieved for low grade appendiceal

tumours. Complete resection in selected patients with carcinomatosis of high grade appendix or colonic tumour origin is possible, but outcomes for patients with colonic tumours are disappointing. Our experience with both high and low grade appendiceal tumours is promising but it remains to be seen what proportion of patients with colonic carcinomatosis benefit.

#### The Use of Self-Expanding Metallic Stents in the Management of Malignant Large Bowel Obstruction

(P141)

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**Purpose:** Colorectal stents are used in the management of malignant large bowel obstruction, for palliation of inoperable cancer or as a bridge to surgery. We report our experience of self-expanding metallic stents (SEMS) for malignant large bowel obstruction in a dedicated unit.

**Methods:** We reviewed our experience of SEMS since they were introduced into our practice in 2000. Data were collected retrospectively from a stent database. Following diagnosis by CT or flexible sigmoidoscopy, procedures were performed in an interventional radiology suite, utilizing endoscopic evaluation of the pathology (performed by a consultant surgeon) and fluoroscopically-guided insertion of guide wire and stent by a consultant radiologist.

**Results:** During the review period, 84 SEMS were employed in the management of 72 patients (median age 79 years, range 43-101 years; 42 males, 30 females) with malignant large bowel obstruction. In 9 patients, 2 stents were inserted on separate occasions, whereas one patient was stented on 3 separate occasions. 67% of stents were palliative, whereas 33% were used as a bridge to surgery, with surgery being performed after a median 14 days (range 0-88 days) following stent insertion. The sites of stent insertion were: upper rectum 7, rectosigmoid 13, sigmoid colon 53, descending colon 5, splenic flexure 4, and transverse colon 2. Stenting was technically successful during 75 insertions (89%). The complications were: 7 early migrations (within 24 hours), 8 late migrations, and 2 perforations. Median survival of patients following insertion of palliative stent was 7 months, compared with 26 months for patients stented as a bridge to surgery.

**Conclusions:** SEMS are useful adjuncts in the management of malignant colorectal disease, particularly for palliation of inoperable disease or in patients unsuitable for definitive resection. They are associated with a high technical and clinical success, and have few complications, thus obviating the risks of emergency surgery. We feel the availability of a dedicated stent service, comprising an appropriately trained team, is essential for units treating patients with obstructing colonic disease.



# **Malignant Ascites - Influenced By Means of HIPEC Hyperthermic Intraoperative Peritoneal Chemotherapy** (P142)

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..... Prague, Czech Republic

**Purpose:** Appearance of ascites during the investigation and treatment of intraabdominal malignancies usually signalizes the impending end of patients life (in average 1-8 months, 1 year survival 0-13%). The only recommended symptomatic treatment (besides diuretics) are multiple abdominal punctures with all, mainly metabolic consequences. Dealing with the topic of peritoneal carcinomatosis we noticed that after HIPEC application the malignant ascites mostly did not appear any more.

**Methods:** Among the group of 137 patients treated by means of cytoreduction plus HIPEC there is a subgroup of 29 pts (21,2 %) where cytoreduction was uncomplete or not possible at all because of tumor extention, but troublesome malignant ascites was present (1-11 litres). The group of 25 pts (by 6/2006) was divided according to the procedure performed for 1.subgroup (16) where palliative debulking + HIPEC were done and 2.subgroup (9) where only HIPEC was possible. The diagnosis of these patients were pseudomyxoma peritonei, mesothelioma, colorectal carcinoma and ovarian carcinoma.

**Results:** In group 1. malignant ascites did not appear any more in 12 pts, appeared in 4 pts in average 6,3 months after surgery. Four pts already died in average 10,7 m after surgery, but 3 of them survived 1 yr. Twelve pts are still alive (6pts> 1yr, 3pts> 2yrs, 1pt > 4yrs). In group 2. ascites did not appear in 3 pts and appeared in 5 pts in average 7,2 months after surgery. Survival was 2-23 months (2,3,9,11,12,12,13,23).

**Conclusions:** Comparing to the other therapeutic modalities for the treatment of malignant ascites HIPEC seems to be highly effective, extends the life time and especially improves the quality of the rest of life. Note: The study is supported by the grant of Ministry of Health of the Czech Republic IGA MZCR:NR 8414-5/2005

# **Does Position in the Rectal Circumference Influence Prognosis of Patients with Rectal Cancer after Curative Resection?** (P143)

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L. Marongiu, G. Casula ..... Cagliari, Italy

**Purpose:** Recent data suggest that position of the tumour in the rectal circumference may influence the results of a radical resection. In particular, anterior position has been considered as an independent negative prognostic factor for local recurrence and survival. The aim of this study was to evaluate whether tumour position has played a role in the oncological outcome of patients operated on for rectal cancer at our Institution

**Methods:** A total of 283 consecutive patients with rectal cancer operated on with curative intent between January 1993 and December 2005 were retrospectively evaluated. Palliative resections or those with positive resection margins were excluded. On the basis of tumour location in the circumference of the rectum, patients were divided into 4 groups named as anterior, lateral, posterior and circumferential. Tumour position was deduced from preoperative clinical and instrumental assessment

**Results:** Of 283 rectal tumours, 47 were anterior (17%), 75 lateral (26%), 82 posterior (29%) and 79 circumferential (28%). Neo-adjuvant radiotherapy +/- chemotherapy was given to 126 patients (44.5%), without significative differences among groups. Groups were also similar in regard to age, gender, distance of the tumour from the anal verge, type of surgical procedure and overall post-operative morbidity and mortality. Final staging showed that the percentage of Dukes C was 32% for anterior lesions, 25% for lateral, 30% for posterior and 29% for circumferential (p= 0.9). At a mean follow-up of 49 months (10-149) there have been 21 local recurrence (7.5%), with the highest rate for circumferential tumours (10.1%), followed by anterior (8.5%), lateral (6.7%) and posterior (4.9%) (p= 0.6) Systemic recurrence occurred in 37 patients (13%) and estimated 5-year actuarial survival was 72% with no significative difference between the four groups

**Conclusions:** We have noticed that rectal tumours with an anterior component suffered from a higher rate of local recurrence. However the difference failed to reach statistic significance and also distant metastasis and patient survival did not seem to be influenced by tumour position. Further studies are necessary to confirm these data

# **Predicting Rectal Cancer T-Stage Using Circumferential Extent Determined by CT Colonography** (P144)

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**Purpose:** Patients with stage T3/T4 rectal cancer are candidates for neo-adjuvant chemo-radiation therapy. However, conventional evaluation may not accurately identify stage T3/T4 tumors preoperatively. We undertook this study to clarify the role of CT colonography (CTC) in differentiating T3/T4 from T1/T2 rectal cancer.

**Methods:** From April 2003 to June 2007, 70 rectal cancer patients underwent curative-intent surgery at a single institution. Patients who received preoperative radiation or who had familial adenomatous polyposis or colitic cancer were excluded. All patients underwent colonoscopy and subsequently CTC on the same day. Colonoscopy was performed using standard technique, and the circumferential extent of the

tumor was determined by a single experienced endoscopist. CTC was performed in the prone position after insufflation with room air. A single radiologist reconstructed the CTC images and determined the circumferential extent without having the results of the colonoscopy. Circumferential extent of the tumor was estimated in 10% increments using both colonoscopy and CTC by each independent examiner. Pathological T stage was used as the reference.

**Results:** The medians(95 percentile) of the circumferential extent evaluated by colonoscopy for T1(n=6), T2(n=21), and T3/T4(n=43) were 10%(10-20), 30%(20-40), and 80%(20-100), respectively. The medians (95 percentile) evaluated by CTC for T1, T2, and T3/T4 were 10%(10-20), 30%(10-65), and 70%(10-100), respectively. The correlation coefficient between colonoscopy and CTC was very high (0.94). By defining a circumferential extent of 50% or greater by CTC as the criteria for stage T3/T4 rectal cancer, the sensitivity, specificity, positive predictive value (PPV) and accuracy were 72%, 88%, 91%, and 79%.

**Conclusions:** Circumferential tumor extent >50% determined by CTC is a simple and potentially useful marker to identify candidates for neo-adjuvant chemo-radiation therapy with high PPV. Conventional modality such as endoscopic ultrasound could be applied for only the patients with <50% circumferential extent rectal cancer.

#### The Prognostic Significance of Human Epidermal Growth Factor Receptor-2 in Colorectal Cancer

(P145)

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**Purpose:** To determine the incidence of HER-2/neu positivity in CRC and the evaluate it's ability to predict outcome in colorectal cancer

**Methods:** This study involved 124 paraffin-embedded colorectal specimens from surgical resections. 33 were benign disease. Her-2/neu immunohistochemistry was performed using the HER-2 4B5 Vantana Medical antibody. Fluorescent insitu hybridisation (FISH) was performed using INFORM HER-2/Neu Plus. All slides were reported by two independent observers. Statistical analysis was performed using SPSS version 11.5

**Results:** 108 were HER-2/Neu negative using IHC, 8 showed barely perceptible positivity, 7 showed moderate staining and 2 were strongly positive. There was no correlation with sex, age, grade, Dukes' stage, time to recurrence and 5-year survival ( $p>0.05$ ). All cases which were moderately positive underwent FISH. An additional one case was over-amplified

**Conclusions:** Our data confirms that Her-2/neu is over-expressed in 3% of colorectal cancer. It does not correlate with an adverse prognosis. This receptor is unlikely to play a role in the therapeutic management of colorectal cancer in the future.

#### Immunohistochemistry for Colorectal Cancers May Predict their Response to Chemotherapy

(P146)

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**Purpose:** Immunohistochemistry staining to detect Hereditary Non-Polyposis Colorectal Cancer (HNPCC) is a useful screening technique and can also be used as a prognostic marker for patients with sporadic cancers. If a mutation is indicated, these patients may not benefit from chemotherapy.

**Methods:** 230 consecutive colorectal cancer specimens from 2005 and 2006 were stained for MLH1, MSH2, MSH6 and PMS2 proteins, reviewed by a histopathologist and checked by a senior consultant histopathologist. Staining was assessed both for the proportion of tumour cells stained and the intensity of staining.

**Results:** See table 1 Overall the MLH1 and MSH2 staining was clear and easy to assess whereas in PMS2 and MSH6 it was often weak and patchy.

**Conclusions:** The power of immunohistochemical staining to detect HNPCC is high for the MSH2 and MSH6 proteins but MLH1 and PMS2 form a heterodimer and staining for these two proteins is often lost in sporadic colorectal cancer due to hypermethylation of the MLH1 promoter region. Although it is quite clear when a tumour is totally positively stained and when it is totally negative, there is a range of staining in between the two extremes. It may be that the tumour is only partially negative but artefacts such as poor staining or poor fixation also have to be considered. It is unclear whether only totally negative staining indicates a mutation or whether partial staining also indicates the presence of mutation. In addition to a screening tool for Lynch syndrome, this form of testing can be used as a prognostic marker (MSI tumours have a better prognosis) for patients with sporadic tumours. Patients with MSI tumours do not seem to benefit from chemotherapy, so this may be relevant in selection of treatment. We will present our findings with reference to recurrence and survival

P146 Table 1

Site of tumour	Protein	Intensity of stain	
		Strong %	Weak %
Left colon & rectum	MLH1	72	0.5
Right colon	MLH1	42	38
Left colon & rectum	PMS2	38	1.5
Right colon	PMS2	19	46
Left colon & rectum	MSH2	68	0.5
Right colon	MSH2	56	2
Left colon & rectum	MSH6	22	0.5
Right colon	MSH6	22	6

# Prospective Immunohistochemical Analysis of Primary Colorectal Cancers for Loss of Mismatch Repair Protein Expression

(P147)

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**Purpose:** The evaluation of patients with suspected hereditary nonpolyposis colorectal cancer (HNPCC) includes age, family cancer history and laboratory testing, such as sequence analysis of mismatch repair (MMR) genes, microsatellite instability testing and immunohistochemical (IHC) analysis for MMR protein loss. Of these, IHC testing is the least expensive and most widely available. However, a prospective evaluation of its clinical use in different age groups has not been performed.

**Methods:** A program was established whereby all patients under the age of 50 undergoing radical resection or local excision of primary colorectal adenocarcinomas had their specimen examined by IHC for MMR protein loss. Older patients were analyzed if histopathologic criteria suspicious for HNPCC were met or if IHC was requested by a clinician. Detailed family cancer history was obtained from medical records and prospective questionnaires and patients meeting Amsterdam criteria for HNPCC identified. Both overall MMR and specific MLH1 protein expression rates were stratified by age.

**Results:** During the study period, July 1, 2006 to September 30, 2007, 82 patients under the age of 50 underwent a colorectal cancer resection. Of these, 62 (76%) underwent IHC testing (35 colon and 27 rectal). Of the 20 patients < 50 years of age not tested, 17 were rectal cancers and 16 of these (94%) received preoperative chemoradiation resulting in limited tissue availability. Within the < 50 age group, both MMR and specific MLH1 protein loss rates were highest in patients less than 30 years of age (25%). Interestingly, in a select group of patients ranging in age from 50-60 and those > 60, the MMR protein loss rates were 30% and 60%, respectively, with specific MLH1 loss in 15% and 53%, respectively.

**Conclusions:** This study demonstrates the feasibility of performing routine IHC for loss of MMR protein expression in colorectal cancer patients < 50 years of age. It appears that the rate of IHC detection of MMR and MLH1 protein expression loss is higher in the younger age groups.

## P147

	MMR Loss (%)	MLH1 Loss (%)
< 30	1/4 (25)	1/4 (25)
30-40	5/18 (28)	3/18 (17)
41-49	4/40 (10)	4/40 (10)

# Elevated CEA Prior to Complete Tumour Removal in Patients with Pseudomyxoma Peritonei Predicts a Significantly Increased Risk of Recurrence

(P148)

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**Purpose:** Pseudomyxoma peritonei (PMP) generally originates from rupture of an appendiceal mucinous tumour, and is generally now categorized as either low or high grade adenocarcinoma. Elevated tumour markers may indicate adverse tumour biology but do not preclude complete tumour removal. This study was undertaken to assess the potential value of preoperative CEA in identifying PMP patients at risk of recurrence and/or death from disease following complete cytoreductive surgery and intra-peritoneal chemotherapy.

**Methods:** Between March 1996 and August 2006, 159 patients underwent complete tumour removal and intraperitoneal chemotherapy. CEA, CA125 and CA19-9 tumour markers were measured pre-operatively. Follow-up included annual CT and measurement of tumour markers, and abnormality on CT or elevated markers was regarded as recurrence.

**Results:** The median age was 55 years (range 20-77). There were 108 (68%) females; three (2%) postoperative deaths; and 88 patients (55%) had elevated CEA. Pathological assessment of the resected specimens reported 133/159 (84%) low grade tumours and 26 high grade adenocarcinoma. Median follow up was 29 months (range: 1 – 130); 32/159 (20%) developed recurrence and 18 (11%) died from disease. The 5-year recurrence free interval in patients with elevated pre-operative CEA was 55%, compared with 76% in those with normal CEA ( $p=0.023$ ). Overall 5-year survival was 72% in patients with elevated CEA and 80% in those with normal CEA.

**Conclusions:** Elevated CEA predicts a significantly higher risk of developing recurrent disease, and probably an increased risk of death from disease although the latter is not statistically significant. An elevated pre-operative CEA is likely to indicate adverse tumour biology and might be an indication to consider post-operative treatment such as systemic chemotherapy.

# Microarray Definition of Chromosome 18 Minimal Regions of Deletion has Identified SMAD 7 and Cadherins as Possible Causative Genes in Colorectal Cancer

(P149)

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**Purpose:** Chromosome 18 has the highest frequency of deletion in colorectal cancer (CRC); it is the likely site of a

causative tumour suppressor gene inactivated by deletion in CRC carcinogenesis. Lower resolution techniques have not defined common regions of deletion small enough to identify the disease gene with certainty. The purpose of this study was to further refine the minimal common region of deletion that may contain the putative tumour suppressor gene.

**Methods:** A high-resolution technique, microarray comparative genomic hybridisation (CGH) was used, with complete "tiling path" coverage of chr. 18, able to identify smaller deletions than previous studies. Chromosome fluorescent in situ hybridisation (FISH) was used to confirm the presence of deletions.

**Results:** Microarray CGH analysis of 47 cell lines and 69 primary cancers, identified deletions in 81% of the cell lines and 55% of the primary cancers. Three minimal regions of deletion were identified, spanning 371kb to 3.5 Mb. Two of the minimal regions of deletion were common to 92% of all deletions in the cell lines and 79% of primary cancers. The other region was common to 92% of all deletions in the cell lines and 63% in the primary cancers. FISH confirmed the presence and location of these minimal deletions. The 3 minimal regions of deletion contained only 8 genes; including 3 strong candidate tumour suppressor genes. SMAD 7, part of the tumour growth factor cascade, a potent inhibitor of cell growth and important in colorectal carcinogenesis. CADHERIN 7 and 19, involved in intercellular adhesion, disturbance of which is a prerequisite for invasion and metastasis of tumour cells.

**Conclusions:** One of 3 chromosome 18 microdeletions have been detected in the majority of CRC samples using high resolution microarray and confirmed by FISH. Candidate gene analysis identifies SMAD 7 as a strong putative disease gene that may be key in tumorigenesis. This is particularly important given the recent publication reporting a genome-wide association study that identified polymorphisms within SMAD 7 that caused predisposition to CRC (Broderick et al. *Nature Genetics*; 39 (11) pages 1315-1317, Nov. 2007).

#### Loss of Smad4 Expression is Related to the Composition of Tumor-associated Stroma and Poor Prognosis in Node-Negative Colorectal Cancer

(P150)

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**Purpose:** Colorectal cancer has the highest rate of Smad4 mutation with the exception of pancreatic cancer. S100A8 and S100A9 are calcium-binding proteins which are expressed on the surface of neutrophils and monocytes and form complexes which are capable of inducing an inflammatory response. We have characterised the expression of stromal S100A8 and S100A9 in relation to Smad4 expression in pancreatic tumours and have now extended this work to colorectal cancer.

**Methods:** A colorectal cancer microarray was constructed using tissue from 314 colorectal adenocarcinomas resected between 1997 and 2000. Immunohistochemistry was performed using anti-S100A8, S100A9 and Smad4 antibodies on consecutive sections of the array. Arrays were scored by two independent observers, one of whom was a consultant pathologist. Smad4 was graded 0-3, a mean score of  $\leq 0.5$  denoted Smad4-negativity. S100A8 and S100A9 expression was scored by counting the number of positive stromal cells per field at 40 x magnification. Scores were correlated with clinicopathological parameters and overall survival data.

**Results:** Stromal S100A9-positive cells were more numerous than S100A8-positive cells in 284/308 (92%) tumours with median counts of 65 (IQR 27-126) versus 23 (IQR 6-70, ( $p < 0.0001$ , Wilcoxon Signed Rank). Loss of Smad4 expression was found in 42/304 (14%) of tumours and correlated with increasing T-stage, ( $p = 0.028$ ,  $\chi^2$ ), but not nodal invasion, ( $p = 0.433$ ,  $\chi^2$ ). Smad4-negative tumours had a worse 5-year survival in patients with stage I-III disease ( $n = 166$ ), 59% versus 28%,  $p = 0.008$ , but not stage III disease ( $n = 130$ ). Loss of Smad4 expression was associated with reduced S100A8-positive cell counts, 14 (IQR 5-37) versus 25 (IQR 6-76),  $p = 0.036$ , Mann-Whitney U. Poor 5-year survival was seen in Smad4-negative tumours with a dense ( $n = 7$ ) rather than sparse ( $n = 33$ ) S100A8-positive infiltrate, (0% versus 41%,  $p = 0.019$ ).

**Conclusions:** Loss of Smad4 expression in colorectal cancer is related to the composition of the surrounding stroma. Node-negative tumours which have lost Smad4 expression have a poorer prognosis; this may reflect a differential tumour response to stromal S100A8 and S100A9 expression.

#### Protein Expression Profiling of Post-operative Blood Sera from Colorectal Cancer Patients Reveals Potential Correlation with Dukes Stage

(P151)

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**Purpose:** Mass spectrometry-based protein expression profiling of colorectal cancer sera can provide diagnostic molecular signatures, characteristic of disease and may be predictive of disease progression. We are evaluating the changes in expression profiles in sera of colorectal cancer patients following surgery and whether this has any potential for monitoring response to treatment and prediction of disease recurrence.

**Methods:** Serum specimens from 11 cancer patients immediately prior to surgery and at 6 weeks following surgery were processed alongside 10 normal control sera by MALDI-ToF mass spectrometry. Spectral data was analysed by unsupervised hierarchical cluster (Spearman's Rank correlation) and by k-NN cross validation algorithms.

**Results:** Unsupervised hierarchical cluster analysis using a set of 20 markers, and predictive model using 'leave-one-



out' k-NN cross-validation clearly discriminated the pre-operative colorectal cancer sera from the control group. Four of the post-operative sera were from Dukes Stage A or B patients and were classified as normal. The remaining 7 that were from higher Dukes stages were classified as tumour.

**Conclusions:** These results illustrate the proof-of-concept of protein expression profiling of blood sera from individual cancer patients in monitoring response to treatment. Further validation with prospective data including follow-up on patient survival, could in the future be exploited to guide individualised treatment modalities.

#### The Accuracy of Pre-Operative Magnetic Resonance Imaging (MRI) and Positron Emission Tomography-CT (PET-CT) in the Restaging of Rectal Cancer after Neo-Adjuvant Chemoradiation

(P153)

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**Purpose:** Chemoradiation has been proposed as a definitive treatment modality for patients whose rectal tumors undergo a complete pathological response (pCR) following therapy. However, the absence of tumor must be identified. The aim of this study was to assess the accuracy of MRI and PET-CT in the restaging of rectal cancer.

**Methods:** Twenty patients (pts) with advanced primary rectal cancer undergoing neoadjuvant chemo radiotherapy [CRT] (50.4Gy in 28 fractions over 5.5 weeks with concomitant infusional 5-Fluorouracil) underwent pre-CRT staging PET-CT and pelvic MRI scans. Scans were repeated after completion of CRT prior to surgery. Median time from completion of CRT to PET-CT and MRI was 25 days (range 14-40 days). All MRI and PET-CT scans were reviewed by a consultant radiologist or nuclear medicine physician respectively, both blinded to the final pathological stage. Tumor stage, down staging, and metabolic response (progressive; stable; partial; complete) were recorded and compared with the final histopathological stage.

**Results:** The median pt age was 57 years (range 33-77). The pre-therapy MRI stage was T2 N1/2 3 pts, T3 N0 2 pts, T3 N1/2 11 pts, T4 N0 1 pts, and T4 N1/2 3 pts. The final histopathological stage was 3 pCR, 2 T2 N0, 2 T2 N1/2, 5 T3 N0, 7 T3 N1/2, 1 T4 N0. MRI restaging had a T stage accuracy of 50%, with overstaging in 30%, and understaging in 20%. The tumor was down-staged in 45% of pts and accuracy of MRI in assessing down staging was 55%. 2 of the 3 pts with pCR were identified as down staged but none identified as no tumor present. The metabolic response on PET-CT in downstaged patients was complete in 25% and partial in 20% and in patients with no downstaging was complete in 10%, partial in 40%, and stable in 5%. pCR corresponded with complete

metabolic response in 2 cases and partial metabolic response in 1 case.

**Conclusions:** The accuracy of MRI restaging of rectal cancer post neoadjuvant therapy is limited. Metabolic response on PET-CT does not correlate with histopathological downstaging. Neither staging modality accurately identifies complete pathological response.

#### MRI Following Downstaging Chemoradiotherapy in Rectal Cancer is Unreliable

(P154)

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**Purpose:** To determine the accuracy of MRI staging following CRT and its correlation with final pathological staging.

**Methods:** Data was derived from 49 patients prospectively assessed within a specialist coloproctology unit between 1998-2006 who received neo-adjuvant chemoradiotherapy for locally advanced rectal cancer. All patients were radiologically staged with thin-slice dynamic MRI before and after long course chemoradiotherapy prior to discussion at a multidisciplinary oncology meeting.

**Results:** A total of 49 patients (34 male, 15 female) with median age 68 years (60-74) were analysed. Median time from completion of CRT to MRI was 32 days (16-37). Pre-treatment, four patients had stage II disease, 41 patients had stage III disease and 4 patients had stage IV disease. The overall accuracy of MRI staging Post CRT was 43% (21/49) with over-staging and under-staging in 43% (21/49) and 14% (7/49) respectively. There was little correlation between MRI stage and pathological assessment for UICC stage ( $\kappa=0.255$ ) and T-stage ( $\kappa=0.112$ ). Nodal assessment with MRI demonstrated an accuracy of 71% (35/49), with a sensitivity of 82% (9/11) and specificity of 68% (26/38). The positive predictive value for nodal disease was 43% (9/21) and negative predictive value of 93% (26/28). A significant difference was seen in node positivity between MRI and pathological staging ( $p=0.005$ , Fisher's Exact Test). Of 5 patients (10%) who achieved complete pathological response (ypT0) only two were identified on MRI making management of this subgroup unreliable using MRI alone. which were staged by MRI pre-CRT as stage I(1), II(3) and III(1) disease and post CRT as Stage 0(1), I(1), II(2) and III(1) disease.

**Conclusions:** The staging of rectal cancer with MRI following chemo-radiation is poor. Over-staging of disease occurs three times more often than under-staging - mostly due to the poor positive predictive value of nodal assessment. A complete radiological response with MRI does not predict for complete pathological response. These results suggest that post CRT MRI is fundamentally inaccurate and should not be used as the single predictor of tumour response.

# Comparing Distances Obtained at Virtual and Optical Colonoscopy: How to Interpret the Differences in Measurements of Cecal Length and Polyp Distance

(P155)

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**Purpose:** Virtual colonography (VC) has emerged as a promising and increasingly accepted strategy for colorectal cancer screening. As VC becomes more widespread, endoscopists will be referred patients for optical colonoscopy (OC) based on lesions identified at VC. The purpose of this study was to determine what the discrepancy is between VC and OC measurements for both cecal length and distance to polyps and to determine if a conversion factor could be generated that would equate these VC and OC distances.

**Methods:** An IRB-approved retrospective review was performed of VC and OC reports from patients who had undergone first VC followed by blinded OC. The anus-to-cecum (ATC) measurement recorded by the radiologist at VC was compared to the cecal insertion length as measured by the endoscopist for each patient. Likewise, anus-to-polyp (ATP) distances were compared as measured by the radiologist and endoscopist. The VC and OC measurements for ATC and ATP distances were then compared.

**Results:** A total of 338 patient records were identified with paired, complete data from both VC and same-day OC. The majority of the patients were male (M:F 1.8:1) with an average age of 58 years (range 41-75). A total of 437 "matched" polyps with correlating VC and OC findings were also identified. Average ATC distance measured at VC was 189 cm (range 75-257, median 200). Average ATC distance measured at OC was 108 cm (range 65-150, median 100). For each individual patient, the VC ATC distance was always greater and an average of 81 cm more than, or 1.8X, that at OC. For polyps proximal to the splenic flexure (n=145), the VC ATP measurement was on average 1.7X that measured at OC. For left-sided polyps (n=292), the VC measurement was on average within 13 cm or 1.3X that of the OC ATP measurement.

**Conclusions:** With increasing use of VC for colorectal cancer screening, endoscopists need to be familiar with how the examination is performed and how results are reported. Based on our data, ATC and ATP distances are disparate but comparable using a conversion factor of 0.57 for the VC ATC measurement and 0.59 for right-sided VC ATP or 0.78 for left-sided VC ATP measurements.

# 18F-FDG PET for Predicting Tumor Response to Neoadjuvant Chemoradiation Therapy in Rectal Cancer

(P156)

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**Purpose:** Prediction of tumor response after neoadjuvant chemoradiation therapy (CRT) in rectal cancer is important and remains difficult. 18F-FDG PET has emerged as a valid method for predicting tumor response. This study aimed to evaluate the efficacy of 18F-FDG PET in predicting the response of locally advanced rectal cancer to neoadjuvant CRT.

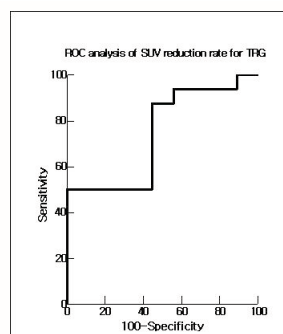
**Methods:** 25 patients with locally advanced rectal cancer was prospectively enrolled between July 2006 and June 2007. Neoadjuvant chemoradiation therapy was performed in all patients, and 5-6 weeks later, surgery was done with curative intent. All patients underwent 18F-FDG PET before and 4 weeks after neoadjuvant CRT. Pretreatment stage and final pathological stage was evaluated. Initial SUV (standardized uptake value), SUV after CRT, SUV difference between initial and post CRT ( $\Delta$ SUV) and SUV reduction rate ( $\Delta$ SUV%) were correlated with histopathologic staging (pTNM) and tumor regression grade (TRG) according to Mandard's criteria (patients with TRG1-2 being defined as responders and patients with TRG3-5 as non-responder).

**Results:** The mean initial SUV was 12.1, significantly higher than the mean value of 3.9 post CRT ( $P < 0.001$ ). Tumor and lymph node down staging were not correlated with initial SUV, SUV after CRT,  $\Delta$ SUV, and  $\Delta$ SUV% but, TRG was correlated with SUV after CRT and SUV reduction rate. 16 patients (64%) were classified as responders (10 TRG1 and 6 TRG2), while 9 patients (36%) were non responders (4 TRG3 and 5 TRG4). The mean SUV after CRT was significantly lower in responders than in non-responders (3.1 vs. 5.5,  $P = 0.002$ ). The mean  $\Delta$ SUV% was significantly higher in responders than in non-responders (69.2% vs. 58.9%,  $P = 0.049$ ). With a 4.1 cut-off value of SUV after CRT, 81.3% sensitivity, 77.8% specificity, and 80% overall accuracy was obtained ( $AUC = 0.87$ ,  $P = 0.003$ ). For the  $\Delta$ SUV%, 87.5% sensitivity, 55.6% specificity, and 76% overall accuracy was resulted with a 58% as the cut-off value ( $AUC = 0.74$ ,  $P = 0.048$ ).

**Conclusions:** 18F-FDG PET is potentially useful as a method for predicting tumor response after neoadjuvant CRT in locally advanced rectal cancer. SUV after CRT and  $\Delta$ SUV% seem the best predictors of CRT response, especially in TRG.

**P154 Pre and Post CRT MRI Staging and Final Pathological Stage**

	Stage 0	Stage I	Stage II	Stage III	Stage IV
Pre CRT MRI	0	0	4	41	4
Post CRT MRI	2	9	14	17	7
Pathology	5	9	22	7	6



ROC analysis of SUV reduction rate for TRG

### The Local Impact of MRI, MDT and Surgical Sub-specialization on the CRM in Rectal Cancer Over 10 Years (P157)

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**Purpose:** Recent developments in rectal cancer have produced lower local recurrence rates and improved survival. We assessed the relationship between the involved circumferential resection margin (CRM) rate and abdomino-perineal excision (APE)/ anterior resection (AR) ratio with pre-operative pelvic MRI scan, multidisciplinary team (MDT) meetings and surgical sub-specialisation.

**Methods:** A retrospective study of the Royal Devon & Exeter Hospital Colorectal database between January 1998 - August 2007.

**Results:** 625/763 (82%) patients with rectal cancer underwent elective surgery. CRM involvement was a mean of 15% (range 12-17%) between 1998 - 2003. This dropped to a mean of 7% (range 6-8%) between 2004 - 2005. In the last two years this decreased to a mean of 1.5% (range 0-3%). The APE/ Total (APE+AR) ratio was a mean of 0.4 (range 0.2-0.5), 0.5 (range 0.4-0.5) and 0.3 (range 0.2-0.4) for the same periods.

**Conclusions:** Surgical sub-specialisation halved CRM involvement, before the introduction of pre-operative MRI and MDT. With these measures the rate again declined rapidly. The APE/AR ratio is also decreasing year on year since rectal cancer patients are operated on by specialist surgeons. The impact of pre-operative MRI and MDT meetings adds to the effect seen with surgical specialisation.

### Perfusion Effects in Diffusion-Weighted Magnetic Resonance Imaging of Rectal Cancer (P158)

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**Purpose:** Current assessment of rectal tumors are

focused on anatomic and histological analysis. No reliable method exists to study physiologic parameters even though the perfusion of tumors may influence growth patterns and treatment response. The aim of this study was to assess if perfusion effects are detectable in diffusion weighted magnetic resonance imaging (DW-MRI) of rectal cancers.

**Methods:** Rectal MRI was performed at 3Tesla with a phased array surface coil in 14 patients with newly diagnosed rectal cancer. An echo planar DW-MRI sequence was performed at 3 (n=9) or 4 (n=5) different b-values. From signal intensity measurements in the tumors at the different b-values, the apparent diffusion coefficient (ADC), true diffusion (D) and the perfusion fraction (f) were calculated.

**Results:** The mean (10-3 mm<sup>2</sup>/s) and standard deviation for ADC, D and f were 1.17±0.17, 0.86±0.16, and 0.26±0.10, respectively. There was an excellent linear correlation between the natural logarithm of signal intensity in the rectal tumors versus the b-values, for b-values ≥200 s/mm<sup>2</sup>. The mean, standard error, and 95% confidence interval for the Pearson correlation coefficient in this range was -0.995±0.292, (-0.996, -0.973) respectively. For comparison, no perfusion effects were detected in three ovarian cysts.

**Conclusions:** Microperfusion in rectal tumors can be quantified in vivo. Further studies are needed to evaluate the feasibility of using microperfusion as a prognostic factor before treatment or as surrogate marker of treatment effect.

### Impact of MRI Assessment of Nodal Involvement in Patients with Rectal Cancer on Use of Preoperative Radiotherapy (P159)

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**Purpose:** The use of preoperative radiotherapy has been promoted by recent multi-centre study data (UK, MRC-CR07 trial). Accurate assessment of lymph node involvement is essential for planning the optimal treatment including preoperative radiotherapy. The aim of this study was to determine the correlation between the perceived pre-operative MRI nodal stage with the histopathological stage.

**Methods:** The preoperative MRI report of 100 consecutive patients with biopsy proven rectal cancer was assessed retrospectively. The MRI nodal stage for (71) patients was compared with the postoperative histopathological stage. Patients receiving neoadjuvant therapy (29) were excluded.

**Results:** The median patient age was 74 (IQR 41 to 93) years and Male : Female: 2:1. 25/71 patients had lymph nodes metastasis; MRI correctly identified 22 patients, yielding a sensitivity of 88%. Of 46 patients with negative lymph nodes, MRI correctly identified 33 patients, yielding a specificity of 72%. 28% of patients were over staged and 12% were under staged.

**Conclusions:** The use of MRI in this study to lymph

node involvement results in significant over staging. This may potentially lead to overuse of preoperative radiotherapy. There is a need for additional methods to improve the accuracy of preoperative staging.

#### A Post-operative Study of Bowel Function, QOL, and Effectiveness of Probiotics in Patients with Colorectal Cancer

(P160)

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**Purpose:** Probiotics can improve the balance of microbacterial flora in the bowel and is effective in irritable bowel syndrome. We investigated the bowel functions and health-related QOL of patients who underwent surgery for colorectal cancer and reviewed the effectiveness of probiotics.

**Methods:** During 2002-2006, questionnaires were mailed to 201 of 476 colorectal cancer patients. Patients with Stage 4, recurrence and severe complications were excluded. The questionnaires included the SF36 and EORTC QLQ-C30, Wexner score, and an original questionnaire. Probiotics (The Guard, Kowa Co., Ltd., Japan) containing *Bacillus natto* and *Lactobacillus acidophilus* were given to 80 applicants for 3 months and then they completed the same questionnaire again.

**Results:** The questionnaire was collected from 134 of 201 patients, 84 with colonic cancer and 50 with rectal cancer. Colonic cases were divided into 2 groups: 36 cases of right sided colectomy with ileocecal valve resection (right group) and 48 with left sided colectomy (left group). Although the ratio of elderly patients in the right group was higher, there was no difference in sex ratio, cancer stage, and the postoperative period between groups. In the rectal group, fecal frequency, inadequate defecation, anal pain, and Wexner score were worse than for those in the colonic group. In the right group, fecal form was looser and fecal frequency at night was higher than in the left group. Physical function, Role function in SF36, and Role function in QLQ-C30 of the right group were deteriorated compared with the left group. Effectiveness of Probiotics: 63 of 80 patients taking Probiotics answered the questionnaire (18 in right group, 23 in left group, 22 in rectal group). 40 of 63 patients had improvement of bowel function. Fecal frequency, laxative usage, and patient satisfaction were statistically improved.

Role function in the SF36 and Global QOL, nausea/vomiting, constipation, and diarrhea in QLQ-C30 were also improved after taking Probiotics.

**Conclusions:** Not only rectal resection, but also right sided colectomy affected bowel function. Probiotics appeared to be a positive effect on improving bowel function and QOL after colorectal resection.

#### A Qualitative Analysis of a Focus Group Discussion on Patient Decision Making in Cancer Care

(P161)

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**Purpose:** Patient preferences should play an important role when decision making in cancer care. Literature is increasingly demonstrating that surgeons and physicians have divergent preferences for treatment options compared with their patients and with each other. Cancer psychology is an important aspect of cancer care. Qualitative research is a gateway to explore this. We aim to explore opinions and thoughts among surgical colleagues about "patient decision making in cancer care".

**Methods:** A pilot focus group discussion among members of the academic surgical unit involving 4 consultants, 3 registrars and 3 research fellows. The discussion was audiotaped and transcribed. Qualitative methodology was adopted for analysis. Thematic analysis using framework approach was done thereby identifying Themes & Outcomes.

**Results:** Themes that emerged are Evidence based clinical practice, Knowledge, Decision making, Patient Information, Risk, Communication, Consent, Socioeconomic factors and Patient empowerment. Outcomes derived are to increase the evidence base, Increase the clinician and patient knowledge, provide adequate information, Decisions to be based on patients best interest, Communicate risk in a understandable manner, Take patients views, knowledge and demands into consideration.

**Conclusions:** Patient decision making in cancer care is slowly evolving, where decisions are not only made taking into account patients views, knowledge and demand but are also driven by them in a minority. Time is a factor and in years to come the patients will play an increased role in their treatments taking into account tradeoffs and risks between survival and quality of life.

**P159 Table: Accuracy of MRI in detection of lymph node involvement.**

		Histopathological staging of lymph node (No. of patients = 71)		
		N -	N+	Total
MRI staging of lymph nodes (No. of patients = 71)	N -	33	3	36
	N+	13	22	35
	Total	46	25	71



### Disparities in Diagnosis and Treatment of Colon and Rectal Cancers in Patients from Rural versus Urban Environments

(P162)

K. Hardiman, B. Diggs, M. Douthit, B. Sheppard, D. Herzig. . . . . Portland, OR

**Purpose:** We hypothesized that there would be differences in the diagnosis and treatment of colorectal cancer patients from urban versus rural environments.

**Methods:** We queried the Oregon State Cancer Registry, a prospective state registry capturing demographics, stage, and initial therapy for colon and rectal cancers from 1998 through 2004. We compared and analyzed data for patients from urban and rural settings. Categorical variables were compared with chi-squared, continuous variables with t-test or Mann-Whitney U, as appropriate, and logistic regression modeling was used to assess which variables were independent predictors of receiving specific therapies.

**Results:** More males than females were diagnosed with colon ( $P<0.001$ ) and rectal ( $P<0.05$ ) cancers from rural environments. Patients from rural environments were diagnosed with rectal cancers at a significantly older age (67 vs. 69,  $P<0.001$ ). There was no difference in stage at diagnosis for colon or rectal cancers; however, rural patients were diagnosed with significantly more distal tumors than urban patients (52% vs. 47%,  $P<0.001$ ). For rectal cancer, surgical treatment and the use of chemotherapy were not different between groups, but radiation therapy was given significantly less to patients from rural areas with locally advanced rectal cancer (78% vs. 63%,  $P<0.01$ ). Logistic regression analysis showed that young age and urban environment were significant predictors of receiving radiation for locally advanced rectal cancer. With respect to current "quality indicators" for colon cancer, use of chemotherapy for stage 3 colon cancer was lower than target guidelines in both groups (58% of urban vs. 54% of rural,  $P=0.10$ ), and the median number of nodes evaluated was lower than guidelines in both groups, but significantly higher in urban patients (11 vs. 10;  $P<0.001$ ).

**Conclusions:** Colorectal cancer patients from urban environments are more likely to be female, have proximal tumors, have more lymph nodes evaluated and have radiation treatment for locally advanced rectal cancer. Opportunities for improvement in quality indicators, however, exist in both populations.

### Testing the Validity of Colorectal Cancer Quality of Life Instruments from the Patients' Perspective

(P163)

T. Wilson, D. Alexander . . . . . York, United Kingdom

**Purpose:** Health related quality of life (HrQoL) should be measured from the patient's perspective, but the construct validity of HrQoL instruments is usually judged

against clinical parameters deemed to be important by health professionals. The aim of this study was to evaluate the construct validity of two colorectal cancer specific HrQoL instruments, FACT and EORTC, from the patients' perspective.

**Methods:** The construct validity of FACT and EORTC was assessed using six "known groups" hypotheses. To ensure these reflected the patient perspective, the hypotheses were developed using the results of a qualitative study to evaluate the HrQoL experiences of colorectal cancer patients. Two hypotheses were designed to evaluate the functional scales, two to evaluate the emotional scales and two to evaluate sensitivity (changes over time). To test these hypotheses, prospective HrQoL data was collected using the two instruments at discharge from hospital, at 6 weeks and at 6 months in a cohort of 210 colorectal cancer patients who underwent potentially curative surgery.

**Results:** The Role and Physical scores from FACT and EORTC and the Social scores from EORTC identified significant and expected differences in known patient groups based on the presence of a stoma and on degree of bowel control (moderate to large effect size (ES) 0.69 to 1.59). The emotional scores from both instruments identified significant expected differences in groups based on concern for the future (large ES 1.42 to 1.68). The FACT Emotional score, but not the EORTC Emotional score identified a significant differences between groups based on stage of disease (moderate ES 0.67). In tests of sensitivity based on evaluating differences over time in groups based on adjuvant chemotherapy and change in health status, the scales from both instruments performed similarly. The FACT Social scale did not identify significant differences in any of the six tests.

**Conclusions:** In tests of construct validity based on patient the patients' perspective the majority of scales from FACT and EORTC performed satisfactorily. However, no evidence was found to support the validity of the FACT Social scale.

### Is the Patients' Experience of Colorectal Cancer Really Captured by Quality of Life Instruments?

(P164)

T. Wilson, D. Alexander . . . . . York, United Kingdom

**Purpose:** Health-related-quality-of-life (HrQoL) instruments in colorectal cancer (CRC) were designed for research and may not be transferable to clinical practice. The aim of this study was to determine which areas of HrQoL are important to patients with CRC and to establish whether these areas are represented by validated questionnaires.

**Methods:** Open-ended interviews were conducted on a purposive sample of 20 patients who were undergoing treatment or follow up for potentially curable CRC. The areas of HrQoL that were important to the patients were extracted

from the interview data using a qualitative thematic framework analysis. These important areas were then compared to the item content of two CRC specific HrQoL questionnaires, FACT and EORTC.

**Results:** From the interviews, nine determinants of HrQoL were found to be of particular relevance to patients. These comprised control, normality, physical challenges, uncertainty, emotional support, self-image, emotional challenges, coping and information. Questions from both instruments provided information for some of the areas deemed important by patients. However, only three of the scales in EORTC and none from FACT produced scores from which clinicians could identify problems in these areas.

**Conclusions:** Validated instruments used in CRC provide little information on many areas of HrQoL that are deemed important by patients.

#### Is Preoperative Stoma Counseling Effective?

(P165)

T. Wilson, D. Alexander . . . . . York, United Kingdom

**Purpose:** Preoperative counseling is routinely used in all our rectal cancer patients to limit any adverse influence on health related quality of life (HrQoL) should a stoma (temporary or permanent) be required. The aim of this study was to assess the role of this current strategy by examining post-operative HrQoL outcomes of our stoma patients in comparison to our non-stoma patients.

**Methods:** A single centre prospective observational study examined HrQoL after elective rectal cancer surgery in patients who underwent counseling for a potential stoma prior to surgery. Two colorectal cancer specific and two generic instruments (EORTC QLQ-C30/CR38, FACT-C, SF12 and EQ-5D) were administered at one week and six weeks post surgery. Five global, 17 functional and 15 symptom HrQoL scores were generated for comparison. Multifactorial analysis was used to control for patient, cancer and treatment related variables that could potentially confound these scores.

**Results:** A series of 101 patients were studied, of whom 74 (73%) required a stoma. The stomas were permanent in 21 patients (28%). At one week, patients with stomas reported significantly worse scores in self evaluated health status, emotional function and body image ( $P < 0.03$ ,  $P < 0.03$ ,  $P = 0.005$ ). By six weeks stoma patients were additionally reporting worse scores for social and role functioning ( $P < 0.01$ ,  $P < 0.01$ ). After three months, significant differences between the groups remained only in body image scores.

**Conclusions:** Despite preoperative counseling, stoma formation has a profound impact on early postoperative HrQoL. Consideration should be given to further examination and revision of the current counseling strategy to help patients adjust to life with a stoma.

#### Colorectal Cancer in Durban, South Africa: An Epidemiological Study in the Different Population Groups

(P166)

T. Madiba, P. Ramdial, V. Sewram. . Durban, South Africa

**Purpose:** Colorectal cancer is the 3rd most common cancer in the world, accounting for 15% of cancer related deaths. This study was undertaken to establish the clinico-pathological pattern of colorectal cancer among the different population groups in the Durban Functional Region of South Africa.

**Methods:** This is a prospective epidemiological study of colorectal cancer among patients of the four main population groups treated in the Durban Metropolitan Teaching Hospitals, which commenced in 1998. Data extracted included demographics, clinical presentation, site of lesion, staging and grading of carcinoma, outcome of surgery and follow-up.

**Results:** There were a total of 685 patients (233 Africans, 319 Indians, 20 Coloured and 113 Whites) with a Male: Female ratio of 1:1 in the entire group and in the individual population groups. Mean age was 57 years (50, 59, 61 and 65 for Africans, Indians, Coloured and Whites respectively; Africans vs other population groups,  $p < 0.0001$ ). Proportion of patients  $< 40$  years of age was 17% (31%, 10%, 0%, and 7% for African, Indians, Coloured and Whites respectively). Both site distribution and tumour staging were similar in all population groups; young and old presenters had similar site distribution and tumour staging. Mucin secreting cancer occurred in 13% (9%, 17%, 10%, 11% in Africans, Indians, Coloureds and Whites respectively) and in 8% and 14% in younger and older presenters respectively. 460 patients underwent resection (67%). Of the 225 (33%) that did not, 7 refused surgery, 13 were irresectable at trial of surgery, 2 were unfit for surgery and the rest had irresectable tumours on clinical assessment. 29 of 225 patients with irresectable lesions attended oncology (13%) compared to 234 of 460 with resectable lesions (51%).

**Conclusions:** Colorectal cancer is an established disease that presents earlier among Africans and primarily amongst those  $< 40$  years. The site distribution, disease stage and tumour differentiation were found to be similar to that observed internationally. Site distribution and staging was similar in young and old presenters.

#### What is the Impact of Changes in the Management of Patients with Colorectal Cancer? A 20-Year Prospective Audit

(P167)

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. . . . . Guildford, United Kingdom

**Purpose:** Two consecutive 10 year periods of surgery by one colorectal surgeon were compared to see if changes in

practice, particularly in the use of adjuvant therapy, had affected outcomes in terms of recurrence and survival

**Methods:** A prospective database of patients operated on between May 1980 to May 1990 (Group 1) and June 1990 to December 1999 (Group 2) was analysed. A curative operation was defined as complete tumour resection, confirmed on histopathology. Surgical technique and pathological examination using a lymph node clearance process were the same for both periods. A large number of patients were entered into trials of radiotherapy in the first period and chemotherapy in the second period. A number of patients in both groups had local excision of tumours with no lymph node staging and therefore no Dukes' stage.

**Results:** A total of 1205 patients, 519 in Group 1 and 686 in Group 2, were followed up for a minimum of 7 years. Average age, proportion of those over 75, rates of curative resection and cancer recurrence and time to recurrence were similar between the two groups. The two groups were not comparable in terms of pre-operative imaging which changed from ultrasound and chest x-ray to CT chest/abdomen/pelvis. Many more patients had adjuvant therapy in the latter group. Patients in group 1 who received adjuvant therapy had poorer outcomes than those who did not. Patients with Dukes C cancers in group 2 had some improvement in survival with adjuvant therapy. Overall survival of patients with Dukes B and C cancers did not improve significantly over the period

**Conclusions:** There is a trend towards improvement in cancer-related survival between the two groups. However, even in a large group of patients with a minimum of seven years follow up, the number of recurrences and adjuvant interventions is small and sub-group analysis may be statistically underpowered. We have not been able to show a significant improvement in time to recurrence or survival following adjuvant therapy. This may indicate selection bias of patients with poor prognosis tumours or ineffectiveness of adjuvant therapy. We conclude that surgery is still the mainstay of treatment for colorectal cancer.

### Surgical and Functional Outcomes of Ileal J-Pouch Rectal Anastomosis Following Total Colectomy

(P168)

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**Purpose:** To assess the surgical and functional outcomes of performing an ileal J-pouch rectal anastomosis to the upper or mid-rectum following total colectomy.

**Methods:** Twenty consecutive patients operated on by a single surgeon were contacted for a phone interview with a standard questionnaire following review of their clinical records at least 6 months after their operation. These patients had a total colectomy with or without a partial proctectomy. A standardised 8 cm ileal J-pouch was anastomosed with a double stapled technique onto the residual rectal stump.

**Results:** Mean follow-up was 18 months. Mean age of patients was 63.5 years (SD 17.8). Operative indications were colorectal carcinoma (6 acutely obstructed rectosigmoid or sigmoid tumours, 9 elective resections), familial adenomatous polyposis syndrome (1), multiple polyps (1) and others (3). Covering loop ileostomy was used in 1 case. There was no mortality peri-operatively and 1 major post operative complication (anastomotic leak). Mean daytime stool frequency was 3.1 (SD 1.1) and night time frequency was 0.2 (SD 0.4). Only 3 patients reported nocturnal bowel motions. No patients reported incontinence but 1 patient described mucous leakage. Urgency was reported by 38.5%. 54% of patients reported modifications to their diet. Stool consistency was reported as semisolid or solid by 77%. 40% of patients required antidiarrhoeal medication (loperamide) averaging 4mg/day. No patients had symptoms related to poor emptying of the pouch.

**Conclusions:** Total colectomy with ileal J-pouch rectal anastomosis is safe and a good alternative to conventional ileorectal anastomosis (IRA). The need for a covering stoma is not routine and this would certainly be an advantage to the patients. The functional outcome in our series appears to be better than published results for conventional IRA. This may be explained by the increased reservoir capacity of the pouch.

**P167 Five year survival , Group1= 1980 -1990, Group 2= 1990 -1999**

	GROUP 1		GROUP 2	
	No.	5 year survival (%)	No.	5 year survival (%)
Total patients	519	60.29	686	69.04
Dukes' stage for those undergoing resection with curative intent				
A	70	93.22	79	95.60
B	175	83.33	247	90.06
C	132	60.25	191	64.39
Total	385	78.93	537	83.35
Survival after adjuvant therapy				
Dukes' B + adjuvant therapy	23	54.02	56	86.43
Dukes' B no therapy	152	88.17	191	91.43
Dukes' C + adjuvant therapy	23	50.00	93	68.72
Dukes' C no therapy	109	62.62	98	58.91

**Anal Incontinence before Anterior Resection**

(P169)

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..... Southampton, United Kingdom

**Purpose:** A persistent change in bowel habit to looser stool or increased frequency of defaecation is a recognised symptom associated with a higher risk of colorectal cancer in patients older than 60 years (UK Department of Health criteria). This study investigates why some patients may complain of anal incontinence as a manifestation of their change in bowel habit.

**Methods:** The preoperative rectal function of 47 patients awaiting anterior resection for pathology within 30cm of the anal verge was investigated with anorectal manometry including mean resting pressure (MRP) and mean squeeze pressure (MSP), Cleveland Clinic Incontinence Score (CCI) and quality of life assessment (EORTC QLQ C30 & CR29). The CCI measures incontinence on a scale of 0 to 20, where zero is perfect continence (CCI=0). The global health(GH) score is a combined score from the EORTC QLQ C30 questionnaire, expressed as a scale from 0 to 100 where 100 is excellent health and quality of life over the previous week. The EORTC QLQ C30 questionnaire includes single item symptom measures, such as diarrhoea, that range in score from 0 to 100. A high score represents a high level of symptoms.

**Results:** The average GH was 76.7. Patients with perfect anal continence (n=26), as measured by CCI=0, had a GH score of 81 whereas those with some degree of incontinence (n=21) had a GH score of 71 (P=0.090). Diarrhoea was a symptom in 22(47%) patients. Patients with CCI=0 had lower symptom scores for diarrhoea compared to those with some incontinence. The average scores were 14 and 35 (P=0.025). Mean squeeze pressure (MSP) was 90.2mmHg in the CCI=0 group and 64.5mmHg in the CCI>0 group (See Table 1). This difference did not reach statistical significance (P=0.057) but there was a significant difference in MSP in a subgroup (n=7) with severe incontinence (CCI>9) compared to those with perfect anal continence (CCI=0). The values were 90.2mmHg and 45.6mmHg respectively (P=0.004).

**Conclusions:** Patients who have pathology within 30cm of the anal verge frequently describe diarrhoea symptoms. Those patients who also have a weak external anal sphincter and reduced MSP are more likely to experience anal incontinence. A diagnosis of colorectal cancer must be excluded in patients who complain of anal incontinence.

**Functional Outcome following Treatment of Distal Rectal Cancer: Local Excision vs. Restorative Proctectomy with Coloanal Anastomosis**

(P170)

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**Purpose:** To compare functional results in patients with distal rectal adenocarcinoma undergoing neoadjuvant radiotherapy, restorative proctectomy and coloanal anastomosis (CAA) with those undergoing local excision and adjuvant radiotherapy (LE).

**Methods:** Assessment of functional results was made at least 6 months following completion of therapy using the Cleveland Clinic Incontinence Score (CCIS) and the Fecal Incontinence Quality of Life Instrument (FIQL). Prestudy power calculation indicated that 10 patients per group would be necessary to detect a difference of 5 on the CCIS with alpha of 0.1 and 85% power. Comparison of outcome variables was made by Student's t-test and Fischer's exact test, where appropriate.

**Results:** LE patients were older than CAA patients (68  $\pm$  8 vs. 57  $\pm$  7 years, p=0.005) and were more likely to be male (9/10 vs. 3/10, p=0.02). There were no differences between the LE and CAA groups with regard to radiation dose (4252  $\pm$  1210 vs. 4995  $\pm$  371 cGy, p=0.26) and time from tumor resection to questionnaire completion (35  $\pm$  17 vs. 50  $\pm$  20 months, p=0.10). Among the CAA patients, 9 underwent neorectum creation (J pouch n=7; coloplasty n=2) and 1 underwent straight anastomosis. Handsewn coloanal anastomosis was performed in 1/7 J pouch patients, 2/2 coloplasty patients and 1/1 straight anastomosis patients. The remainder underwent stapled anastomosis at the pelvic floor. There were no differences in the CCIS between the LE and CAA groups (mean scores 6.6  $\pm$  3.1 vs. 6.5  $\pm$  3.0, p=0.94). There were also no differences in FIQL scores between the groups [mean scores (LE vs. CAA): Lifestyle 3.5 vs. 3.6; p=0.62; Coping/Behavior 2.8 vs. 3.1; p=0.26; Depression/Self-Perception 3.8 vs. 3.5; p=0.24; Embarrassment 3.4 vs. 2.9; p=0.17].

**Conclusions:** Our data suggest that functional results following local excision and radiotherapy are not substantially different from those following restorative proctectomy with coloanal anastomosis and neoadjuvant radiotherapy. Larger studies will be necessary to confirm these results.

**P169 Table 1: Anal continence prior to anterior resection**

	Perfect continence CCI=0	Incontinence CCI>0	P value
Number of patients (n=47)	26	21	
Global Health Score (GH)	81	71	0.090
Average diarrhoea score	14	35	0.025
MRP mmHg	42.5	43.9	0.758
MSP mmHg	90.2	64.5	0.057



### External Validation of the ACPGBI Mortality Risk Stratification Model

(P171)

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**Purpose:** Risk stratification allows meaningful comparison of treatment outcomes of different patient populations. The ACPGBI model of post operative 30 day mortality risk prediction has been internally validated in the United Kingdom, but not elsewhere. It is not clear whether this model is predictive in other patient populations.

**Methods:** Data was collected over 2 years from 3 major teaching hospitals, including both private and public patients. The series included 481 consecutive patients under the care of 4 surgeons. Inclusion criteria included all patients undergoing laparotomy for treatment of large bowel adenocarcinoma. Observed 30 day mortality was compared with that predicted by the model. Model discrimination and calibration were assessed.

**Results:** Observed 30 day mortality (1.1%) was less than predicted (7.5%)  $P < 0.0005$ . There was no significant difference between individual hospital outcomes. The current cohort was right skewed compared with the ACPGBI series. The adjusted Hosmer Lemeshow C-statistic and area under the ROC curve for the patient population were however 0.944 and 88.51%, indicating acceptable model calibration and discrimination in this series.

**Conclusions:** The ACPGBI model significantly overpredicted mortality in the current cohort, and its use for operative risk prediction and outcome comparison in Australia is questionable. While calibration and discrimination of the model were acceptable, the rate of adverse events in this series was low, reducing the capacity to reject the model despite the difference between observed and predicted mortality. An extended series is required to either recalibrate the UK model or create and validate a risk model under Australian conditions.

### The Prevalence of Sphincter Preservation for Rectal Cancer in England and Wales: A Population-Based Study

(P172)

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 . . . . . Whitechapel, London, United Kingdom

**Purpose:** Over the past decade specialist colorectal units have reported that sphincter saving resection (SSR) may be appropriate for 70–90% of patients with rectal cancer. However, this has been challenged by a study which suggests the true incidence of SSR out with specialist centers in the United States is as low as 50%. Therefore, the aim of this population based study was to determine the current prevalence of sphincter preservation for rectal cancer in England and Wales.

**Methods:** Data were collected from the British Department of Health HES database, which records all healthcare episodes occurring at National Health Service (NHS) hospitals in England and Wales. ICD-10 diagnostic and procedure codes were used to determine the demographic data of patients admitted between April 2002 and April 2005 for rectal cancer resection. The primary outcome measure was defined as the proportion of patients undergoing rectal cancer resection who avoided permanent stoma construction, with the effect of variables such as age and sex on stoma avoidance identified as secondary outcomes.

**Results:** A total of 32,679 patients were admitted to NHS hospitals for rectal cancer resection, with a mean age of 66.5 years and a male: female ratio of 1.4:1. Throughout the study period the incidence of hospital admissions remained constant. SSR was performed in 26,210 patients (80.2%) while 6,469 (19.8%) underwent rectal excision and permanent stoma formation. The likelihood of undergoing SSR was lower in male (78.8%) when compared with female patients (82.1%) ( $p = 0.0086$ ). However, increasing age did not appear to affect SSR rates.

**Conclusions:** These data suggest that the prevalence of SSR across England and Wales for patients with rectal cancer is comparable with rates reported by specialist colorectal units. While age was not demonstrated to be a determinant of permanent stoma construction, a significant difference in SSR rates between male and female patients was identified. It is presumed that the higher rates of permanent stoma construction in men are due to the limited access afforded by the smaller male pelvis, and the deleterious effects of anterior encroaching tumors. However, this will require further investigation.

### Current Practice in Bowel Preparation for Colorectal Surgery: A National Survey of the Members of the Association of Coloproctology of GB & Ireland

(P173)

R. Drummond, R. McKenna, D. Wright. Glasgow, United Kingdom

**Purpose:** Several recent meta-analyses and RCTs have compared outcomes following different forms of mechanical bowel preparation. These have suggested that bowel preparation provides no benefit and may in fact have a detrimental effect on patient outcome. Despite this, current practice throughout the UK appears to vary greatly. The aim of this study was to assess trends in preparation for elective colorectal surgery, both open and laparoscopic, in the UK.

**Methods:** Three hundred and ninety-eight consultant members of The Association of Coloproctology of GB & Ireland (ACPGBI) were invited via e-mail on 2 occasions to complete an anonymous online survey in order to ascertain current practices of bowel preparation. The questionnaire also asked about their attitudes with regard to defunctioning a low anterior resection (LAR).

**Results:** 199 (50%) completed surveys were received. Of those surveyed, 48% (n=95) routinely performed laparoscopic bowel resections in addition to open surgery. The overall results for use of full bowel preparation are shown in the table below. 13.6% of surgeons change their practice between doing open and laparoscopic procedures. 76.6% of surgeons would routinely defunction a Low Anterior Resection (LAR). Of these, 22.2% do not feel that full bowel preparation is required if they are going to form a defunctioning stoma.

**Conclusions:** Current practice for bowel preparation varies widely throughout UK Consultant Coloproctologists. This study has suggested that a large proportion of patients may be receiving full bowel preparation when it is not necessary and may actually be detrimental. There is a place for national guidelines for bowel preparation, and a randomised controlled trial of bowel preparation for a defunctioned low anterior resection is required.

**P173 Table I - Percentages of respondents using full bowel preparation**

Procedure	Open Procedures	Laparoscopic Procedures
Right-Sided	9.5%	16.8%
Left-Sided	43.4%	40.2%
LAR	72.2%	63.6%
AP resection	20.5%	22.5%

#### Finding More Nodes in Patients with Colon Cancer: Do We Really Understand the Effect on Prognosis?

(P174)

S. Heffernan, N. Hyman, H. Blaszyk, P. Cataldo, T. Osler. Burlington, VT

**Purpose:** Recent studies suggest that survival following colectomy for cancer is better in pts with more lymph nodes identified in the pathologic specimen. We hypothesized that this may be attributable to an enhanced immune response to the tumor rather than staging error as is commonly assumed.

**Methods:** We retrospectively studied a cohort of 48 consecutively treated patients with T1-4N0M0 colorectal cancer who underwent complete resection by one of two colorectal surgeons at a university hospital from 1/00-12/02. A thorough chart review was performed to elicit demographic information and clinical data. All archived H&E slides for each case were reviewed and lymphocytic infiltration at the tumor's leading edge, presence and degree of sinus histiocytosis in the largest lymph node, and presence of lymph node hyperplasia were recorded. Tumor and lymph node specific attributes were then correlated with node count using Fisher's exact test.

**Results:** The mean number of lymph nodes in the specimens was 14.1. Advanced T stage was strongly predictive of

the number of negative nodes ( $p=.01$ ). The relationship between node count and sinus histiocytosis approached significance ( $p=.07$ ). Tumor location, grade, the presence of lymphovascular invasion, the amount of lymphocytic infiltration at the tumor's leading edge and presence of lymph node hyperplasia were not predictive of number of negative nodes in the specimen sample (Table 1).

**Conclusions:** The number of lymph nodes identified in a surgical specimen may serve as a marker for a more immunogenic tumor or a more robust host reaction to tumor. If so, national efforts to increase node counts after colectomy for colon cancer may be misguided.

**P174 Table 1: Factors potentially associated with the number of lymph nodes identified**

Tumor Specific	p-Value
T stage	.01
Lymphocytic infiltrate	.91
Location	.44
Grade	.56
Lymphovascular invasion	.64
Lymph Node Specific	p-Value
Sinus histiocytosis	.07
Hyperplasia	.51

#### Colorectal Surgeons and Biomedical Scientists Improve Lymph Node Harvest in Colorectal Cancer

(P175)

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**Purpose:** The presence of metastases within lymph nodes is the main prognostic factor in colorectal cancer survival. The recommended minimum number of lymph nodes to examine ranges from 9 to 14. UK National Institute for Clinical Excellence (NICE) guidelines suggest examination of 12 lymph nodes is sufficient for accurate staging. Identification of insufficient lymph nodes may result in misleading survival data and patients being denied adjuvant chemotherapy. The aim of this study was to review lymph node retrieval from colorectal cancer resections.

**Methods:** We examined consecutive, single colorectal cancers excised between September 1999 and February 2007. Data gathered included age, sex, cancer location, total lymph nodes and involved lymph nodes identified. The speciality of the operating surgeon was recorded. Whether a pathologist or biomedical scientist was responsible for harvesting lymph nodes from the resected specimen was also noted.

**Results:** A total of 1194 patients (M:F 713:481; median age 72; interquartile range (IQR) 63-78) were identified. 885/1194 resections (74.1%) were performed by colorectal surgeons. The median number of lymph nodes examined has increased year-

ly from 9 (7-12) to 12 (10-18) between 1999 and 2007. Increased number of lymph nodes identified was associated with increased lymph node positivity ( $p<0.001$ ,  $r=0.121$ ). Biomedical Scientists identified more total lymph nodes (median=15 (12-20)) within specimens than Pathologists (median=10 (7-13),  $p<0.001$ ). Colorectal Surgeons removed more total lymph nodes (median=11 (7-15)) than non-Colorectal Surgeons (median=9 (7-14),  $p=0.002$ ).

**Conclusions:** There has been a significant increase in lymph node harvesting over time and this correlates with lymph node positivity. Lymph node harvest is significantly higher when resections are performed by colorectal surgeons and when retrieval is by biomedical scientists. For accurate staging and consequent correct planning of adjuvant treatment and prognosis, resections should be performed by colorectal surgeons and the lymph nodes harvested by biomedical scientists.

#### Same Surgeon – Different Center Equals Differing Lymph Node Harvest

(P176)

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**Purpose:** An adequate lymph node (LN) harvest has been shown to be important in accurate staging of colorectal cancer (CRC). The aim of this study was to compare the LN harvest and factors influencing it in patients undergoing CRC resection by a single surgeon in two separate units.

**Methods:** 159 consecutive patients undergoing CRC resection by the senior author in 2 units over a 5-year period were studied (the senior author moved units during the study period). There was no change in surgical technique during the study period. LN harvests were compared between the 2 centres. Statistical analyses were carried out using Mann-Whitney, Kruskal-Wallis, Chi-squared tests and backward linear regression.

**Results:** Median LN harvest were significantly different between units but case mix was similar (see table). On univariate analysis unit reporting pathologist ( $p<0.001$ ) and Dukes' stage ( $p=0.002$ ) also impacted on LN harvest, but not operation type ( $p=0.435$ ). On multivariate analysis only unit ( $p<0.001$ ) and Dukes' stage ( $p=0.048$ ) remained significant variables.

**Conclusions:** This study has demonstrated that a single surgeon operating in two centres, with a similar case mix,

has significantly differing LN retrieval. This suggests that reporting pathologist is a critical discriminator on LN harvest following CRC surgery.

#### Impact of Numbers of Metastatic and Retrieved Lymph Nodes on Outcome in T3 Rectal Cancer

(P177)

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**Purpose:** Status of metastatic lymph nodes (mLN), along with depth of tumor invasion, is known as an important prognostic factor for survival in colorectal cancer, and the incidence of mLN is increasing according to the advancement of tumor invasion. Though there are controversies, the number of mLN and total examined lymph nodes (tLN) are important in colorectal cancer, and studies have shown that a minimum of 12 lymph nodes are to be identified during pathologic examination. Lymph node examination is important especially for T3 rectal cancer that adjuvant chemotherapy is required for whom with mLN, incidence of mLN is high, and it occupies the largest portion of rectal cancer. With these environment, we investigated the impact of the mLN and tLN on the on the survival of T3 rectal cancer.

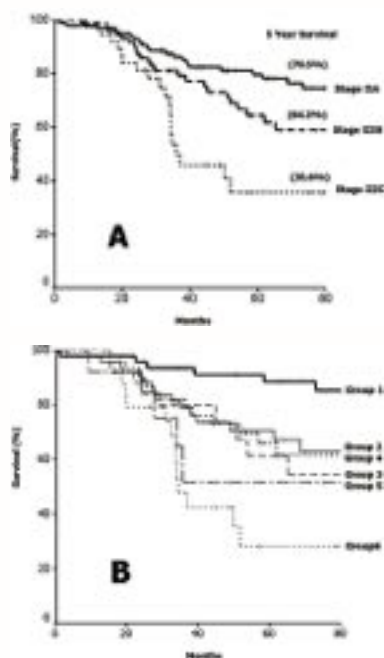
**Methods:** From 1992 to 2001, 208 consecutive patients who received curative resection for rectal cancer with T3 stage in a university hospital were reviewed retrospectively.

**Results:** Mean follow-up time was 36.1 months. Patients were divided according to mLN and tLN; group 1 ( $n=47$ ): no mLN in 12 or more tLN, group 2 ( $n=53$ ): no mLN in less than 12 tLN, group 3 ( $n=25$ ): 1 to 3 mLN in 12 or more tLN, group 4 ( $n=45$ ): 1 to 3 mLN in less than 12 tLN, group 5 ( $n=24$ ): 4 or more mLN in 12 or more tLN, group 6 ( $n=14$ ): 4 or more mLN in less than 12 tLN. Patients in group 4, 5, and 6 received adjuvant chemotherapy (5-FU). There were no significant differences on age, sex, operative methods, and tumor location. Mean mLN and tLN are 0/20.3 (group 1), 0/6.1 (group 2), 1.7/18.9 (group 3), 1.6/6.1 (group 4), 7.5/20.1 (group 5), and 5.7/8.3 (group 6), respectively. Five year survivals were significant according to the stage; 79.5% (IIA), 64.3% (IIIB), and 35.6% (IIIC), respectively ( $p<0.05$ ), however, when analyzed according to the groups, no significant differences were found among group 2, group 3, and group 4.

**Conclusions:** In conclusion, numbers of metastatic and retrieved lymph nodes can influence on survival in T3 rectal cancer, and it should be considered during survival analysis.

#### P176

	Unit 1 (n=112)	Unit 2 (n=47)	p value
Median LN harvest (range)	13 (0-30)	24(0-60)	$p<0.001$
% of cases staged as Dukes' C	40% (47/117)	55% (26/47)	$p=0.099$
% of right colonic cases	35% (41/117)	38% (18/47)	$p=0.451$
Median patient age (range)	71(33-90)	69(42-90)	$p=0.310$



#### Recurrences after Total Mesorectal Excision in Rectal Cancer: The Role of Lymph Node Invasion

(P178)

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**Purpose:** Treatment of rectal cancer with pre-operative radiotherapy followed by TME is nowadays the standard. It reduces local recurrences and improves overall survival. The aim of this study was to review the role of lymph node invasion in rectal cancer patients.

**Methods:** Between 1996 and 2003, 210 patients with rectal cancer were identified in our prospective database, containing patient characteristics, radiotherapy plans, operation notes, histopathological reports and follow-up details. An evaluation of prognostic factors for local recurrence, distant metastases and overall survival was performed.

**Results:** The mean age at diagnosis was 70 (range 40 - 91) years. 54% was male. Mean follow up was 4 years. The 5-year local control was 88%. The overall survival was 65%. A LAR was done in 145 patients and 65 patients underwent an abdominal perineal resection. Sex, age and pre-operative radiotherapy did not show any statistic difference. Tumor stadium, high level of CEA (>5), incomplete resection (n=21) and lymph node invasion (n=82) negatively influenced local control, distant metastases and overall survival.

**Conclusions:** Lymph node invasion is of great significant importance. Therefore meticulous pre-operative work-up should also be focused on invasion of lymph nodes. Pre-operative chemoradiation maybe increases the final outcome in these patients. Further prospective studies are needed to confirm our conclusions.

#### Correlation Between the Size and the Presence of Metastases in Perirectal Nodes of Patients with ypT0-2 Rectal Cancer after Neoadjuvant CRT – Can Radiological Studies Rely on Lymph Node Size for Proper N0 Staging?

(P179)

R. Perez, A. Habr-Gama, D. Pereira, G. São Julião, V. Rawet, I. Proscurshim, J. Gama-Rodrigues, D. Kiss, I. Ceconello . . . . . São Paulo, Brazil

**Purpose:** Local excision is currently being considered as an alternative approach for ypT0-2 rectal cancer. However, patient selection is crucial in order to rule out the presence of lymph node metastases and is performed by radiological studies that consider LN size as a surrogate marker for positive nodes. The purpose of this study was to determine the difference in size between metastatic and non-metastatic nodes and the critical lymph node associated with increased of harboring metastatic disease.

**Methods:** Patients with distal rectal cancer managed by neoadjuvant CRT (50.4Gy and 5FU/Leucovorin) and radical surgery (TME) were eligible for the study. There were 34 patients with ypT0-2 rectal cancer with 201 lymph nodes available for review. Each lymph node was reviewed and measured by a GI-dedicated pathologist. Lymph nodes were compared according to the presence of metastases and size.

**Results:** Overall, there were a mean of 9 LN/patient. There were 12 positive nodes of the 201 lymph nodes recovered (6%). 95% of all nodes LN were smaller than 5mm while 60% of metastatic LN's were less than 5mm and 83% were smaller than 1cm. Metastatic LN's were significantly greater in size when compared to normal LN's ( $5.0 \pm 3.3$  vs  $2.5 \pm 1.2$ mm;  $p=0.02$ ). Lymph nodes greater than 3.5mm had a greater risk of harboring metastases (Sensitivity 42% and Specificity 95%;  $p=0.009$ ).

**Conclusions:** Patients with ypT0-2 rectal cancer following neoadjuvant CRT have considerably small perirectal nodes. Metastatic lymph nodes are significantly greater in size. Even though size remains a surrogate marker for N+ disease, radiological studies must consider LN's greater than 3.5mm at an increased risk for harboring metastatic disease.

#### Is Emergency Surgery for Colorectal Cancer Best Performed by Specialists?

(P180)

F. McNicol, C. Barben . . . . . Liverpool, United Kingdom

**Purpose:** This audit examined whether emergency surgery for colorectal cancer in a UK teaching hospital conformed to ACPGBI guidelines. Colonic malignancy frequently presents acutely yet emergency surgery has  $\approx 20\%$  mortality. ACPGBI guidelines state "in the absence of perforation/life-threatening bleeding, operation can be urgent rather than emergency...performed during the day by experienced surgeons."



**Methods:** This was a retrospective audit examining the casenotes of colorectal cancer patients who underwent colectomy on emergency lists March 2004-2007 (identified from theatre records). With reference to ACPGBI guidelines, investigation, stoma nurse and colorectal specialist input, stenting and operative procedure were all examined. Outcome measures included primary anastomosis, stoma formation, and operative mortality.

**Results:** 54 cases were identified, 14 excluded (surgery on elective lists, incomplete casenotes) therefore 40 files examined. Presenting complaints were obstruction (40%) perforation (23%), bleeding/anaemia (20%) and pain/mass (17%). 83% patients had CT, 61% endoscopy, and 22% gastrografin enemas for diagnosis. 78% operations were performed during the day; 63% by consultants, 55% by colorectal specialists. The 16 left colonic tumours were treated with hemicolectomy (4), Hartmann's (9) and anterior resection (3). Stenting was discussed in 5 and performed once. Of 16 left-sided cancers, 6 had primary anastomosis, 3 with loop ileostomy. For obstructing (not life threatening) left-sided cancers, colorectal specialists performed anterior resection. 9 Hartmann's were performed; anastomosis was impossible 7/9. 2/9 were cases of obstruction operated on by non specialists; one was later reversed. Mean time to stoma nurse input was 8 days. 30 day mortality was 6%.

**Conclusions:** Most emergency surgery occurred during the day, by colorectal consultants, yet stoma nurse input was delayed. In obstructed left-sided cancers specialist input did alter outcome, particularly primary anastomosis. It is vital in obstruction that colorectal advice is sought early. Stenting may be employed to relieve obstruction, thus avoiding "emergency" surgery and increasing feasibility of anastomosis rather than end colostomy.

#### Nurse-Led Colorectal Cancer Follow-Up is a Cost-Effective Surveillance Program

(P181)

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**Purpose:** There is clear evidence that intensive follow-up after resection of colorectal cancer leads to early detection of recurrence, improved resectability of local and distal recurrence and improved survival. Time constraints on consultant clinics has led to the introduction of specialist nurse led clinics which can provide this follow-up service. This paper aims to show that this process can also be cost effective.

**Methods:** A prospective study of protocol driven follow-up by a colorectal trained specialist nurse. Patients were divided into high and low risk groups based on Dukes tumour staging, with Dukes A deemed low risk, and Dukes B, C and D as high risk. Follow-up included clinic visits, serological tumour markers, radiological and endoscopic imaging. Low risk patients were followed for 3 years, and high risk for 5 years.

**Results:** 212 patients were enrolled in the clinic between 2005 and 2007, 206 of whom had complete data for analysis. Of the 27 patients with low risk disease, 18 were rectal and 9 non-rectal. There were no deaths or recurrences during this study. The cost for the low risk group was £1506 and £1179 for rectal and non-rectal patients respectively, for full 3 year follow-up. 179 patients were included in the high risk group with 58 rectal and 121 non-rectal tumours. 45 recurrences/deaths occurred (15 rectal, 30 non-rectal) during this study period and mean follow up of 45.1 and 43.8 months for rectal and non-rectal equating to £1814 and £1487 per patient respectively. Intensive follow-up has been shown to confer a benefit of 0.73-0.82 quality adjusted life years (QALY) per patient. The NHS cost of acceptability for each QALY gained currently stands at £30,000. Adjusted costs for each QALY gained calculated using our data were £1914 and £2180 for low and high risk tumours respectively, well within the limits of acceptability. These costs also compare favourably with QALY costs of national screening both for colorectal cancer (£2,500 to £8000) and breast cancer (£6,500).

**Conclusions:** Nurse led follow-up clinics are a cost effective tool for the surveillance of patients post colorectal cancer resection. This study should enable the wider implementation of nurse led colorectal cancer follow-up clinics.

#### How Important is it to Investigate the Whole of the Colon Following a Rapid Access Colorectal Clinic?

(P182)

C. Lim, L. McGeever, J. Grey, A. Krishna, A. Jabbar, W. Hendry . . . . . Stirling, United Kingdom

**Purpose:** The Stirling Royal Infirmary Rapid Access Colorectal Clinic, SRI RACC, is a one-stop clinic in a district general hospital in Scotland to diagnose patients with anorectal and colorectal symptoms. The aim of this study is to examine the diagnoses and outcomes of all patients who attended the SRI RACC in 2006. We also investigated the additional pathologies found in patients who subsequently had the whole colon investigated, either with a barium enema or a colonoscopy.

**Methods:** We performed a retrospective database and casenotes review of all the patients who attended our SRI RACC from 1 January 2006 to 31 December 2006.

**Results:** 591 patients attended the SRI RACC in 2006. Of these, 116 (19.6%) patients were discharged after the first clinic attendance and the remaining 475 (80.4%) had further investigations or clinic review. Of these, 370 barium enemas were requested from the clinic with the compliance rate of 92.4%. The most common additional benign pathology identified by the barium enemas was diverticular disease which only required reassurance and lifestyle changes. Of the 105 patients without barium enema being requested from the clinic, 49 had a colonoscopy. The most common additional pathology detected by colonoscopy was polyps.

In total, 42 colorectal cancers were diagnosed. 34 (81.0%) were distal to the splenic flexure and 8 (19.0%) were proximal. 31 cases (73.8%) were diagnosed at the initial SRI RACC assessment, 3 (7.1%) by barium enemas, 3 (7.1%) by colonoscopy, 4 (9.5%) by CT scan of the abdomen and pelvis, and 1 (2.4%) by a repeat flexible sigmoidoscopy. 2 patients who were initially assessed at and discharged from the SRI RACC subsequently were diagnosed with colorectal cancer

**Conclusions:** Rapid access colorectal clinic that uses flexible sigmoidoscopy as the initial diagnostic method is safe and effective in detecting benign colorectal pathology and left colon cancers. However, over two-third of the patients may need to return for subsequent imaging of the remaining colon. The cost-effectiveness and the acceptability of this by the patients remain unknown.

#### Colorectal Cancer Target Referral; Diagnostic Efficacy of the Referral Criteria and Cancer Detection Rate

(P183)

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**Purpose:** The purpose of this study was to evaluate the effectiveness of the UK colorectal cancer (CRC) target referral scheme introduced in response to concern over lengthy waiting times for cancer treatment.

**Methods:** During 2004-2007, data from 1020 patients referred with suspected CRC were prospectively collected. Multivariate regression analysis of the target referral criteria as well as the appropriateness of the referral at consultation was used to identify their diagnostic value and efficacy. The cancer detection rate and staging were compared with 544 patients with CRC referred by other routes was determined by the Fisher's exact 2-tailed. Statistical analysis was conducted using the SPSS 14 statistical package.

**Results:** There were 456 (45%) males and 564 (55%) females with a median age of 66 years (22 - 96). There was a disagreement between GP referral criteria and colorectal clinic in a total of 1493 observations. The inappropriateness of referral of 161 (16%) patients correctly excluded cancer. Table 1 shows the diagnostic efficacy of the target referral criteria. A palpable right-sided abdominal mass was the only criterion with diagnostic efficacy ( $p=0.042$ ). Seventy nine (8%) had cancer of which only 52 (5%) were CRCs. Of those with cancer, 25 (2%) were early (T1+2 N0 M0). There were more CRCs diagnosed through the non-target referral route (371/544 vs 52/1020,  $p<0.001$ ) and with an earlier stage (T1 N0 M0: 66/320 vs 1/52  $p=0.018$ ).

**Conclusions:** The referral criteria are of poor diagnostic value, which explains the poor cancer yield. The target referral scheme has not improved detection of early stage disease which otherwise can be achieved more cost-effectively by a screening programme.

**P183 Table 1. Diagnostic efficacy of GP Target Referral Criteria**

Criteria	Sensitivity (%)	Specificity (%)	Accuracy (%)	Positive predictive value (%)	Negative predictive value (%)	Positive likelihood ratio	Negative likelihood ratio	P values (Diagnostic efficacy)
Definitive Palpable R sided abdominal mass	14	94	90	11	95	2.25	0.92	0.042
Definitive Palpable rectal mass	10	92	88	6	95	1.18	0.98	0.609
A change in bowel habit to looser stools and/or frequency persisting >6 weeks (with rectal bleeding in pts >45 yrs)	33	60	58	4	94	0.81	1.13	0.310
Iron Deficiency Anaemia without obvious cause	12	87	83	5	95	0.90	1.01	1.000
Rectal bleeding in the absence of anal symptoms > 60 yrs	19	81	79	5	95	1.06	0.99	0.651
A change in bowel habit to looser stools and/or frequency persisting >6 weeks even without bleeding > 60yo	27	71	68	5	95	0.91	1.04	0.310

### Effectiveness of Family History Screening for Colorectal Cancer

(P184)

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..... Nottingham, United Kingdom

**Purpose:** Increased awareness of the heritable component of colorectal cancer has resulted in a rise in referrals of individuals with a positive family history. A dedicated nurse led family history clinic was established in 1999 in partnership with the clinical genetics service in order to provide appropriate triage and management of these patients. This study reviews the results of the data from the last 6 years.

**Methods:** Prospective data was collected from 2001 to 2007. Referrals were stratified as very low, low, medium or high risk allowing selective investigation. Endoscopic screening was provided to selected individuals according to the Trent Regional Genetics Guidelines.

**Results:** 815 asymptomatic individuals were referred, mean age 46.6 (SD 11.9) years, 506 (62%) of these were females. Of those referred 115 were classed as High Risk, 387 as Medium, 141 as Low Risk and 172 as Very Low Risk. Overall 37 (5.8%) adenomas were detected with 9 (1.4%) colorectal cancers. Of 38 patients who have commenced genetic screening, 15 are now complete with 11(73%) testing positive for HNPCC. The detection of adenomas was greater in the high risk group (8(7%) vs. 5 (1%)) but this was not statistically significant. The detection of colorectal cancer was higher in the high risk group (4(3.4%) vs. 1(0.7%)) but this was not statistically significant.

**Conclusions:** The detection rate of the FHC screening process compares favourably with the National FOBT Screening process with a 16.7 and 12.4 fold yield improvement in CRC and Adenoma respectively per population. Nurse led family history clinics provide an effective method of family history screening for colorectal cancer.

### Is There a Place for Community Based Bowel Cancer Screening Programmes in the Light of the U.K. National Bowel Cancer Screening Programme?

(P185)

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Marks ..... Guildford, United Kingdom

**Purpose:** An opportunistic, targeted faecal occult blood screening programme for colorectal cancer was established in 1987 and has run continuously. The criteria for testing in this programme, differed from those of the UK national bowel cancer-screening programme, (NBCSP). The NBCSP currently offers screening to individuals aged 60- 69 years with a proposal to extend to 74 years. We wished to examine the overlap between the two programmes to identify how we might complement the NBCSP.

**Methods:** Patients of 35 local general practices, attending the surgery for any reason, were invited to take part in the pro-

gramme if they were over 40 years old, with either bowel symptoms or a first degree relative with cancer of the bowel, breast, endometrium, liver or stomach. Guaiac-based faecal occult blood tests, (FOBT), were performed. All results entered into a prospective database. FOBT positive patients were offered colonoscopy. Positive colonoscopic findings are followed up via the relevant treatment or surveillance pathways. For patients with a family history, repeat FOBT is offered at 1 year and thereafter biennially. This protocol was modified in 2000 to limit screening to those over 50 with a family history of bowel cancer.

**Results:** 10861 individuals were offered 21478 FOBTs. 17020 tests were completed. 728 (4.3%) of these were positive in 701 individuals. 623 of these individuals underwent colonoscopy. 92 individuals had cancer and 100 had polyps. 28% of the polyps were adenomas > 10mm. Analysis of colonoscopy findings by age group was undertaken and demonstrates that 49 cancers and 50 patients with polyps, (51.56% of all neoplasia) in this study, would not have been identified by the NBCSP. If the NBSCP were limited to patients aged 60 -69 years, 70.8% of neoplasia found in our programme would not have been detected

**Conclusions:** There is still a role for targeted screening strategies of high-risk groups outside the national bowel cancer screening project

### P185 Numbers of patients with neoplasia detected at first colonoscopy in 623 FOBT positive individuals

Age	Cancer (%)	Polyps (%)
<60 years	18 (20)	35 (35)
60-74 Years	43 (47)	50 (50)
>74 years	31 (33)	15 (15)
Total	92	100

### The Feasibility of a Fast Track Surgery Modified Protocol Applied in 101 Consecutive Laparoscopic Colonic Resections in a Community Hospital of the Tuscany Public Health System

(P186)

F. Feroci, K. Kroning, L. Moraldi, M. De Prizio, M.

Scatizzi ..... Montevarchi (Arezzo), Italy; Firenze, Italy

**Purpose:** The experience of multimodal management of patients undergoing colorectal surgery applied by Prof. H. Kehlet has made it possible to decrease non-surgical postoperative complications and allows for a quicker release from hospital. Colorectal laparoscopic surgery in comparison to open colorectal laparoscopic surgery without treatment "Fast track," has better results in regards to pain, respiratory performance and reduction of postoperative hospitalization. We started our protocol on the application of these two procedures in patients submitted to colorectal laparoscopic surgery in a peripheral hospital of the SST (Tuscan Sanitary Service) in Italy.

**Methods:** From November 2004 to October 2007, 101 patients had laparoscopic right or left colic resection or laparoscopic low anterior resection (AR) and we gave them a modified multimodal fast track program.

**Results:** The mean postoperative hospitalization was 4.7 days for laparoscopic left hemicolectomy and laparoscopic anterior resection group, and 5.1 days for the right hemicolectomy group. The percentage of observed complications was 6.4%, one patient was converted to open procedure (0.9%); one patient (0.9%) were readmitted in the hospital within 30 days. No mortality was observed.

**Conclusions:** The results of the two procedures were feasible in the observed context, and effective in the reduction of almost 50% of the mean postoperative hospitalization compared to patients in Europe who had the same kind of operation without the application of these two procedures.

#### The Importance of Family History in Patients at High Risk of Familial Colorectal Cancer: The Message Hasn't Got Through

(P187)

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**Purpose:** A retrospective study to investigate the frequency and detail of family history recorded for patients diagnosed with colorectal cancer (CRC) under the age of 50 and therefore at high risk of having familial CRC, and to determine the proportion of patients referred to a high risk assessment clinic.

**Methods:** Hospital and consultant medical records of patients diagnosed with CRC under the age of 50 who were admitted to a major Sydney teaching hospital were reviewed. Data was collected on the extent of family history recorded and the patient's demographic characteristics. Bivariate analysis was conducted to investigate associations between the inclusion of information about family history and the demographic and clinical characteristics of patients. Logistic regression modelling was undertaken to identify significant, independent predictors of study outcomes.

**Results:** 113 patients with CRC were identified to be at potentially high risk of having familial CRC by virtue of their age at diagnosis. 61 (54%, 95% CI: 44-63%) had an entry in their hospital medical record about family history. Family history was significantly less likely to be recorded for females, for those admitted via the Emergency Department, and for those with shorter lengths of stay. 51% of patients who had family history recorded were found to have a significant family history. 102 patients were seen by consultants in their private rooms and family history information was recorded for 85 (83%, 95% CI: 74-90%). Records for patients attending specialist colorectal surgeons were significantly more likely to contain information about family history than those for patients attending other specialists ( $p=0.04$ ). Only 14 patients (12%, 95% CI: 7-20%) were formally referred for further genetic assessment.

**Conclusions:** Identification of individuals at potential risk of familial CRC has implications for surgical management and screening. The results of this study suggest family history is still being neglected and imply the need for further dissemination of guidelines with regards to the recognition and management of familial CRC. In addition high risk assessment services appear to be under utilised.

#### Local Recurrence Rates after Rectal Cancer Surgery in a Specialist Unit are Higher in Patients Referred from Out-of-area

(P188)

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**Purpose:** Many patients with complex low rectal cancer seek second opinions in their quest to avoid a permanent stoma and improve outcome. There is now general agreement that oncological outcomes, in particular local and systemic recurrence, are worse for low rectal cancer. To assess the effect of second opinions on outcomes following rectal cancer surgery in a specialist unit, analysis of local recurrence rates for out-of-area referrals and contemporaneous cases from the local catchment population was undertaken.

**Methods:** Between October 1995 and November 2006, 459 consecutive procedures undertaken for primary rectal cancer were categorised into local (278) or out-of-area referrals (181). The proportions of low (within 6cm of the anal verge), mid (7-11cm) and upper rectal tumours (12-15cm); male/female distribution and percentage having neoadjuvant therapy were analysed. All patients were followed-up, in particular for local recurrence.

**Results:** There were 286/459 (62%) males; 218/459 (47%) tumours within 6cm of the anal verge; 146/459 (32%) between 7-11cm, and 95/459 (21%) between 12-15cm; 133/459 (29%) had neoadjuvant therapy. There were 181/459 (39%) out-of-area referrals; 122/181 (67%) were male compared with 164/278 (59%) in the local population. There were 114/181 (63%) low, 50/181 (28%) mid, and 17/181 (9%) upper rectal tumours in out-of-area cases, and 104/278 (37%), 96/278 (35%) and 78/278 (28%) respectively in local cases. The proportions having neoadjuvant therapy were 85/181 (47%) and 48/278 (17%) There were 33/459 local recurrences, with a Kaplan-Meier predicted overall local recurrence rate at 5 years of 11%; significantly higher in out-of-area referrals (15%) than in the local population (8%).

**Conclusions:** Out-of-area patients tend to have more complex tumours than a local population. In this series almost two-thirds had low rectal cancer; there were more males; and almost half had neoadjuvant therapy for locally advanced tumours. Consequently the local recurrence rates were significantly higher. The different case mix, with more complex tumours in out-of-area referrals, may adversely affect results and should be borne in mind when auditing outcomes.



# The Use of the Fecal Occult Blood Test Outside Colorectal Cancer Screening

(P189)

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 ..... Derby, United Kingdom

**Purpose:** The two week wait (2WW) referral system was introduced to reduce the delay in referral, diagnosis and subsequent treatment of patients with colorectal cancer. General practitioners are required to state the necessary referral criteria for each patient. It is not part of the criteria for patients to have a FOB prior to referral. The NHS Bowel Cancer Screening Programme was introduced in England in July 2006 utilising the faecal occult blood (FOB) test. Screening demands a total of 6 samples be tested with 5 or 6 positive samples classified as a positive result. The aim of our study was to find the proportion of patients with an FOB performed as part of the referral for the lower gastrointestinal 2WW referral system, and whether this correlates with the cancer status.

**Methods:** The last two thousand patients (from 01/08/05 - 31/07/07) referred as a 2WW were identified using the hospital's cancer audit database. Performance of FOB and cancer status were recorded for each patient.

**Results:** A total of 2000 patients (F:M 1097:2000; median age 58; range 18-98) were referred by general practitioners. The FOB test was only performed on three samples in all cases. 1 positive (or more) FOB was classified as a positive result. In total, 169/2000 patients (8.5%) had an FOB performed prior to their referral, with 55/169 patients (32.5%) as part of the referral for 2WW. 16/169 patients (9.5%) had an FOB performed in the presence of overt rectal bleeding. In only 2/169 patients (0.01%) did the FOB correlate with a colorectal cancer (one of these had overt rectal bleeding). Unnecessary testing for FOB costs has cost £4001.92 in 2 years.

**Conclusions:** There is significant misuse of FOB testing. The detection rate, even in this symptomatic group of patients, is very low. FOBs are being performed in the community on three samples and not six, and those with one or

two positive samples are being referred rather than being recalled for further testing, contrary to protocol. This, combined with the high false positive rate, leads to patients not only experiencing psycho-social consequences but could potentially lead to significant risks from unnecessary invasive investigation as well as the added financial burden of the test itself.

# Rectal Cancer: Three-Year Review from a Pilot Screening Center

(P190)

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 ..... Warwick, United Kingdom

**Purpose:** Since commencement of colorectal screening, we have previously demonstrated a significant reduction in emergency colorectal cancer operations. It remains unclear whether there is a down-regulation in histological staging, recurrence or mortality rate. This study intends to analyse these parameters in rectal cancer patients within the pilot screening programme.

**Methods:** Data on all rectal cancer patients were prospectively collected between May 2001 and 2004. This audits reviewed information relating to Dukes' and histological staging, mortality and recurrence within 3 years.

**Results:** 73 biopsy-proven rectal cancer patients (39M:34F) were identified, median age was 72. 54 patients (73.9%) required adjuvant therapy. Dukes A accounted for 19%, B for 22%, C for 33% and D for 11%. 15% of cases did not have surgery. 47 cases demonstrated lymphovascular invasion in their histology. 7 patients (9.6%) had local recurrence within 3 years. 54 (74%) patients were still alive 3 years after diagnosis.

**Conclusions:** Rectal cancer in our unit has a 3 year mortality and recurrence rate comparable with the national average. There is no evidence of improved staging during the pilot screening programme. Long term study is warranted to assess if screening can shift Dukes' staging to the left, reduce recurrence and mortality rate from rectal cancer.

**P189 Table comparing FOB to cancer status**

2WW Referral Criteria	Number of patients	Number of cancers	Number of FOB's	No. of FOB's within 6/52 of referral	No of +ve FOB	No. of cancer in FOB +ve pt's
Palpable right sided abdominal mass	92	10	9	1	0	0
Palpable rectal mass	96	20	6	2	0	0
Rectal bleeding with a COBH >6 weeks	368	41	22	11	7	1
Persistent rectal bleeding without COBH	314	27	24	5	5	0
COBH >6 weeks	668	46	54	14	3	0
Iron deficiency anaemia	462	34	54	23	11	1

COBH = change of bowel habit

**Radical Resection of Rectal Cancers with Complete Pathological Response to Neoadjuvant Chemoradiation Does Not Improve Outcome Compared to Local Excision**  
(P191)

S. Al-Saadi, S. Rasheid, J. Lopez, J. Marcet . . . Tampa, FL

**Purpose:** The standard treatment for advanced rectal adenocarcinoma consists of neoadjuvant chemoradiation followed by low anterior resection (LAR) or abdominoperitoneal resection (APR). Neoadjuvant chemoradiation often results in downstaging tumors, and in a smaller percentage of patients the tumor is completely eradicated. This study is undertaken to examine the outcomes in patients who had radical resection vs. transanal excision (TAE) after complete pathologic response to neoadjuvant chemoradiation for rectal adenocarcinoma.

**Methods:** From 1995 to 2005, 235 patients with rectal adenocarcinoma underwent neoadjuvant chemoradiation followed by surgery. 151 patients had a radical resection, 53 had TAE, 9 had TAE followed by radical resection, and 22 were not resected. Complete pathologic response to neoadjuvant therapy was defined as T0 or Tis. Patients were followed for complications and recurrence. Adverse events, survival, and recurrence rate were compared for patients that had complete response on pathologic examination. Data are presented as median, mean  $\pm$  SD.

**Results:** 31 patients (65% men) with median age 67 years were found to have complete pathologic response (Table). 26 patients underwent a TAE, 4 underwent an LAR, and 1 underwent an APR. Of the 31 patients, 1 patient with a TAE developed liver metastases. Disease-free survival for TAE was 91 months,  $79 \pm 35.2$  vs. 34 months,  $36 \pm 19.4$  for radical resection ( $p=NS$ , Log-rank test). Postoperative complications included: 2 strictures requiring dilation, 1 fecal incontinence, 1 bowel obstruction, and 1 rectovaginal fistula and were more common amongst patients with radical resection ( $p=0.0008$ , Fisher's exact test).

**Conclusions:** Only 14% of patients that received neoadjuvant chemotherapy for rectal cancer had a complete pathologic response. Radical resection did not improve outcome but did increase postoperative morbidity over TAE for patients that have complete pathologic response to neoadju-

vant chemoradiation for rectal cancer. Although this study is small, it supports the use of TAE as the sole surgical treatment when complete pathologic response is demonstrated.

**Repeat Attempt at Endoscopic Polypectomy Intraoperatively Rather than Surgery Avoids the Need for Colorectal Resections for Benign Tumors**  
(P192)

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**Purpose:** Patients with colorectal adenomas that do not undergo complete polypectomies are referred for surgical resection. Many of these adenomas are considered too large or are found in difficult locations that prevent complete removal by the referring gastroenterologists. This study is undertaken to evaluate the validity of attempted redo intraoperative polypectomies before surgical resection.

**Methods:** From 2001 to 2006, 76 patients with nonmalignant colorectal adenomas were referred for surgical resection. The patients underwent a repeat colonoscopy with polypectomy in the operating room (OR). Laparoscopic-assisted endoscopic polypectomy was undertaken as necessary. Finally, bowel resection was done when endoscopic resection was insufficient to remove the adenoma. All patients had follow-up endoscopy to assess recurrence. Utilizing a chi-square analysis and Mann-Whitney U-test, hospital length of stay, adverse events, and recurrence rate were compared for patients with redo polypectomy with or without laparoscopic assistance, and with bowel resections. Data are presented as median, mean  $\pm$  SD.

**Results:** 76 patients (58% men) underwent redo polypectomy and were followed a median of 12 months. 53 patients had complete endoscopic polypectomy, of which 5 required laparoscopic-assistance, and 23 required bowel resection. Median hospital length of stay for patients after endoscopic polypectomy alone was 0 days vs. 1 day after laparoscopic assistance ( $p=0.05$ , Mann-Whitney U-test) and 3 days after bowel resection ( $p<0.0001$ , Mann-Whitney U-test). Two patients that did not require a bowel resection had a local recurrence vs. 0 patients with local recurrence after bowel resections ( $p=NS$ , Fisher's exact test).

**P191 Patient Rectal Cancer AJCC 6th Edition Staging Before Neoadjuvant Chemoradiation.**

Preoperative Stage Before Neoadjuvant Therapy	Patients Who Had Complete Pathologic Response	All Patients
I	5 (16%)	25(11%)
IIA	14 (45%)	55(24%)
IIB	0 (0%)	3(1%)
IIIA	1 (3%)	2(1%)
IIIB	8 (26%)	47(20%)
IIIC	0 (0%)	1(0%)
IV	1 (3%)	29(12%)
Cannot Be Determined	2(6%)	73(31%)

**Conclusions:** 70% of patients with difficult colon adenomas underwent successful redo polypectomy in the OR setting, avoiding the need for surgical resection. Intraoperative colonoscopy allows for more aggressive approaches at polypectomy since complications can be dealt with immediately. Patients that undergo a complete redo polypectomy have shorter length of stay with no difference in recurrence compared to patients that undergo bowel resection.

#### Outcome of Left-Sided Colon Emergency Surgery With and Without Intraoperative Colonic Irrigation

(P193)

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**Purpose:** To compare the outcome of resection and primary anastomoses in patients undergoing emergency surgery of the left colon with and without intraoperative colonic irrigation.

**Methods:** From January 2004 to December 2006, 102 consecutive patients with acute occlusion or perforation of the left colon were operated on an emergency basis in two Coloproctology units. According to the sample size calculation, 61 patients from one unit underwent surgery with intraoperative colonic irrigation, whereas 41 patients from the second unit underwent surgery without intraoperative colonic irrigation. The endpoints were mortality and morbidity.

**Results:** Thirty (49.2%) patients with intraoperative colonic irrigation and 8 (19.5%) without colonic irrigation developed one or more complications postoperatively (odds ratio 4.0, 95% CI 1.6 to 10.0,  $P = 0.002$ ). An increased number of wound infections was seen in the group managed with colonic irrigation 15 vs. 3 ( $P = 0.034$ ). The postoperative mortality rate and the occurrence of dehiscence of the anastomoses were similar in both study groups.

**Conclusions:** The present findings indicate that resection and primary anastomosis in patients undergoing emergency surgery of the left colon can be safely performed without intraoperative colonic irrigation.

#### Radical Abdominoperineal Excision (APE) with Transpelvic Rectus Abdominus Myocutaneous (RAM) Flap Reconstruction

(P194)

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**Purpose:** Perineal wound complications after radical APE with primary closure, for anorectal cancer are frequent. In the presence of radiotherapy, the risk of major complications can be up to 41%. This is a prospective outcomes study on patients undergoing radical APE with RAM flap reconstruction performed by a single surgeon.

**Methods:** Prospective data on 13 patients undergoing APE and RAM reconstruction from 2005-7 was collected. Outcomes included clinico-pathological status, time to healing, flap complications, morbidity and mortality.

**Results:** 11 patients had APE for low rectal cancer (1 had recurrence), 2 patients had APE for anal squamous cell cancer. 9 had neoadjuvant chemoradiotherapy. 4 patients had previous abdominal surgery and required mesh reconstruction of their abdomen. 1 patient died of renal failure 11 days post-op. 2 patients with Body Mass Index (BMI) >30 had abdominal wound infection requiring readmission, debridement and VAC therapy. Median (range) time to perineal wound healing was 42(21-90) days in 6 patients with uneventful primary healing. Median (range) time to perineal wound healing was 69(21-97) days in 4 patients with minor wound breakdown. 2 patients with BMI >30 had delayed perineal wound healing requiring VAC assisted closure (time to healing was 116 and 125 days). There were no cases of flap necrosis.

**Conclusions:** One stage APE and RAM reconstruction can be safely performed by colorectal surgeons when plastics expertise is unavailable. It allows for wide excision and improved cancer clearance. Our data compare favourably with that published for primary perineal closure after APE.

#### P192 Polyp Location

Polyp Location	Redo Polypectomy Without Assistance	Redo Polypectomy With Laparoscopic Assistance	Surgical Resection
Rectum	13	0	9
Rectosigmoid	1	0	1
Sigmoid*	7	1	0
Descending Colon	2	0	0
Splenic Flexure	2	0	2
Transverse Colon	3	0	1
Hepatic Flexure	3	1	2
Ascending Colon	5	0	1
Cecum	10	3	9

\*Polyps here are significantly less likely to require surgical resection,  $p < 0.05$  Fisher's exact test

### Abdominoperineal Resection: Do Myocutaneous Flaps Decrease Perineal Wound Complications?

(P195)

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**Purpose:** Perineal wound complications occur frequently following abdominoperineal resections, and myocutaneous flaps have been used to decrease this risk. We aimed to compare the perineal wound complication rate of abdominoperineal resections using myocutaneous flaps or primary closure to close the perineum.

**Methods:** We reviewed all abdominoperineal resections performed for anal or rectal cancer from 1995-2006. We compared patient characteristics and perineal wound complications in patients with myocutaneous flap reconstruction of the perineum to those with primary closure. Next we performed multivariate analysis of risk factors that affect wound healing and their effect on flap success. Perineal wound complications were defined as either cellulitis, abscess, or wound separation.

**Results:** Of 124 patients treated for anal and rectal cancer, those with flaps were younger and more likely to have anal cancer, HIV, recurrent cancer, pelvic radiation or current tobacco use. Perineal wound complications were more common in the flap group. This difference was primarily due to a higher cellulitis rate, while abscess and wound separation rates were similar. Patients with anal cancer or diabetes had four-fold increased odds of having a perineal wound complication. After adjustment for wound healing risk factors (tobacco use, radiation, diabetes) in a multivariate analysis, the odds of having perineal wound complications was not increased in patients with myocutaneous flaps.

**Conclusions:** Although patients with flaps had more wound complications, they also had more risk factors for poor wound healing. This highlights the fact that myocutaneous flaps may improve healing, but cannot overcome other risk factors such as radiation, tobacco use and dia-

betes. The use of flaps is still warranted in selected patients with multiple risk factors for poor healing.

### Randomised Multicenter Trial of Circular Stapling Devices

(P196)

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..... Uppsala, Sweden

**Purpose:** To compare the risk of clinical anastomotic leakage after anterior resection for rectal cancer depending on the choice of circular stapling device.

**Methods:** All patients above 18 years with a rectal cancer, able to give informed consent, and planned for an anterior resection were eligible for the study. Randomisation took place at the time of the operation. Randomisation was to Ethicon ILS or Tyco/Autosuture Premium CEEA. Anastomotic leakage was defined as a clinical leak as judged by the surgeon. Data was analysed with the Statistica software.

**Results:** 519 patients were randomised (58% male). A leak occurred in 8.3%. The ILS stapler leaked in 25/259 anastomoses and the Premium CEEA stapler leaked in 18/254 (p=.33). The mean anastomotic height was 6.9cm and the mean BMI was 25.9. There were no differences in the distribution of sex, BMI or anastomotic height between the instruments. The impact of gender, age, ASA-classification, diabetes, BMI, Smoking, Neoadjuvant treatment, stapler size, type of anastomosis, bleeding, diverting stoma, tumour level, anastomotic height, mobilisation of flexure and tumour stage were also investigated.

**Conclusions:** No statistical significant difference in the leak rate between the two compared instruments could be shown. However, this study was ended before the stipulated numbers of patients were recruited since one of the staplers will be taken from the market. In the future, surgical devices may have to prove superiority in randomised trials before they can be introduced.

### P195

	Flap N=29	No Flap N=95	p-value
Age	54(44-62)	61(49-72)	0.02
Female	16 (55%)	37 (39%)	0.1
Rectal Cancer	12(41%)	90 (95%)	0.001
HIV	7(24%)	1(1%)	0.001
Tobacco Use	9(33%)	15(17%)	0.06
Diabetes	2(7%)	7(7%)	0.6
Pelvic Radiation	26(90%)	73(77%)	0.1
Recurrent Cancer	16(55%)	22(23%)	<0.001
Perineal Cellulitis	9(31%)	12(13%)	0.02
Perineal Abscess	4(14%)	8(8%)	0.3
Perineal Wound Separation	8(28%)	21(22%)	0.4
Total Perineal Wound Complications	14(48%)	23(24%)	0.01



# Does Total Mesorectal Excision Require a Learning Curve?: Analysis from Database of Single Surgeon's Experience

(P197)

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**Purpose:** The procedure of total mesorectal excision (TME) becomes a gold standard for treatment of the rectal cancer. The reason is the lowest incidence of local recurrence after TME even without adjuvant treatment, which has been reported by several independent groups. This study was conducted to determine whether TME requires a learning curve to grasp a technical expertise.

**Methods:** We retrospectively analyzed clinical data of patients who underwent total mesorectal excision for their rectal cancers between 1994 and 2003. The 195 patients operated on with curative intent in this study were divided into four groups according to the order in which they were performed by a surgeon. By repeating the analyses for groups 1-4, groups 2-4, groups 3-4, we would identify a point where the variable of interest showed no significant difference for the remaining groups and hence the learning curve had flattened. Patients underwent radiotherapy, either preoperative or postoperative, were excluded. The local recurrence rate was compared between TME learning group and TME learned group.

**Results:** There was no significant difference between four groups by age, gender, type of surgery, tumor location and TNM stage. From group 2 onwards, there was no significant difference with the remainder of the cases in local recurrence rate. The local recurrence rate decreased from 23.6 percent in TME learning group (G1) to 10.2 percent in TME learned group (G2-4) ( $P=0.04$ ) and LN metastasis was an independent predictor of local recurrence ( $P=0.04$ ). However, the difference of local recurrence rate between two groups is particularly prominent in TNM stage III patients (42.6% vs 14.1%,  $P=0.04$ ) rather than in TNM stage II (21.8% vs 8.4%,  $P=0.25$ ). There was no statistical significance in the distant metastasis (15.8% vs 28.3%,  $P=0.37$ ).

**Conclusions:** Our results suggest that even though the principle of TME is strictly obeyed, a learning curve would be necessary to grasp a technical expertise. Vigorous training and assessment of each surgeon are paramount to reach the highest point of learning curve and further study should be conducted in a larger group of patients.

**P197 Cox proportional hazard ratio  
for local recurrence**

	Hazard ratio	95% CI	P-value
G1	2.8	(1.2, 6.6)	0.022
LN metastasis	3.0	(1.2, 7.3)	0.015
T3-4	4.2	(0.5, 32.2)	0.167
Size	1.5	(0.6, 3.7)	0.399
Location	1.5	(0.6, 3.4)	0.391

# Intersphincteric Resection with Quadrant Resection of Upper External Sphincter in Cases of the Very Low Rectal Cancer

(P198)

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**Purpose:** In the treatment of rectal cancer, sphincter saving operation is increased but low anterior resection is limited in treatment for low rectal cancer situated below 4cm from the anal verge. In other reports intersphincteric resection for T2 cancer can allow an oncologically safe resection margin and have good functional results in very low rectal cancer. The purpose of this study is to evaluate the morbidity, mortality, oncological and functional results of intersphincteric resection for T2 and T3 rectal cancer situated below 4cm from the anal verge.

**Methods:** Between 2000 and 2004, 62 patients (mean age 52 years, range 34-74) with adenocarcinoma of the rectum underwent abdomino-intersphincteric resection with a colonic J-pouch and diverting ileostomy. After preoperative radiochemotherapy, patient with overt T2 lesion was 24 cases and received traditional intersphincteric resection (Group I: simple intersphincteric resection), and patient with borderline cases or T3 lesion was 38 cases and received extended intersphincteric resection with quadrant resection of upper external sphincter and primary repair of the external sphincter (Group II: extended intersphincteric resection).

**Results:** The mean distance between the tumor and anal verge was 3.4 (range 2.4-4.0) cm. Over 3mm lateral surgical margin was 79.1%, 84.2% of Group I and II. 1 case of inferolateral recurrence (4.0%) was occurred in Group I and 1 case of pelvic recurrence (2.6%) in Group II. Systemic recurrence was 2 cases (8.3%), 3 cases (7.9%) in Group I and II. Perineal wound infection was 25.0%, 26.3%, and mild anastomotic stricture was 25.0%, 26.3% in Group I and II. The grade I, II of continence by Kirwan classification was 83.3%, 81.5% in Group I and II. Under 3 times stool frequency per day was 54.2%, 63.2% in Group I and II. There was no postoperative mortality.

**Conclusions:** This intersphincteric resection can be alternative to abdominoperineal resection for very low rectal cancer without compromising chance of cure and can improve quality of life. Furthermore, additional quadrant resection of upper external sphincter near the T3 cancer is recommendable to obtain safe infero-lateral surgical margin.

# Complete Tumor Removal Significantly Influences Long-Term Survival in with Perforated Appendiceal Tumors: Analysis of 259 Consecutive Laparotomies

(P199)

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**Purpose:** Pseudomyxoma peritonei (PMP) usually originates from a perforated mucinous appendiceal tumour, and

is now generally categorised pathologically as low or high-grade adenocarcinoma. PMP may present unexpectedly at laparoscopy, laparotomy, hernia repair, or be suspected at cross-sectional imaging. Traditionally serial debulking has been the standard treatment, but complete macroscopic tumour removal (cytoreduction) with heated intraperitoneal chemotherapy (HIPEC) is currently considered optimal therapy. The experience of a tertiary referral centre is reported.

**Methods:** Laparotomy was performed in 259 patients with PMP from a perforated appendicular tumour; 155 females (60%) and 104 males; median age 54 years (range 20-80). The aim was complete cytoreduction and HIPEC (mitomycin C, 10mg/m<sup>2</sup>) or, if not feasible, maximal tumour debulking; generally by colectomy and greater omentectomy. All patients had annual CT and tumour marker measurements to detect disease recurrence or progression.

**Results:** Complete cytoreduction was achieved in 170/259 (66%) and debulking in 89 (34%). Distribution of low and high grade tumours in both group was similar (low grade in 144/170 (85%) undergoing complete cytoreduction; and 69/89 (78%) in debulking). Post-operative mortality was 4/259 (1.5%). Kaplan Meier predicted 5 year overall survival for the whole group of 259 patients was 58%. Five year survival for patients undergoing complete cytoreduction was 79%, and for those undergoing debulking 11% ( $p<0.0001$ ). Provided complete cytoreduction was achieved there was no significant difference in survival between patients with low or high grade tumours (82% versus 67% at 5 years). In contrast, there were no 5 year survivors in the 20 patients with high grade tumours who had palliative debulking.

**Conclusions:** Despite dissemination of a perforated appendix tumour (pathologically T4, M1) approximately two-thirds are amenable to complete tumour removal, with a predicted 5-year survival of 79%. Surgery combined with heated intraperitoneal chemotherapy is optimal therapy for a perforated appendiceal tumour provided complete macroscopic tumour removal is achieved.

#### Use of Myocutaneous Flaps for Perineal Closure Following Abdomino-perineal Excision of the Rectum for Adenocarcinoma

(P200)

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**Purpose:** Abdominoperineal excision (APE) following radiotherapy is traditionally associated with high rates of perineal complications (up to 40%). Use of myocutaneous flaps may improve wound healing by providing healthy tissue in an irradiated field. We review our experience of this.

**Methods:** Prospective data were collected on patients undergoing APE between October 2003 to October 2007. Patient demographics, operating time, wound complications and length of stay were recorded.

**Results:** Of 45 patients having APE for rectal adenocarcinoma, 21 had primary closure and 24 had myocutaneous flap closure (18 Vertical Rectus Abdominus Muscle flaps [VRAM], 6 gracilis). The proportion of patients undergoing preoperative radiotherapy were 62% vs. 92% respectively. Flap formation was associated with a significantly longer mean operating time (313 vs. 210 minutes,  $p<0.0001$ , students unpaired t test) but not a significantly longer median length of stay. Major perineal wound complications requiring reoperation or debridement were seen in 3 patients (14%) in the primary closure group and 5 patients (21%) in the flap group (see table).

**Conclusions:** Primary closure is suitable for patients who have not had pre-operative chemoradiotherapy. Irradiated patients have fewer perineal complications and a shorter hospital stay if a myocutaneous flap is used. With the increasing use of pre-operative chemoradiotherapy more patients will need to be offered this reconstructive surgery.

#### Short-Term Results of a New Sphincter-Preserving Approach to Excise the Distal Rectum: The APPEAR Procedure

(P201)

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**Purpose:** When sphincter-saving rectal resection cannot be performed abdominally there are few alternatives to preserve gastrointestinal continuity. Available procedures are technically difficult, result in sphincter injury and may compromise disease clearance. The APPEAR procedure (Anterior Perineal PlanE for ultra-low Anterior Resection) is a new ultra-low sphincter-saving technique which utilizes the anterior perineal plane to access the distal rectum, and effect colo or ileoanal anastomosis under direct vision. This approach allows complete rectal excision for both malignant and benign disease, maintaining sphincter integrity and potentially preserving continence. The aim of this study was to evaluate the short-term results of this new procedure.

**Methods:** 19 patients destined for a permanent stoma were enrolled (10 neoplasia, 5 ulcerative colitis, 4 trauma). Clinical and physiological assessment was undertaken both preoperatively and at a median of 1.9 years after surgery (range 4 months-4 years).

**Results:** Late mortality was encountered in 1 patient. 10/19 patients underwent ileostomy reversal with 3 pending. 3 patients developed anastomotic perineal fistulae delaying reversal, while 2 further patients were given permanent stomas: 1 patient with irresectable disease identified intraoperatively, and 1 patient with local and systemic recurrence. When the APPEAR procedure was performed for neoplasia or trauma, postoperative median Wexner continence score was 5 (range 0-8,  $n=7$ ), with a median defecation frequency of 3 (1-8/day). Following restorative proctocolectomy, Wexner continence score was 2 (0-6,  $n=3$ ), with

a daily frequency of 3 (1-5). Preoperative quality of life scores (SF-36) did not change significantly following ileostomy closure, and anorectal physiological testing was unaltered following perineal dissection.

**Conclusions:** The APPEAR procedure provides an alternative technique to effect an ultra- low sphincter-saving anastomosis, when this is not possible by conventional surgery. It preserves sphincter integrity and restores continence. Although morbidity was encountered, it should improve with experience and the procedure should reduce the current permanent stoma rate significantly.

#### Histological Circumferential Resection Margin – An Objective Analysis Tool for Measuring the Effectiveness of Colorectal Cancer MDT

(P202)

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**Purpose:** The multidisciplinary team (MDT) plays a pivotal role in today's multifaceted management of cancer. In fact in the UK, an MDT is an obligatory component of colorectal cancer management. However, evaluating its effectiveness has proved difficult with little measurable objective evidence. In rectal cancer, a positive histological circumferential resection margin (hCRM) is indicative of an inappropriate patient selection for curative resection. We used the hCRM in rectal cancer as a surrogate marker of an effective MDT.

**Methods:** A retrospective analysis of consecutive patients referred to our colorectal MDT (April 2005 – April 2007), with low or mid-rectal cancer was carried out. The end point of the study was the proportion of successful curative resections, as measured with a hCRM of >1mm.

**Results:** 67 patients (males 42) with a median age 73 years (43-92) were included. Thirty nine patients (57%) underwent surgery (21 abdominoperineal resections, 13 anterior resections, 4 Hartman's procedures, 1 panproctocolectomy). Of the remainder, 4 (%) declined surgery, 8 (%) were medically unfit for surgery and 16 (24%) were managed palliatively due to the presence of metastases at initial staging. Of the 67 patients, 51 (76%) had a pelvic MRI scan. The predicted CRM on MRI was negative in 22 patients, of which 21 had surgery, all with a negative hCRM. Twenty nine were found to have a breached or threatened predicted CRM on MRI. Of these, 12 received neoadjuvant chemoradiotherapy followed by surgery, all of which also had a negative histological hCRM. In 16 patients (24%) without a pre-operative MRI, 6 underwent surgery and 10 were treated palliatively. In 4 of the operated cases, the final hCRM was negative but in the remaining 2, the hCRM was found to be positive. This therefore gave an overall surgical success rate of 97%.

**Conclusions:** This study shows that an effective multidisciplinary approach to the management of rectal cancers results in a high surgical success rate (97% in this study). This can be measured using hCRM, a tool which would allow hospital trusts to monitor their practice and ultimately improve the quality of care.

#### P200 Major perineal wound and flap related complications

Operation	Age (years)	Pre op chemoradiotherapy	Perineal complication	Management	Length of stay (days)
APE + VRAM	60	No	Complete Flap necrosis	Debridement + VAC	47
TPE + myocutaneous gracilis (recurrent cancer)	60	Yes	Complete Flap necrosis	Posterior thigh flap + skin graft + VAC	54
APE + VRAM	74	Yes	Complete Flap necrosis	Myocutaneous gracilis flap	26
APE + VRAM	86	Yes	Partial flap necrosis	Debridement + VAC	47
TPE + distal pancreatectomy/ splenectomy + myocutaneous gracilis	69	Yes	Partial flap necrosis. Iatrogenic small bowel injury	Debridement + VAC. Laparotomy and exteriorisation of fistula	103
APE	87	Yes	Perineal wound breakdown	Debridement + VAC. Maggots	Died day 193
APE	48	Yes	Perineal wound breakdown	Debridement + VAC. Gluteal flap	12
APE	83	Yes	Perineal wound breakdown	Debridement + VAC	146

### Surgery in Complex Rectal Cancers is Associated with Good Long Term Outcomes

(P203)

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**Purpose:** Pelvic cancers of intestinal origin which involve one or more surrounding structures present a challenging clinical problem. Resection often involves excision of one or more surrounding structures with significant morbidity and mortality. In selected cases resection can offer good outcomes for patients. We aimed to stratify factors that may influence survival in patients with complex pelvic cancers which were suitable for surgical resection.

**Methods:** A retrospective chart review was performed on all patients who underwent surgery for complex pelvic cancers. Tumours were classified according to primary or recurrent tumours at time of presentation. Factors evaluated included age, sex, neo adjuvant or adjuvant chemotherapy, time to recurrence, post operative complications and survival. The primary outcome was overall survival.

**Results:** 31 patients had major pelvic surgery for complex pelvic cancers between 1996 and 2006. 52% were primary cancers and 48% were recurrent cancers. The overall complication rate was 42% and the perioperative mortality rate was 3.2% (one death). Median age was 55 years and median follow up was 62 months. 26% of patients required sacrectomy as a part of the surgery while the others required cystectomy and/or vaginectomy. 5 year survival was 40% for the entire group and median time to recurrence was 2 years. There was a trend to a lower 5 year survival in those who had surgery for primary disease than for recurrent disease (38% vs 48%). There was a trend to an improved 5 year survival in those patients who did not receive neo adjuvant treatment (75% vs 30%  $p=0.07$ ).

**Conclusions:** Surgery for complex pelvic cancers is associated with a low mortality and acceptable morbidity considering the magnitude of the surgery. Although the surgical approach is aggressive acceptable 5 year survival rates justify surgery in this group of patients. The worse outcome in those who received neo adjuvant treatment may be a reflection of less favourable disease within that group.

### Rectal Cancer Time Bomb – Defused or Still Ticking?

(P204)

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**Purpose:** There have been significant advances in rectal cancer management and perhaps the biggest has been in patients who have had complete clinical response following chemoradiotherapy (CRT). There has been much debate and controversy on the watch and wait policy adopted in some centres for these patients. However, the verdict is still as yet undecided.

**Methods:** Data was obtained from the Royal Devon & Exeter Hospital Colorectal database between January 2006 - August 2007

**Results:** 18/101 (18%) patients diagnosed with rectal cancer underwent pre-operative CRT following a pre-treatment multidisciplinary team meeting (MDT). Two patients who had complete radiological response went on to have perineo-abdomino excisions (PAE) with complete pathological response seen in the resected specimens. Consequently, we have managed a further 2 patients with the watch and wait policy for over 6 months following complete clinical and radiological response after CRT. Patients have been followed up with 3 monthly MRI scans and yearly PET scans after a frank and informed discussion in the multidisciplinary team (MDT) setting and with the patients themselves. There has been a 22% (4/18) complete clinical response so far in patients given neo-adjuvant CRT in rectal cancer management in this centre.

**Conclusions:** This suggests a small yet highly relevant group of patients who are suitable for this approach. This has alleviated the need for surgery with all its inherent risks for now but the long term effect of this management strategy is still unknown.

### 21st Century Perineal-Abdomino Excision of the Rectum....What Would Miles Think 100 Years On?

(P205)

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**Purpose:** The English Surgeon, WE Miles described the first series of abdomino-perineal excision (APE) in 1908, which although revolutionary was associated with exceptionally high morbidity and mortality. One hundred years later, developments in rectal cancer surgery, including total meso-rectal excision (TME), MRI staging and the multi-disciplinary team process have led to an improved outcome for patients. However, there has been a reduction in the number of APE's performed, yet outcome for APE has not improved as significantly. They are still associated with involved circumferential resection margins (CRM), local recurrence and reduced long-term survival. We have reassessed the Miles approach by performing the perineal dissection with the patient in the prone jack-knife position first before an abdominal completion. This enables a wider excision to compensate for the deficient meso-rectum as it approaches the pelvic floor.

**Methods:** Patients were identified from a prospectively collected database. A review of the notes and histological staging was performed.

**Results:** Ten patients were listed for perineo-abdomino excision of the rectum although one was approached abdominally initially because of the concern of metastatic omental deposits and did not undergo further excision. Of the other nine, eight had locally advanced tumours at diag-



nosis. Seven were treated with neo-adjuvant chemo-radiotherapy prior to surgery, but the eighth was deemed medically unfit for oncological therapy. Two of the eight had no residual tumour, and all had clear circumferential margins. This was an improvement on the previous eight years where the CRM positive rate was 20%.

**Conclusions:** This report describes a modified technique for performing perineo-abdominal excision of low rectal cancers. The pathological reports suggest an improvement in the CRM involvement compared with previous years' performance.

### Rectal Cancer in the Obese: A Technical Challenge

(P206)

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**Purpose:** Pelvic dissection during proctectomy in the obese patient can be technically challenging. Poor technique clearly leads to worse outcome in the surgical management of rectal cancer. Because of the difficulties encountered during pelvic surgery in obese patients, we hypothesized that these patients would have a decreased rate of sphincter preservation.

**Methods:** We retrospectively evaluated data collected in a prospective colon and rectal surgery database from the years 2002-2007. All patients who underwent surgical intervention for rectal cancer during this time period were included in this study. Patients were grouped according to BMI with Group 1 including patients with BMI > 30 and Group 2 including those patients with BMI < 30. Significant differences between continuous and categorical variables were identified using the Wilcoxon rank sum and Chi square tests, respectively.

**Results:** We identified 116 patients that met our inclusion criteria. Groups 1 and 2 include 30 (25%) and 86 patients with average BMI for these groups of 34.5 (range 30-55) and 24.3 (range 15-29), respectively ( $P < 0.05$ ). We found that blood loss (345 ml vs. 264 ml,  $P < 0.05$ ) and length of operative time (219 minutes vs. 206 minutes,  $P < 0.05$ ) were significantly greater in those patients in Group 1. Number of lymph nodes retrieved in the surgical specimen and the number of positive lymph nodes were the same between the two groups. We found the rate of sphincter preservation in those patients with tumors in the lower 2/3 of the rectum was 82% (22/27) and 64% (42/66) in groups 1 and 2, respectively ( $P > 0.05$ ). Interestingly, we did find that those patients in group 1 who underwent a coloanal anastomosis were less likely to have a J-pouch constructed (50 vs. 83%,  $P < 0.05$ ).

**Conclusions:** We have found that patients with a BMI > 30 undergoing surgery for rectal cancer have similar surgical outcomes as those patients with BMI < 30. Our results indicate that, while obesity presents surgical challenges, it should not be a technical obstacle to sphincter preservation in patients with rectal cancer.

### T1 Adenocarcinoma of the Rectum: Oncologic Outcome after Local Excision

(P207)

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**Purpose:** Local excision of rectal adenocarcinoma is an important option for T1 cancers. In contrast to radical resection, local excision has a low rate of morbidity and mortality. However, recent literature has cited local recurrence rates ranging from 0-31%. Many variables have been associated with higher risk for local and distant recurrence, including tumor size, depth of penetration, regional lymph node detection, tumor grade, lymphovascular or neural invasion, tumor fragmentation, incomplete margins, and mucinous histology. We reviewed records of the section of Colon and Rectal Surgery patients from July 1990 to present who underwent local excision of T1 rectal cancers to evaluate for recurrence and survival.

**Methods:** The charts of 61 successive patients diagnosed with T1 rectal cancers were reviewed. The patients were stratified into two groups: group 1 includes patients who had previously untreated cancer ( $n=28$ ), and group 2 includes those with a positive margin after snaring a polyp containing cancer ( $n=33$ ). The excisions were performed by either transanal excision (TAE) or transanal endoscopic microsurgery (TEM).

**Results:** Twenty-eight Group 1 patients diagnosed with early rectal adenocarcinoma underwent local excision. Twenty three were removed by TEM and 5 were removed by TAE. All patients were treated by TEM in group 2. In group 1, four patients were lost to follow up, one patient died of a cause not related to local excision. Of the remaining twenty three patients, three (13%) developed recurrence. One (4.3%) had local recurrence, and two (8.6%) had both local and distant recurrence. There was only 1 (3%) recurrence in group 2, this patient died of cancer. As a whole, for group 1 and 2 T1 rectal cancers, there were 4 (7.1%) recurrences in 56 patients.

**Conclusions:** Although, much of the current literature indicates a wide range of outcomes for local excision of T1 rectal adenocarcinoma, our experience demonstrates that outcomes can be reasonable when patients with rectal cancer are carefully selected.

### Chemoradiation as Primary Treatment for Medically Unfit or Stage IV Rectal Cancer Patients: A Viable Option?

(P208)

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**Purpose:** Palliative chemoradiation for patients diagnosed with rectal cancer who are either medically unfit for surgery or have stage IV disease at presentation is frequently used despite minimal data of outcomes of such treatment.

We hypothesize that the use of chemoradiation instead of surgery as palliative treatment for stage IV rectal cancer or as primary treatment in medically unfit patients, results in adequate control of the primary tumor.

**Methods:** From 1997-2007, we identified patients who received chemoradiation as primary treatment for stage IV rectal cancer or who were unfit for surgery. We reviewed the treatment regimens, response to treatment of the primary tumor, and patient outcomes. Median (range) values listed.

**Results:** Thirteen patients were identified. Ten patients had palliation for stage IV rectal cancer, while 3 patients (ages - 59, 75, 86 years) underwent chemoradiation as primary treatment because they were unfit for surgery. All patients completed a course of radiotherapy (5207 (3750-6480) cGy), 12 combined with chemotherapy (5FU + leucovorin). Three patients developed temporary toxicity requiring dosage adjustments. At follow-up endoscopy, 4 patients had a complete clinical response, 5 had a decrease in size of the primary tumor, and 4 patients had not undergone repeat endoscopy. Of patients with metastases, four are alive - 6, 14, 24, and 41 months from diagnosis, and six died of metastases 14 (4-30) months after diagnosis. Of medically unfit patients, two are alive, 9 and 14 months from diagnosis, and one died of brain metastases at 8 months. Three patients had rectal bleeding; two required no intervention while one had rectal packing and fecal diversion. An additional patient developed obstruction requiring fecal diversion 14 months after diagnosis. No patient developed pelvic pain.

**Conclusions:** In our experience, the use of chemoradiation as palliative therapy in patients with stage IV rectal cancer and as primary treatment in patients medically unfit for surgery adequately controlled the primary tumor in the majority of patients. Primary chemoradiation without surgery has few side effects and is associated with good palliation.

#### Short Course Pre-operative Ferrous Sulphate Supplementation – Is it Worthwhile In Patients with Colorectal Cancer

(P209)

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**Purpose:** Pre-operative anaemia is well recognised in patients presenting with colorectal cancer (CRC). While the benefits of long term FeSO<sub>4</sub> supplementation on Fe deficiency anaemia are well established, it is not known if short course supplementation (2-3 weeks) impacts significantly on

pre-operative haemoglobin (Hb) levels. This study examines the impact of short term oral FeSO<sub>4</sub> supplementation on patients undergoing surgery for CRC.

**Methods:** : Ethical committee approval was granted for a cohort study only. All patients with CRC presenting to a single surgeon were included. At diagnosis, baseline Hb and blood film were checked on all patients who then received 200mg tds of FeSO<sub>4</sub>. Hb was re-checked pre-operatively and daily post op. Patients requiring pre-operative blood transfusions were excluded from analysis. Results (median(interquartile range)) were compared using the Mann Whitney U test, p<0.05 considered significant

**Results:** Between 1.1.04 and 31.12.06, 117 patients were identified (exclusions due to pre-operative transfusion (n =14)). Patients received a median of 20 days treatment with FeSO<sub>4</sub>. 58 (56.3%) patients who were anaemic at presentation benefited from short course Fe SO<sub>4</sub> supplementation, gaining a mean of 1.73g/dl (p<0.001). Right sided tumours (lower mean Hb at presentation, p=0.008) responded more to Fe SO<sub>4</sub> when compared to left sided tumours, p< 0.017 (Table 1). Increase in Hb was unrelated to pathological stage (Dukes classification). The transfusion rate for all curative resections was 0.78 units/patient. Compared to a historical cohort (patients undergoing curative resection between 1.1.01 - 12.31.03), the mean transfusion rate fell from 1.69 units/patient.

**Conclusions:** Routine short course supplementation with iron offers improved pre-operative Hb prior to surgery in CRC, especially in right sided lesions and those with presenting anaemia. 12 patients had a post-operative Hb in the transfusion zone (Hb<8g/dl). Had FeSO<sub>4</sub> not been given between diagnosis and surgery, 31 patients could have been predicted to have fallen into this category.

#### Do Surgeon Attitudes Contribute to Underutilization of Neoadjuvant Chemoradiation Therapy for Rectal Cancer?

(P210)

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**Purpose:** The selective use of neoadjuvant chemoradiation therapy (NT) in the curative treatment of rectal adenocarcinoma based upon pretreatment staging has become an established standard. Underutilization of NT has been demonstrated by us and others. We sought to determine if surgeon attitudes regarding pretreatment locoregional stag-

P209

Tumour site	Median gain	Mean gain	Inter-quartile range
Right sided	1.050	1.613	0.20-2.70
Left sided	0.250	0.937	0.00-1.30

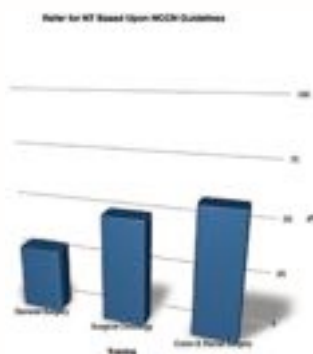
Table 1: Hb gain for tumour location (all values in g/dl)

ing (LS) and NT use contribute to underutilization of NT.

**Methods:** From December 2006 to March 2007, an electronic survey was distributed to physician-members of the American College of Surgeons and American Society of Colon and Rectal Surgeons practicing in the State of Florida. The survey was designed to ascertain surgeon attitudes and practices with regard to the use of LS and NT for patients with rectal cancer. The appropriateness of surgeon preferences were judged based upon NCCN guidelines.

**Results:** 759 surveys were distributed and 323 completed surveys were returned (43% response). 168 were excluded from further analysis because they did not treat rectal cancer (n=117), were in training programs (n=34), returned incomplete surveys (n=15), or were not BC/BE in surgery (n=2). The remaining 155 were analyzed with regard to training, years of practice, use of and preferred methods for LS, use of NT in their practice, and stages appropriate for NT referral. The respondent's preferred LS modality was: transrectal ultrasound (TRUS) 51.6% (n=80); CT 35.5% (n=55); MRI 7.7% (n=12); PET 4.5% (n=7); other 0.7% (n=1). 59.3% of respondents preferred either TRUS or MRI for LS consistent with NCCN guidelines. 58 (37%) respondents referred for NT in a stage-appropriate manner. Subspecialty-trained surgeons utilized treatment guidelines significantly more often than others (see figure). Additional detailed analyses by subspecialty training, years of practice, and cancer stage were performed.

**Conclusions:** The preferred practices of surgeons who treat rectal cancer are frequently inconsistent with established guidelines for pretreatment staging and use of NT. This may result in understaging of tumors and contribute to the underutilization of neoadjuvant therapy seen in prior studies. Subspecialty training was associated with increased use of these guidelines.



#### Radiotherapy in Rectal Cancer – Is it Time for Change? A Qualitative Analysis of the Survey of Members of ACPGBI on Preliminary MRC-CRO7 Results

(P211)

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**Purpose:** The role of Neoadjuvant therapy (NAT) in management of rectal cancers has not reached a consensus in the

UK. A survey of ACPGBI members indicated 39% have changed practice based on preliminary evidence from CRO7 trial. Change in clinical practice is driven by a number of factors. Aim: To find out factors influencing changing clinical practice in context to use of radiotherapy in rectal cancer.

**Methods:** A postal questionnaire was sent to 400 members of the ACPGBI. Data for this subset of results is derived from the comments section on the questionnaire. Qualitative methodology was adopted to analyze the comments section.

**Results:** Of 400 questionnaires, 200(50%) were returned. Of these only 52(26%) surgeons completed comments section. Themes emerging from thematic analysis are Patient-groups, Treatment, Evidence-based-practice (EBP), Professional-consensus and Service-provisions. Outcomes derived are individualize treatment, provide safer/less harmful treatment, increase role of MDTs, increase awareness of current evidence-based-literature, develop protocols/ guidelines, shorten delay in implementing evidence-based-practice and improve service provisions. Themes and outcomes are shown in figure 1.

**Conclusions:** Change is a slow and complex process influenced not only by data/ scientific evidence but by a combination of other factors. Some of them are Clinical decision making, Evidence based practice / Education, Research Translation and Organizational factors with Infrastructure / Resources. The derived outcomes would help in early implementation of EBP.

#### Thrombocytosis in the Management of Colorectal Cancer (P212)

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**Purpose:** High circulating platelet counts have been associated with poor prognosis in a variety of solid tumours such as breast, renal and lung cancer. Platelets contain high levels of pro-angiogenic factors such as Vascular Endothelial Growth Factor, VEGF and may promote tumour angiogenesis. A recent meta-analysis (Lazo-Langner et al) concluded that low molecular weight heparin conferred a survival benefit for patients with a variety of advanced solid malignancies including colorectal cancer. We investigated the significance of a high pre-operative platelet count on overall survival in patients with stage I-III colorectal cancer.

**Methods:** All patients who underwent resection of a colorectal adenocarcinoma between 1999 and 2003 in our institution with a full blood count taken within 90 days of surgery were assessed. A total of 398 patients met the inclusion criteria, male: female 7:5, median age 73 (40-99 years). Thrombocytosis was defined as platelet count of  $\geq 450 \times 10^9/L$ . The relationship between platelet count, pathological features and overall survival was assessed.

**Results:** Cox regression showed platelet count to be an independent marker of survival on univariate analysis

( $p=0.0002$ ) and multivariate analysis ( $p=0.014$ ), in addition to age ( $p<0.0001$ ), T-stage ( $p=0.002$ ), N-stage ( $p<0.0001$ ), extramural vascular invasion ( $p=0.012$ ), lymph node yield, ( $p=0.005$ ) and resection margin status, ( $p=0.026$ ). Thrombocytosis was defined in 39/398 (9.8%) of cases and its presence was associated with extramural vascular invasion ( $p=0.025$ , Fisher's Exact Test), depth of tumour invasion, ( $p=0.005$ , Chi-squared test) and lymph node involvement, ( $p=0.006$ , Fisher's Exact Test). Patients with thrombocytosis had a significantly poorer overall median survival, (41 versus 15 months,  $p<0.0001$ , Mantel-Cox). A difference in median survival was seen in patients with stage I/II disease ( $n=215$ ) of 47 versus 34 months, ( $p=0.022$ , Mantel-Cox) and patients with stage III disease ( $n=147$ ) of 36 versus 10 months, ( $p=0.016$ , Mantel-Cox).

**Conclusions:** Colorectal cancer patients with pre-operative thrombocytosis have a poorer overall survival regardless of pathological stage. Studies of agents which modulate the platelet-tumour interaction in colorectal cancer are now warranted.

#### **Surgical Morbidity after Neoadjuvant Bevacizumab, Oxaliplatin, 5-Fluorouracil and Radiation in Locally Advanced Carcinoma of the Rectum**

(P213)

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**Purpose:** This study evaluates the complication rate of radical proctectomy after induction chemotherapy with bevacizumab and FOLFOX, followed by concurrent chemoradiotherapy with bevacizumab, weekly oxaliplatin and continuous infusion 5-FU for stage II-III adenocarcinoma of the rectum.

**Methods:** Eligible patients received one month of biweekly bevacizumab (5mg/kg) and FOLFOX6, then 50.4 Gy radiation and concurrent bevacizumab (5mg/kg on days 1, 15, and 29), oxaliplatin (50mg/m<sup>2</sup>/week for 6 weeks) and 5-FU (200mg/m<sup>2</sup>/day) continuous infusion throughout radiation. Radical proctectomy with total mesorectal excision was performed 4-8 weeks after completion of neo-adjuvant therapy. Postoperative chemotherapy with 12 biweekly treatments of modified FOLFOX6 and bevacizumab was started 4-12 weeks after surgery.

**Results:** Twenty-two patients entered the study and twenty (14 males, 6 females) completed the treatment protocol. Age range was 39-75 years, mean 53 years. Pre-treatment ERUS stage was T3N1 in ten patients, T3N0 in eight, and T2N1 in two. Fifteen patients underwent low anterior resection with colo-anal anastomosis and temporary ileostomy; five had an abdomino-perineal resection. Mean operative time was 182 minutes; mean blood loss was 360 ml, with two patients requiring blood transfusions; average hospitalization was 8 days. Complications included: one DVT, three

wound infections, two intra-abdominal abscesses, two anastomotic leaks, one rectovaginal fistula, no deaths. To date, eleven patients had their temporary stoma closed. After histologic exam of the resected specimen, four patients had a pathologic complete response.

**Conclusions:** In this pilot study, a more vigorous multi-agent chemotherapy protocol did not appear to substantially increase the incidence of pathologic complete response after radical resection, when compared with data from single agent neo-adjuvant chemoradiation regimens. In addition, this study suggests a possible association with an increase in post-operative complications related to anastomotic healing and infections.

#### **Preoperative therapy with CpG Oligodeoxynucleotide, TLR 9 Agonist, Strongly Inhibits the Growth of a Murine Colon Adenocarcinoma in Vivo**

(P214)

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**Purpose:** There is experimental data demonstrating that CpG Oligodeoxynucleotide (CpG), a Toll Like receptor (TLR) 9 agonist, inhibits tumor growth by augmenting Th1 immunity when used alone or with chemotherapy for solid tumors. CpG has not been used perioperatively, its use might limit the well documented surgery-associated cell-mediated immunosuppression and increased tumor growth noted in murine models. This study's hypothesis is that preoperative CpG treatment will inhibit tumor growth after surgery.

**Methods:** Subcutaneous tumors were established in Balb/C mice via injection of 6 x 10<sup>5</sup> CT-26 tumor cells. Starting 9 days after tumor inoculation the mice received direct intratumoral injections of either CpG 1826 20ug/dose or PBS alone (1 dose q 2 days). After 5 doses the mice were divided into 4 groups ( $n=10$ /group) and underwent the following procedures: 1) Anesthesia alone (control) with placebo (AC-PL), 2) sham laparotomy with placebo (SL-PL), 3) anesthesia control with CpG (AC-CpG), and 4) sham laparotomy with CpG (SL-CpG). Tumor volume was assessed at several time points and tumor mass determined on POD 21.

**Results:** The median tumor mass of the AC-CpG (0.01; IQR 0-2.9) and SL-CpG groups (1.2; IQR 0.01-1.6) on POD 21 was significantly smaller than noted in the AC-PL (6.2; IQR 3.2-12.1, vs. AC-CpG,  $p<0.01$ ) and SL-PL groups (4.1; IQR 2.5-8.9, vs. SL-CpG,  $p<0.05$ ). Also, significantly smaller tumor volumes were noted in both CpG groups on the day of surgery vs. the Placebo results. No differences in tumor mass or volume were noted when the SL-PL and AC-PL groups' tumor were compared; the same was true for the SL-CpG and AC-CpG groups results. Complete tumor regression was noted in 40% of AC-CpG mice and 20 % of the SL-CpG (vs. none in the Placebo groups).

**Conclusions:** Preoperative intra-tumoral CpG therapy markedly decreased tumor growth before and after SL or



AC. Of note and for unclear reasons, SL, when compared to AC, was not associated with increased tumor growth. The specific mechanism of CpG's effect was not assessed. Further studies are indicated to determine if the addition of postoperative CpG therapy would improve the results.

**Direct Herpes Simplex Virus 1 (HSV-1) Delivery into Rectal Adenocarcinoma in Mice Results in an Efficient Anti-tumor Effect**

(P215)

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**Purpose:** Cancer of the rectum is a common clinical problem. Because of its anatomical location in the pelvis and the proximity to the anal sphincters, rectal cancer poses a complex therapeutic challenge. The current standard of care combining neoadjuvant chemo/radio therapy followed by surgery has been shown to confer good survival rates and low local recurrence rates. This approach allows to preserve sphincter function thus enhancing the quality of life after surgery. Nevertheless, these modes of treatment are associated with significant side effects. We have recently shown that HSV-1 preferentially infects human colon cancer compared to normal colonic mucosa suggesting that HSV-1 based therapy may offer a novel therapeutic modality for rectal cancer. To determine the oncolytic effect of HSV-1 in a clinically relevant setting, we examined the effect of intra-tumoral delivery of HSV-1 into rectal adenocarcinoma in mice.

**Methods:** Orthotopic rectal tumors were established by injecting mice colon adenocarcinoma cells (CT-26), stably transfected ex-vivo to express luciferase (Luc), directly into the submucosa of the distal rectum. The tumor response to viral therapy was assessed by imaging of Luc expression in-vivo.

**Results:** A single intra-tumoral injection of HSV-1 resulted in complete arrest in tumor growth compared to untreated tumors which increased significantly in volume. HSV-1 significantly increased animal survival by two folds. Histological analysis of the tumors injected with HSV-1 revealed a massive apoptotic response signifying a combined direct oncolytic and bystander effect. There was no HSV-1 gene expression or notable damage in the adjacent colonic mucosa nor at distant organs.

**Conclusions:** These results demonstrate the efficacy of HSV-1 delivery into orthotopic rectal cancer and may provide the basis for a novel clinical therapeutic neoadjuvant modality for rectal cancer.

**HIV Status Does Not Influence Recurrence of Squamous-Cell Carcinoma of the Anus**

(P216)

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**Purpose:** Reasons for recurrence of squamous cell carcinoma of the anus (SCCA) are not well-known, particularly in the HIV positive population. Only a small number of studies have been published regarding the treatment and outcomes of HIV-infected individuals with SCCA, mostly based on treatment of HIV patients before the routine use of highly active anti-retroviral therapy (HAART). The influence of HAART on SCCA outcomes and recurrence has not been well-studied. The purpose of this study is to determine the recurrent rates of SCCA in HIV positive patients as compared to HIV negative patients.

**Methods:** A retrospective case control study was performed, identifying patients with SCCA from 1990-2005. Patients were identified by pathology, hospital, and outpatient records. Patients excluded were those with contraindications to chemoradiation therapy, squamous cell carcinoma in situ, or stage IV SCCA at the time of diagnosis.

**Results:** At time of abstract submission, 79 patients were identified with SCCA. 45% (36 of 79) of patients had HIV at the time of initial diagnosis of SCCA. Of all patients, 38% (30 of 79) were identified with recurrent disease, most of whom initially presented with stage II disease. Of the 30 patients with recurrent SCCA, 43% (13) were HIV positive, all male, with a mean CD4 count of 255. Median time to recurrence was 13 months, with a mean time to recurrence of 32.2 months (6-192 months). The relative risk of developing recurrent SCCA given HIV positive status is 0.91, with a risk difference of 8% compared to HIV negative patients. Of the 30 patients with recurrence, 15 underwent an abdominoperineal resection (APR), 4 of whom were HIV positive. Median follow-up for patients undergoing APR was 15 months. Of the patients who underwent an APR, 6 mortalities with a median survival time of 14 months was observed.

**Conclusions:** Based on these preliminary results, HIV status does not influence recurrence of SCCA. Further analysis is needed to identify which clinical factors predict recurrent SCCA, particularly in HIV positive patients in the era of HAART therapy. A better knowledge of predictive factors may eventually help in the development of risk-adapted treatment strategies for anal cancer.

**A Fifteen-Year Study of Dukes' A Colorectal Cancer (CRC)**

(P218)

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**Purpose:** The diagnosis of a lymph node-negative CRC should imply a good prognosis. The five year survival for patients with Dukes A CRC is quoted to be 85%(Robert 2002). The number of lymph nodes evaluated has been shown to be associated with survival of patients with CRC (Chang et al 2007). Mander et al (2006) showed that Jass staging was a predictor of outcome following curative resection of Dukes B CRC. The aim was to determine the recurrence rates of patients with Dukes A cancer operated on

between January 1991 and December 2005, and to assess the lymph node reporting and the relationship of Jass staging to recurrence.

**Methods:** The details of patients undergoing CRC resection over a 15-year period were obtained from the histopathology database. Only patients who underwent planned curative surgery were included. Each case was reviewed to determine lymph node reporting, the Jass classification and whether or not there had been any disease recurrence. The results were looked at in three time periods, each of 5 years: 1991-1995; 1996-2000; 2001-2005. The incidence of Dukes A adenocarcinomas as a percentage of the total number of CRCs was calculated.

**Results:** There were 217 operations on 215 patients and 12 patients were lost to follow up. There were 22 (10.2%) recurrences in the remaining 205 cases. As the number of histology reports documenting the lymph node harvest increased over the 5 year periods with reporting rates of 44%, 63% and 96% respectively the percentage of CRCs which were classified as Dukes A decreased with rates of 15.3%, 13.9% and 10.5% respectively ( $p < 0.01$ ) over the 5 year periods. 183 patients were reported as Jass I and 22 were Jass II. Five of the 22 Jass II patients developed recurrence compared with 17 recurrences out of 185 Jass I patients. ( $p = 0.06$ ) There was one anastomotic recurrence, 5 local recurrences and 16 patients with distant metastases.

**Conclusions:** In this study there was a 10% recurrence rate. The incidence of Dukes A CRC significantly decreased as the number of reports documenting lymph node harvest increased over the study period. Jass staging can provide useful additional and may identify a sub-group of Dukes A CRC patients who require adjuvant treatment to minimise their chance of tumour recurrence.

#### Colorectal Cancer (CRC) in Elderly Patients – Presentation, Treatment and Outcomes

(P219)

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**Purpose:** Elderly patients are a growing subset of the population who are under-represented in clinical trials and often present and are treated differently than their younger counterparts with CRC. The objective of this study is to characterize the presentation, care and outcomes of CRC in individuals over 75 years of age compared to those aged 50-74.

**Methods:** All patients over age 50 who had surgery for CRC between 1997 and 2006 were identified through the Mount Sinai Hospital CRC database and their information collected.

**Results:** 895 patients had surgery (55.6% male, 44.4% female). There were 623 patients aged 50-74 (mean 62.6) and 272 patients 75 and over (mean 81.5). The mean ASA scores were 2.23 and 2.8 for the younger and older groups respectively. See table for further results.

**Conclusions:** Older patients selected for CRC surgery are more likely to have colon cancers and lower stage cancers, but their cancers less likely to be diagnosed by screening. They are less likely to receive adjuvant chemotherapy and may be less likely to be offered surgery for advanced disease. Although they have more cardio-pulmonary complications and longer hospital stays, their long-term CRC related outcomes are similar to younger patients even when adjusting for important predictors such as ASA score. This suggests that treatment should not be withheld based on age alone.

#### P219 RESULTS

	50-74 years	75+ years	p-value
% Stage 4	18.6	12.1	0.001
% Identified by Screening	13.7	7.3	0.008
% Colon	55.1	65.8	0.003
% Emergency Procedures	6.6	6.6	0.989
% with No Complications	71.9	54.0	0.011
Median Hospital Stay (days)	8.0	10.0	0.005
Post-op			
% Stage 3 Chemotherapy	91.3	43.5	0.001
5-year Overall Survival (%)	68.7	57.3	0.036
5-year CRC-related survival (%)	74.0	74.7	0.277

#### Can You Teach Old Dogs New Tricks?

(P220)

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**Purpose:** Laparoscopic colonic surgery is as yet not widely available in the UK. One of the limitations has been the lack of structured training programs aimed particularly at established consultant, wishing to set up a laparoscopic service. In 2004, the Association of Laparoscopic Surgeons of Great Britain and Ireland (ALS) initiated a preceptorship program in laparoscopic colorectal surgery. Following the successful completion of this program in 2005, this study examines the results of a laparoscopic colorectal service in a district general hospital.

**Methods:** All laparoscopic colorectal operations were performed by two colorectal surgeons working together. The data presented were retrospectively analyzed from a prospectively collected database.

**Results:** Over a 2 year period, 55 patients (35 male) with a median age of 76 (28-88) years underwent laparoscopic colorectal resections. Fifty two (95%) cases were cancer resections and 3 (5%) were for benign disease. In total, there were 22 right hemicolectomies, 4 left hemicolectomies, 27 anterior resections (AR), 1 subtotal colectomy and 1 defunctioning loop colostomy for an inoperable tumour found at laparoscopy. The overall activity of the unit increased from

20 cases in the first year to 35 in the second year. The median operative time was 150 (80-390) minutes. This had decreased from a median of 150 minutes in the first year to 80 minutes in the second ( $p=0.36$ ; Mann-Whitney U Test). The median hospital stay was 6 (3-40) days. The median lymph node yield was 15 (4-96) nodes. Six cases (11%) were converted, all occurring in the AR group. There were 25 (44%) complications; 18 (33%) were minor (eg: superficial wound or extraction site hernia) and 6 (11%) were major (2 anastomotic leaks, 2 ureteric injuries, 1 obstructed ileostomy). The 30-day mortality rate was 2% (1 case following an anastomotic leak).

**Conclusions:** The preceptorship program has enabled two consultant surgeons to successfully establish a laparoscopic colorectal service in a district general hospital. Our early results demonstrate acceptable operative and oncological outcomes. By working together, each surgeon can benefit from the advice and support of the other, thus potentially increasing productivity and reducing the gradient of the learning curve.

#### Gastrointestinal Manifestations of Graft-vs-Host Disease in Bone Marrow Transplant Patients

(P221)

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..... Buffalo, NY

**Purpose:** Bone marrow transplantation is performed with increasing frequency to treat hematologic diseases. Graft versus host disease (GVHD) is a cause of significant morbidity and mortality after bone marrow transplantation. While GVHD usually presents cutaneously, we noticed an increasing number of patients with gastrointestinal GVHD. The aim of this study is to assess the incidence, presentation, and outcome of GI GVHD.

**Methods:** We conducted a retrospective chart review of all patients who underwent allogeneic bone marrow transplantation between 1998 and 2006. GI complications related to BMT and requests for surgical consultation were documented. Patient demographics, symptoms, presentation, evaluation, treatment, and outcome were recorded.

**Results:** Twenty-two patients underwent bone marrow transplantation during the study period. 59% (13/22) developed GI GVHD. In 69% (9/13), a surgical consult was requested. Diagnoses included esophagogastrroduodenitis, non-infectious colitis, clostridium difficile colitis, pneumatosis intestinalis, elevated liver function tests, acalculous cholecystitis, and multi-organ dysfunction syndrome (table). Overall mortality was 23% (5 patients). Lower GI GVHD was seen in 6/13 (46%). 4 of the 6 patients with lower GI disease had complete resolution with medical management and the other two, both with pneumatosis and free air, died from multi-organ dysfunction. Among patients with upper GI GVHD (7/13), patients with elevated liver function tests did particularly poorly (3 of 4 developed multi-system organ

failure and died). The remaining 3 patients with upper GI manifestations recovered uneventfully. All of the GI complications were managed non-operatively.

**Conclusions:** GI GVHD occurred in over half of the patients who underwent bone marrow transplant, but mortality was relatively low (23%). Elevated liver function tests and colonic pneumatosis were poor prognostic factors. Although over two-thirds of patients had surgical consultation, none required an operation, and most improved with aggressive nutritional support and intravenous antibiotics. This is a limited study but it questions the role of operative intervention in patients who develop GI manifestations of GVHD.

#### P221

	Total Number of patients	Mortality
Upper Gastrointestinal	7/13	3/13
Elevated Liver Function Tests	4	3
Other (acalculous cholecystitis, SBO, duodenitis)	3	0
Lower Gastrointestinal	6/13	2/13
Pneumatosis intestinalis with free air	2	2
Non-infectious colitis	3	0
Clostridium difficile colitis	1	0

#### Outcome of Patients with a Focus of Malignancy Within a Colorectal Polyp

(P222)

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**Purpose:** To evaluate the outcome of patients who were discovered to have a focus of malignancy after local resection of a colorectal polyp

**Methods:** All patients with malignancy within a colorectal polyp from 1998 to 2007 were identified from the prospective colorectal multidisciplinary database. Data gathered included patient demographics, type, size and location of polyp excised, histological features, further surgical intervention, follow up data, administration of chemo-radiotherapy, complications, recurrence and survival.

**Results:** 27 patients were identified to have a focus of malignancy. The mean age was 69.62 (range 29-89), 1.7:1 male to female ratio. There were 19 tubulovillous sessile adenomas and 8 pedunculated tubular polyps. 13 were located in the rectum, 12 sigmoid, 1 transverse colon and 1 in the caecum. The mean size of the polyps was 18.87mm (range 8-65mm). Histology revealed 18 well differentiated adenocarcinomas, 7 moderately differentiated, 1 carcinoid and 1 basaloid tumour. Primary excision of the polyp was undertaken by snare diathermy in 21 cases, 4 TEMS (transanal endoscopic microsurgery) and 2 TAR (transanal).

Resection was deemed complete in 16, incomplete in 4 and uncertain in 7 cases as diathermy artefacts were present. 6 patients underwent further surgery, 4 of the incomplete group and 2 of the uncertain group. The procedures included 2 anterior resections, 2 sigmoid colectomies, 1 left hemicolectomy and 2 further TARs. Histological analysis of the resected specimens revealed residual malignancy in 2/6 cases (33.33%) and positive local lymph nodes were in 1/6 (16.7%). The follow up protocol included a further endoscopy at 6 months and 2 years, and CT scan of the abdomen, pelvis and chest at 6 and 12 months. The patients with rectal polyps also underwent an MRI in addition to the CT scan. All patients were followed at 3 monthly intervals for the first year, 6 monthly for the second and third years, and yearly thereafter. The mean follow up was 57 months (range 6-90 months). There were no recurrences or cancer specific deaths.

**Conclusions:** Primary excision whilst utilising a vigorous follow up protocol provides a safe and satisfactory approach to the management of malignant polyps.

#### Presacral Tumors: A Single Institution Experience

(P223)

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**Purpose:** Presacral tumours are rare in the adults. They are often asymptomatic but can present with vague symptoms and are usually developmental in origin. The natural history and long term prognosis of these lesions is unknown. This study aimed to determine long term outcomes of surgery for patients with these lesions.

**Methods:** Between 1989 and 2006 47 patients underwent surgery for presacral tumours at St Marks Hospital. A retrospective chart review was performed. Age, sex, presentation, type of surgery, malignancy, use of stoma, complications and long term outcome was analysed

**Results:** The median age of patients was 42 years, pain (49%) and infection or inflammation (30%) were the most common presenting symptoms. 10% of patients had no symptoms. The mean measured lesion diameter at pathology was 5.6 +/- 4.1mm. Females were more likely to be affected than males (66% vs 34% p=0.04). Ten specimens (21%) were malignant. On univariate analysis the size of the lesion did not predict type of presentation or malignant risk. Only two of the 10 malignant lesions arose from within dermoid cysts. The remaining malignant lesions composed of chordoma (1), GIST (1), smooth muscle tumour (1), neuroendocrine tumour (1) and adenocarcinoma (4). The most common operative approach was the posterior approach while in selected patients an abdominal approach or AP resection was required. The main determinant of the operative approach was the size of the lesion with lesions greater than 10cm requiring an abdominal approach. Post operative complications occurred in 20

(43%) patients. Wound infection was the most common complication (11%) followed by discharging wound and non healing perineum. Mean follow up was 33 +/- 13 months. At long term review 36 (77%) of patients were alive and without complications while 4 (8.5%) patients had died, 1 (2%) had ongoing sepsis, 1 (2%) had recurrent cancer and 4 (8.5%) patients had ongoing perineal pain.

**Conclusions:** Presacral tumours in adults are composed of varied pathology and present in relatively young individuals suggesting the likelihood of a congenital origin. There are no significant long term sequelae after surgery. The malignant risk in these lesions justifies surgery for presacral cysts.

#### Live Demonstration Rectal Cancer Surgery in a National Multidisciplinary Team (MDT) Development Program: Clinical Details and Outcome in 39 Consecutive Patients

(P224)

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**Purpose:** Live demonstration surgical courses are increasing with little information on early or long term patient outcomes. Good outcomes would facilitate informed consent in patients asked to participate in such courses. Video transmitted "live" total mesorectal excision (TME) surgery for rectal cancer has been the centre-piece of a UK multidisciplinary (MDT) programme and provided an opportunity to assess outcomes in "reality" surgery demonstrations.

**Methods:** TME with restorative resection was performed in 39 consecutive patients (32 males), median (range) age 68 (27-87) years. Median (range) height of the tumour was 5 cm (2-12) from the anal verge and 13/39 (33%) were second opinions on patients wishing to avoid an abdomino-perineal excision. Early and medium term outcomes have been prospectively recorded.

**Results:** There were 3 major intra-operative complications, inadvertent splenectomy in two and uncontrollable pelvic haemorrhage in one requiring pelvic packing with restoration of continuity 48 hours later. 31/39 (80%) had a temporary stoma, closed a median (range) of 8 (1-48 weeks) after anterior resection. The distal margin was 5mm or less in 8/39 (20%). At median (range) follow up of 36 months (7 - 79), one patient has died from disseminated carcinomatosis at 8 months and 4 have metastatic disease (lung 1, combined lung and liver 2 and peritoneal 1). No local recurrences have been detected to date.

**Conclusions:** This is one of the only reports on a relatively large group of patients undergoing "live" major surgery. The majority were male patients with complex low rectal cancer. It is questionable as to whether inadvertent splenectomy in two patients was a random event or related to being on a demonstration course. Medium term oncological results are excellent and suggest that demonstration surgery can result in optimal patient outcome in complex rectal cancer.



### The Fifty-Dollar DIY Laparoscopic Trainer

(P225)

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**Purpose:** The development of laparoscopy has proved to be the most significant technical innovation in visceral surgery of recent years. Surgical trainees now need to learn this technique, yet a combination of service pressure, shortening of working hours and medico-legal scrutiny make it increasingly difficult to do so. Animal models may be used but this resource is expensive and not available in some countries. Virtual reality (VR) simulators are expensive; commercially available video box (VB) trainers are less costly but still require an institutional budget. The purpose of this study was to demonstrate that a versatile VB trainer can be easily assembled by surgical trainees for US\$50.

**Methods:** A plastic box (US\$2) is turned facing downwards and a night vision camera (US\$48) is connected on the inner surface of the box. Camera cables can then be connected to home television, PC or laptop. Single-use or decommissioned laparoscopic instruments can be sourced from the operating department or surgical equipment representatives.

**Results:** The DIY Laparoscopic Trainer permits the full range of MISTELS training exercises expected from a VB trainer. It is inexpensive and easily assembled using readily available components.

**Conclusions:** The Fifty-Dollar DIY Laparoscopic Trainer addresses the unmet need of providing trainees with their own VB trainer.

### Laparoscopic Ventral Rectopexy and Posterior Colporrhaphy – Vaginal Sacrocolpopexy for Rectal Prolapse and Mechanical Outlet Obstruction

(P226)

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**Purpose:** Laparoscopic autonomic nerve-sparing, ventral rectopexy allows correction of the underlying abnormalities of the rectum, vagina, bladder seen in rectogenital prolapse. We present our experience

**Methods:** A prospectively electronic database has been used to audit our seven-year experience of this new technique.

**Results:** 80 patients, 6 males, median age 59yrs (range 31-90), median BMI 25 (19-36) have undergone laparoscopic prolapse surgery for mechanical outlet obstruction between Jan 1997 and 2005: 55% had full thickness prolapse and 45% grade III rectal anal intussusception. Half had undergone previous pelvic floor surgery; hysterectomy 33%, posterior colporrhaphy 15%, posterior rectopexy 6%, Delorme's rectal mucosectomy 5% and Birch colposuspension 3%. Half (54%) were incontinent (mean Wexner score 15) and 31% reported pre-operative symptoms of obstructed defecation. The median operating time was 125mins (range 50-210) with no conversions. Median time to tolerance of diet was 12hrs and median length of stay was 3 days (2-12). No

patient has developed recurrent full thickness prolapse at a median follow-up of 40months. Symptomatic intra-anal intussusception developed in 3(4%). Incontinence improved in 39 of 43 patients (91%) and obstructed defecation resolved in 20 of 25 (80%). Pelvic pain resolved in the majority of patients. Three patients (4%) developed new symptoms of evacuatory dysfunction and one developed dyspareunia. Complications occurred in 12%, the majority being minor; faecal impaction 4%, wound infection 2%, bleeding requiring transfusion 2%, chest infection 1% and urinary retention 1%.

**Conclusions:** Laparoscopic ventral rectopexy is safe with low morbidity. In the medium-term it appears to provide good results for prolapse and associated symptoms of incontinence and obstructed defecation.

### Laparoscopic Colon and Rectal Surgery Increases the Risk of Postoperative Peripheral Neuropathy

(P227)

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**Purpose:** Peripheral nerve injury is a known complication of major abdominal surgery. With the advent of laparoscopic colectomy, the incidence of nerve injury may be increased due to patient positioning. This study was designed to evaluate the incidence of postoperative peripheral neuropathy in laparoscopic versus open colon and rectal resections and to identify risk factors for nerve injury.

**Methods:** A retrospective review of a prospectively maintained single-institution database of consecutive patients undergoing laparoscopic and open colon and rectal resections between March 2004 and October 2007 was performed. The incidence of postoperative nerve injuries was compared between laparoscopic and open operations. To identify risk factors for nerve injury, gender, age, body mass index, presence of diabetes, patient positioning (lithotomy vs. supine), incision type (Pfannenstiel vs. midline) and operative times were compared between groups.

**Results:** 563 patients underwent a total of 659 abdominal colorectal operations. 445 (67.5%) of these were laparoscopic operations. 8 cases (1.2%) of postoperative peripheral neuropathy were identified, all in patients undergoing laparoscopic surgery. There were no cases of nerve injury in the open group. Nerves injured included the median, ulnar, radial, femoral, lateral femoral cutaneous (n = 2), and genitofemoral nerves. One patient had a brachial plexus neuropathy. There was no association between nerve injury and type of operation. Only the laparoscopic approach proved to be a statistically significant risk factor for postoperative peripheral neuropathy (P = 0.042, Fisher exact test). Symptoms of nerve injury resolved within six weeks after surgery in seven patients, and persisted for five months in one patient.

**Conclusions:** Laparoscopic colon and rectal surgery increases the risk of postoperative peripheral neuropathy. The most probable cause of nerve injury is patient positioning during surgery. Laparoscopic surgery requires steep rotation and tilt of the operating table, which may place added traction or pressure on peripheral nerves. Careful attention to positioning and padding of all pressure points may reduce the risk of nerve injury.

**Incisional Hernia Rate After Laparoscopic Colon and Rectal Surgery: Midline Versus Low Transverse Incisions**  
(P228)

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..... Chicago, IL; Park Ridge, IL

**Purpose:** Incisional hernia is a known complication of abdominal surgery. The majority of laparoscopic colon and rectal resections require the use of an incision for either hand-assistance or specimen extraction with anastomosis. Two common choices are a midline or low transverse (Pfannenstiel) incision. This study compares the incidence of incisional hernia following laparoscopic colon or rectal resections using midline versus Pfannenstiel incisions.

**Methods:** A retrospective review of a prospectively maintained single-institution database of consecutive patients undergoing laparoscopic colon or rectal resections between March 2004 and July 2007 was performed. The incidence of incisional hernia detected on physical examination was compared between those patients undergoing midline (including periumbilical and lower midline) versus low transverse incisions. Patients undergoing open abdominal operations during the same time period were also reviewed. Potential risk factors for development of incisional hernia were evaluated. Trocar site or parastomal hernias were excluded.

**Results:** 515 colon and rectal resections were performed during the study time period. 371 (72%) of these were laparoscopic operations. 139 patients received a

Pfannenstiel incision for the use of a hand-port, and 232 patients received a small midline incision for specimen extraction. Mean follow-up was 12 (range, 1-43) months. 21 patients (14.8%) who had open operations and 29 patients (12.5%) who underwent laparoscopic operations with midline incisions developed hernias, whereas no incisional hernias were detected in patients with a Pfannenstiel incision ( $P<0.0001$ ). Open operations were associated with a higher rate of wound infection (30.3%) than laparoscopic surgery with a Pfannenstiel or midline incision (17.3% and 16.8%, respectively,  $P=0.004$ ). No significant differences between the groups concerning age, diabetes, steroid use or body mass index were found.

**Conclusions:** Incisional hernia is a rare complication of low transverse (Pfannenstiel) incisions. For laparoscopic colectomy in which a hand-port is used or an incision made for specimen extraction and anastomosis, a Pfannenstiel incision should be performed when feasible.

**Laparoscopic Colectomy: The Impact on Surgical Site Infection**

(P229)

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**Purpose:** Surgical site infection (SSI) remains a common morbidity following colorectal surgery. The present study aimed to investigate the predisposing factors and outcome of SSI in patients who underwent elective colorectal surgery from a prospectively collected database.

**Methods:** Data of patients who underwent elective colorectal surgery from 2002 to 2006 were collected prospectively by the Infectious Control Unit of the hospital with the objective to audit SSI. The patients were followed up for least 30 days by telephone or at the outpatient clinic for the occurrence of SSI. The factors contributing to SSI were analyzed with univariate and multivariate analysis.

**Results:** One thousand and fifteen patients with the mean age of 68.4( $\pm$  12.5) years were recruited. Surgery for

**P227 Cases of Postoperative Peripheral Neuropathy**

Patient	Age	Gender	Operation	Neuropathy	Outcome
1	62	F	laparoscopic right hemicolectomy	Right brachial plexus	Resolved before discharge
2	45	F	laparoscopic total colectomy	Left femoral	Resolved at 5 mo.
3	56	F	laparoscopic low anterior resection	Right ulnar	Resolved at 6 wks.
4	61	M	laparoscopic right hemicolectomy	Right lateral femoral cutaneous	Resolved at 1 mo.
5	59	M	laparoscopic low anterior resection	Right median	Resolved at 2 wks.
6	48	F	laparoscopic low anterior resection	Right lateral femoral cutaneous	Resolved at 6 wks.
7	62	M	laparoscopic right hemicolectomy	Right genitofemoral	Resolved at 6 wks.
8	52	F	laparoscopic low anterior resection	Right radial	Resolved at 1 wk.

cancer was performed in 882 (87%) patients and laparoscopic operations accounted for 27%. When compared to open colectomy, laparoscopic surgery was associated with longer operating time ( $p<0.01$ ), less blood loss ( $p<0.01$ ) and blood transfusion ( $p=0.01$ ), shorter hospital stay ( $p=0.01$ ) but no significant difference in stage in cases for colorectal cancer. The postoperative mortality was 1.1% and the incidence wound infection was 4.9%. Factors contributed to wound infection included blood transfusion ( $p=0.001$ , O.R.=3.76); high operative risk (ASA score 3-5,  $p=0.05$ , O.R.=1.85); operating time ( $p=0.01$ , 95% C.I.=0.1 -0.8) and open surgery ( $p=0.03$ , OR=2.39). Multivariate analysis found operating time ( $p=0.04$ , O.R.= 2.3, 95% C.I.=1.0-5.4) and open approach surgery ( $p=0.047$ , O.R.=1.2, 95% C.I.=1.0-1.5) as the only two independent significant factors associated with SSI. The presence of SSI was associated with adverse post-operative outcome including abdominal abscess formation ( $p=0.05$ ) and long hospital stay ( $p<0.01$ ) but no increase in mortality.

**Conclusions:** Operating time and approach of surgery (laparoscopic vs. open) were identified as the two independent factors SSI. The reduction in wound infection was another benefit conferred by laparoscopic colorectal surgery and it could contribute to prompt recovery and short hospital stay.

#### Initial Experience and Early Patient Outcomes in a Novel Approach to Laparoscopic Colorectal Training in the UK (P230)

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**Purpose:** Laparoscopic colorectal surgery has recently

been officially sanctioned in the UK (2006 NICE Guidelines). Developing structured teaching programmes for surgeons to learn these minimally invasive techniques is essential. Previous examples in the UK include: laboratory based skills courses, live surgery observational courses, cadaveric courses and preceptorship programmes. We have recently established the Clinical Immersion Programme, which is unique in the UK, in offering visiting colorectal surgeons the opportunity to perform supervised laparoscopic operations on live human patients.

**Methods:** Eight surgeons participated on each four day course. Eight suitable patients were selected for each course and appropriate informed consent was obtained. Visiting surgeons participated in two operations each with the supervising surgeon performing a minimum of the surgery, when required for patient safety. Non-operating surgeons interacted by live audio-visual link. Prospective data was collated on all sixteen patients operated on during the Clinical Immersion Programme and delegates completed a course feedback form..

**Results:** The results are shown in table 1. Delegate feedback revealed that the course had fulfilled its original objectives to the highest degree in 87.5% of cases and 100% of delegates would recommend the course to colleagues.

**Conclusions:** Laparoscopic colorectal teaching courses on live human patients may take place safely in the UK with low morbidity, mortality and conversion rates and short lengths of post-operative stay. Feedback from surgeons was universally positive about this novel approach to training. We believe that this model of training allows established colorectal consultants to gain valuable laparoscopic experience, whilst remaining safe for patients.

**P230 Table 1**

Two courses	16 Patients
Mean Age(years)	57 (23-69)
ASA	3 x ASA I and 13 x ASA II
Pathology	7 cancer, 3 diverticular related(1 colo-vesical fistula), 3 Ulcerative Colitis, 1 polyp, 1 Crohn's Colitis.
Types of Operations	6 Anterior Resection, 1 TME, 4 Right Hemicolectomy, 5 Subtotal Colectomy (allows both right and left sided mobilisation)
Conversion	1 Pfannenstiel (To complete low anterior mobilisation and anastomosis in TME patient)
Median Operative Duration (Inter Quartile Range) - mins	180 (150-210)
Median length of stay (Inter Quartile Range)- days	4.5 (3-6)
Median Wound length (Inter Quartile Range) - cm	4 (4-5)
Enhanced recovery	None
Major Complications	1 (ileus managed conservatively-length of stay 19 days)
Minor complications	3

### Laparoscopic vs. Open Left Colectomy: A Cost-Benefit Analysis

(P231)

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 ..... Milan, Italy

**Purpose:** both clinical and economic advantages from laparoscopic left colectomy (LPS) in comparison with open conventional approach are not fully demonstrated. The aim of this study is to assess the potential clinical and economic advantages of LPS in a randomized series of patients who underwent left colectomy.

**Methods:** 268 patients were randomly allocated to LPS (n=134) or open (n=134) resection. All the operations were performed by the same team. Trained members of the surgical staff who were not involved in the study registered postoperative complications according to a priori definition. Follow-up for postoperative complications was carried out for 30 days after hospital discharge. The following costs were calculated: surgical instruments, operative room occupation, routine care, postoperative morbidity, hospitalization. Quality of life was assessed 6, 12 and 24 months after surgery by a modified version of SF-36 questionnaire.

**Results:** the two groups were homogeneous for age, gender, ASA score, and BMI. Conversion rate in the LPS group was 5.2% (7/134). Operative time (minutes) was longer in the LPS group (212 vs. 173;  $p < 0.0001$ ). Operative blood loss and transfusion rate were significantly lower in the LPS group ( $p = 0.001$  and  $p = 0.04$  respectively). Surgical incision (cm) was significantly shorter in the LPS group (5.2 vs. 17.4;  $p < 0.0001$ ). Postoperative morbidity rate was 20.1 % in the open group and 11.9% in the LPS group ( $p = 0.09$ ). Hospital stay (days) was longer in the open group (10.7 vs. 9.0;  $p = 0.002$ ). The additional operative charge in the LPS group was € 1,148 per patient randomized (€ 830 for surgical instruments and € 318 because of longer operative time). The saving in the LPS group was € 792 per patient randomized (€ 432 because of the shorter postoperative stay and € 360 because of the lower cost of postoperative morbidity). The net balance resulted in € 356 extracost per patient randomly allocated to the LPS group. Quality of life was significantly improved in the LPS group 6 months after surgery, whereas no difference was found later.

**Conclusions:** LPS significantly reduced both hospital stay and length of incision. The saving due to the better short-term outcome covered about 70% of the operative extracost of LPS.

### Feasibility of Using the EndoAssist™ Robotic Camera Holder for Laparoscopic Colorectal Surgery

(P232)

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**Purpose:** Laparoscopic colorectal surgery offers significant benefits to patients. Many recent advances that have

made laparoscopic colorectal surgery feasible relate to improvements in operative view. Robotic camera holders reduce the reliance of the surgeon on the assistant.

**Methods:** We report our initial experience of using the EndoAssist™ robotic camera in a series of 67 colonic resections. Using a head mounted infrared transmitter, the surgeon is able to control the robot through a horizontal arc of 350° with vertical pitch (tilt) from -45° to +90° and a zoom of 300mm.

**Results:** Mean age of patients 65 yrs (12-92 yrs). Resections for benign disease were diverticulosis (5), reversal of Hartmans (1), Crohn's disease (3), panproctocolectomy (1). Operations for carcinoma were right-sided resection (21), left sided resection (33) and abdomino-perineal excision (3). There were no complications as a direct result of using the robotic camera holder and the first assistant was able to use two ports to provide counter-traction and retraction as required without the need for a second assistant.

**Conclusions:** The robotic camera holder did not negate the need for an experienced assistant in laparoscopic colonic resection but provides a steady, reliable image under the control of the primary surgeon. This has significant advantages for laparoscopic colorectal operations, in particular during pelvic dissection.



### Laparoscopic Management of Adult Intussusception

(P233)

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**Purpose:** Laparoscopic managements had been increased for both benign and malignant lesions during last a few decades. The adult intussusception was an infrequent condition requiring surgical management for underline disease. However there were still controversies on detailed management, and it was difficult to find studies on laparoscopic management. The aim of this study was to evaluating usefulness of laparoscopic management on adult intussusception.

**Methods:** Retrospective review of conventional open surgery for adult intussusception in three Korea University Hospitals(KUMCs) from 1987 to 2006 was performed and prospective consecutive management of adult intussusceptions from January 2007 to October 2007 was performed by 3 laparoscopic colorectal surgeons and the data were compared.



**Results:** There were 85 adult cases (3.9%) from 2160 intussusceptions during 1987 to 2006. Most frequent symptom was abdominal pain (median duration: 6D). Fever and leucocytosis were found in 18.0% and 52.3%, respectively. Men were 62% and mean age was 45.3 years. Malignancy was found in 23% and most frequent inducing lesion was lipoma. 80.4% were from enteric origin and 19.5% of enteric lesion and 40.0% of colonic lesion were malignancies. Reduction was performed in 41.5% and 7.7% of enteric and colonic lesion, respectively. Sizes of inducing lesion and resected specimen were significantly different between the group with reduction and the group without reduction. On prospective study during 2007, there were 8 consecutive patients managed by laparoscopic surgery; colon cancer(3), Peutz-Jegher's syndrome(2), inflammatory polyp(2), and lymphoma(1). Reduction was tried in 4 cases and all of them were successful. Two right colon cancers, a sigmoid colon cancer, and an inflammatory polyp in small bowel were resected without reduction. There was no conversion to open surgery. When the laparoscopic cases were compared with previous cases with open surgery, there was no significant differences ( $p>0.05$ ) in symptom duration, location, tumor size, and proportion of malignancy.

**Conclusions:** Laparoscopic management could be used successfully in adult intussusception regardless of reduction or not.

#### Translating the Benefits of Laparoscopy to Patients Undergoing Restorative Proctocolectomy: Fact or Fiction?

(P234)

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**Purpose:** Previous studies reporting outcomes after laparoscopic ileal pouch anal anastomosis (IPAA) are characterized by small numbers of patients and rarely include case-matched or randomized studies. The aim of this study was to compare safety, early and late outcomes, Quality of life (QOL) and functional results of laparoscopic and laparoscopic-assisted (LAP-IPAA) versus open IPAA.

**Methods:** All patients undergoing LAP-IPAA from 1992-

2007 were identified from a prospectively maintained pouch database and matched 1:2 to open IPAA patients with similar age, gender, and body mass index (BMI) over the same time period. The 2 groups were compared for operative and 30-day postoperative outcomes, and long-term functional results. QOL as determined by the Cleveland Global Quality of Life (CGQL) scale (range 0 [worst] to 10 [best possible] QOL) at 1 and 5 years after IPAA.

**Results:** 109 patients (49.5% male), mean age  $35.5 \pm 14.2$ , median BMI 23.9 (range 15.1-40.9) underwent LAP-IPAA. Relative proportions of patients undergoing proctocolectomy or completion proctectomy during IPAA was similar in the 2 groups ( $p=0.13$ ). Characteristics of the 2 groups and factors that were significantly different between them are given in table 1. Overall, the laparoscopic conversion rate was 8.3%. There were no significant differences in 30-day and longterm complications including wound infection ( $p=1$ ), pouchitis ( $p=0.33$ ), pouch failure ( $p=1$ ), sepsis ( $p=0.2$ ), bowel obstruction ( $p=0.9$ ), anastomotic stricture ( $p=1$ ) and anastomotic separation ( $p=1$ ). At 1 and 5 years after IPAA, functional results determined by night-time bowel movements, urgency, incontinence and pad use were similar between groups. A similar proportion of patients in both groups denied social, work and sexual restrictions. QOL determined by the various components of CGQL and the overall CGQL score was also similar at 1 and 5 years.

**Conclusions:** LAP-IPAA is equally safe but offers the advantages of shorter length of hospital stay, lower estimated blood loss, and potential for shorter time to stoma closure when compared with open IPAA.

#### Laparoscopic Approach to Colonic Emergencies

(P235)

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**Purpose:** Many colonic pathologies warrant emergency treatment, these include but are not limited to diverticulitis, obstruction, perforation, ischemic colitis, volvulus and intussusception. Traditionally these pathologies have been treated with an open operation. A laparoscopic approach to elective colonic diseases is widely accepted, based reduced

#### P234

Characteristic	LAP-IPAA (n=109)	Open IPAA (n=218)	P value
Age	35.5 $\pm$ 14.2	35.8 $\pm$ 13.5	P=0.76
Gender (male)	54 (49.5%)	110 (50.5%)	P=0.88
BMI(Kg/m <sup>2</sup> )	24.7 $\pm$ 5.0	25.2 $\pm$ 4.6	P=0.35
Time to stoma closure (days)	84(Iqr26,428)	95(Iqr 23,275)	P<0.05
Length of stay (days)	6 (Iqr2,19)	6(Iqr3,35)	P<0.001
Estimated blood loss (ml)	250(Iqr 20,800)	332(Iqr100,1000)	P<0.001
Median follow up (years)	2.9 (Iqr 0.7, 8.5)	3.4 (Iqr 1.5, 7.8)	P=0.06

Iqr=Interquartil range

hospital costs, better cosmesis, reduced hospital stay, reduced formation of incisional hernias and recently increased demand by patients, but little is appreciated regarding a laparoscopic approach to colonic emergencies. We have approached almost all colonic emergencies laparoscopically for the past 16 years and have made subsequent clinical decisions base on the finding of laparoscopy.

**Methods:** From April 1991 to July 2007, 179 patients requiring emergency laparoscopic colon procedures for right and left colon pathologies as well as rectal emergencies were prospectively studied at the Texas Endosurgery Institute, San Antonio Texas 78222. Data was gathered into categories of age, gender, indication of surgery, disease process, ASA Class, operative time, blood loss during surgery, length of hospitalization, intra- and postoperative complications, conversion rate and long term results.

**Results:** The indications for surgery included acute diverticulitis (Hinchey IIb, III, IV) in 32%, perforation in 27%, obstruction in 22%, ischemic colitis in 9% volvulus in 4 %, fistula 2%, intussusception in 1% and others causes 3%. The laparoscopic procedures included lavage and drainage, repair of perforations, segmental colonic resection, ostomy formation and adhesion take down. The mean operative time was 134.3 minutes and the mean estimated blood loss of 149.45ml. Laparoscopic approach was 100% effective in identifying the colonic pathology and was used to effectively treat 79% of the patients. Thirty eight patients required conversion to open procedures (21%).

**Conclusions:** In experienced hands a laparoscopic approach to colonic emergency situations can be effective and safe with an acceptable conversion rate. A laparoscopic approach seems to be an effective diagnostic tool for colonic emergencies and can guide in treatment strategies.

#### 100 Not Out: A Single Laparoscopic Colorectal Surgeon's Experience

(P236)

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..... Nottingham, United Kingdom

**Purpose:** Laparoscopic Colorectal surgery has been performed at Nottingham University Hospital since July 2003. With one consultant surgeon recently undertaking his 100th laparoscopic procedure, a review of these cases was performed.

**Methods:** Patients were identified using the Nottingham Laparoscopic Colorectal database from July 2003 to September 2007. Operative indication, data and outcomes were analysed.

**Results:** 100 cases were performed over a 50-month period, with the second 50 in the last 14 months. 34% were with consultant colleagues assisting, and 8% by supervised trainees. The majority of patients were male (56%) with a median age of 66.5yrs (30-85yrs) and BMI of 26.4kg/m<sup>2</sup> (14.9-46kg/m<sup>2</sup>). The mean P-POSSUM predicted mortality

and morbidity were 2.7% and 34.8%. The procedures undertaken included: right hemicolectomy 34%; anterior resections 23%; sigmoid colectomy 27%; continuity restoration 13% and others e.g. rectopexy 3%. Most resections were for malignancy (82%). The conversion rate was 14%. The median operation time, excluding conversions, was 180min (100-370min). A median of 13 lymph nodes were retrieved in malignant cases. No excision margins were involved. Post-operatively 8% of patients were nursed in High Dependency. There were no post-operative complications in 74%. Early complications included 8 wound, 3 chest and 3 urinary infections, 3 cases of atrial fibrillation and 2 MIs. 3 were returned to theatre within 28 days: 1 for an incision and drainage of a stoma site abscess; 1 for a EUA and drainage of pelvic sepsis following endocircular stapler misfiring. The other was a joint case on a colleague's patient, who developed ischemic bowel and died of a MI and pneumonia 20 days later. The other death was from a pulmonary embolism 16 days post discharge. 60% of admissions were discharged within 4 days (2-35). There were no readmissions within 28 days of surgery. Long-term complications included 4 incisional hernias, 1 small bowel obstruction, 2 local recurrences and 1 port site metastasis.

**Conclusions:** Even though undertaking a high number of malignant cases, the intra and post-operative outcomes of a single surgeon's experience was better than predicted by P-POSSUM and comparable to the published literature.

#### Is There Any Value of Totally Intracorporeal Anastomosis

(P237)

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**Purpose:** A laparoscopic approach to colon resection has been quoted as showing numerous advantages when compared to similar open procedures including: less post-operative pain, reduced ileus, improved modulation of the patient immunological state decreased length of hospital stay, improved cosmesis and earlier returns to normal activity. There is controversy regarding the value of totally intracorporeal anastomosis, we present our experience with intracorporeal anastomosis (ICA) for right and left colon.

**Methods:** From April 1991 to July 2007, 1651 patient requiring laparoscopic colon resection for right, rectal and left colon were prospectively followed. For the rectal and left colon an ICA was performed with either transanal (TA)specimen extraction or a counter-incision (CI) on the abdominal wall at one of the laparoscopic port sites. In the right hemicolectomies an ICA or extracorporeal anastomosis (ECA) was performed, and the specimen was extracted thru a muscle splitting incision or transvaginal.

**Results:** 769 of our 1240 laparoscopic left-colon resections were completed with TA specimen extraction (62%). The average operating time (OT) was 152 minutes for TA

extraction and 170 minutes for the CI group. Average EBL was 94cc for TA extraction, but was 204cc for the CI group. Anastomotic leak occurred once in the TA extraction group and 7 times in the CI group ( $p=0.01$ ). Incisional hernia was noted once in the TA extraction group and 6 times in the CI group ( $p=0.01$ ). Post-operative wound infections occurred once in the TA extraction group and six times in the CI group ( $p=0.01$ ). 288 of our 411 right colon resections (65.7%) received ICA, while the remaining 123 patients (27.4%) had ECA. The mean OT for ICA was 159.6 minutes, EBL was 83.3 ml, intraoperative (IO) and postoperative (PO) morbidity rates were 1.6% and 5.2%. For ECA, the mean OT was 165.5 minutes, EBL was 135.0 ml, IO complication rate was 4.0%, and PO complication rate was 17%. There were no operative mortalities or port site tumor recurrences in either group.

**Conclusions:** It is possible that totally intracorporeal anastomosis may have value and may become the procedure of choice in the future. Potentially with an increased interest in naturally orifice surgery

#### **Trends Toward Epidural Use in Unfit Patients: The Effect on Laparoscopic Colorectal Surgery Outcomes**

(P238)

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**Purpose:** Epidurals improve pain control and allow earlier return of bowel function, diet and mobility in open colorectal procedures. However their use in laparoscopic colorectal surgery is still debatable. This study assessed the use of thoracic epidurals in laparoscopic colorectal patients and the effect on outcomes.

**Methods:** Patients electing for either an epidural (EA) or patient controlled post-operative analgesia (PCA) were identified using the Nottingham's laparoscopic colorectal database. Patient and operative data was compared using Mann-Whitney U test.

**Results:** 45 patients elected for epidural anaesthesia. There was no significant difference in the age or body mass index of cases. The mean POSSUM predicted morbidity (37.4% vs 34.1%) and mortality (3.4% vs 2.6%) were greater, but not significant, in the EA groups. The EA group also had a significantly greater cardiovascular history (62% vs 44.9%  $p=0.049$ ) and an increased ASA score (2.2 vs 2.0:  $p=0.068$ ) compared to the PCA group. In the EA group, a greater percentage of left sided procedures were performed (52% vs 36.6%). However the indication for surgery was similar in both groups. The median duration of surgery, in non-converted patients was identical (180min). There was a greater, but not significant, conversion rate in the epidural group (22.2% vs 12.7%:  $p>0.05$ ). Although morbidity was similar between groups, there was a significant increase in incidence of post-operative myocardial infarction (4.4% vs 0%:  $p=0.022$ ) in the EA group. This

may reflect the higher cardiovascular morbidity of EA patients. This did not influence the returns to theatre or deaths within 30 days between the groups. Length of stay was also equivalent (3 vs 4 days). The readmissions within 28-days of surgery were significantly greater in the EA group, for which there was no explanation (Mann-Whitney U: 0.021). Readmissions were not directly related to cardiovascular or epidural complications.

**Conclusions:** Epidurals tend to be used in patients with greater ASA and cardiovascular co-morbidities in Nottingham. This should be considered when comparing outcomes between different analgesia modalities in Laparoscopic colorectal surgery.

#### **Laparoscopic versus Open Colectomy: Does a Minimally Invasive Approach Maximally Benefit ASA Class III and IV Patients?**

(P239)

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**Purpose:** It is conceivable that the benefits of earlier recovery associated with a minimally invasive insult during laparoscopic colectomy (LC) may be amplified in patients with comorbid disease. Since there is a dearth of evidence examining the safety of laparoscopy in these patients, we compare outcomes after LC and open colectomy (OC) in patients with American Society of Anesthesiology score (ASA) III/IV

**Methods:** Retrospective review of data of all patients with ASA III or IV scores undergoing elective LC from a prospectively maintained laparoscopic database was performed. LC was matched to OC by age, gender, diagnosis, year and type of surgery. Open conversions were included in LC on an intention to treat basis. Length of hospital stay (LOS), readmission rate, 30-day complications and mortality were compared using Chi-squared, Fisher's exact and Wilcoxon tests as appropriate. For readmissions, total LOS included index surgery and readmission.  $P<0.05$  was considered statistically significant

**Results:** 222 laparoscopic colectomies were matched with 222 open colectomies. The median age was 68 years and 226 (51%) were male. Surgical indication was colorectal neoplasia in 346 (78%), Crohn's disease in 52 (12%), ulcerative colitis in 26 (6%) and diverticular disease in 20 (4%) patients. There were 82 (37%) conversions. LC and OC had similar overall morbidity and mortality (table). Ileus was significantly greater in LC and occurred predominantly in the converted patients. LOS at index admission for LC versus OC was 5 and 7 days, respectively ( $p<0.001$ ). LC had significantly increased 30-day readmissions (20 vs. 5,  $p<0.01$ ) with ileus the predominant cause (25%). Median LOS for readmitted LC patients was 4.5 (2-24) days with no associated mortality. Total LOS for all LC patients was shorter (5 vs. 7 days,  $p<0.001$ ) than all OC.

**Conclusions:** LC can be safely performed in ASA III/IV patients with earlier recovery evidenced by shorter LOS. This may translate into higher readmission rates but total LOS for LC patients is shorter than OC with comparable overall morbidity and mortality.

#### Previous Simple Abdominal Surgery Does Not Limit Laparoscopic Colorectal Techniques

(P240)

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**Purpose:** Colorectal patients have often undergone previous simple abdominal operations, e.g. appendectomy, hysterectomy. There is concern that these cause adhesions, which increase the duration of laparoscopic procedures and risk of conversion. Therefore, the effects of previous abdominal surgery on laparoscopic colorectal outcomes were assessed.

**Methods:** Nottingham's laparoscopic colorectal database was used to identify patients with (Group P) and without (Group N) previous abdominal surgery. Patients undergoing laparoscopic reversal of Hartmann's procedures were excluded. The groups were compared on intra- and post-operative outcomes using Mann-Whitney U.

**Results:** Of the 138 patients identified, 18 had undergone previous surgery (13%). Demographically the groups differed slightly, with Group P tending to be older (75 vs 68 yrs;  $p = 0.069$ ) and having a greater incidence of cardiovascular co-morbidity (72.2% vs 49.2%;  $p = 0.069$ ). The indications and types of surgery performed were similar between the groups. Two Consultant surgeons operating together performed more procedures in Group N (36.1% vs 5.9%;  $p = 0.013$ ), but there were a homogenous number of trainee-lead operating. The conversion rate was greater in Group P (16.6% vs 11.6%;  $p > 0.05$ ). Surprisingly, although not significant, Group P had a median operation time (excluding conversions) of 170min compared to 181 in Group N.

Group P also demonstrated a significantly longer pathological specimen length (20.9 vs 16cm;  $p = 0.046$ ), although the median lymph node retrieval was comparable. Post-operatively, Group P has fewer requirements for critical care (5.6% vs 10%;  $p > 0.05$ ) or epidurals (5.6% vs 32.5%;  $p < 0.05$ ). The median length of stay was 4 days and 3 days for Group N and P. None of Group P returned to theatre within 28 days and there was only 1 death in this time (5.6%) compared to Group N (2.5%). There were no differences in incidence of short or medium term post-operative outcomes.

**Conclusions:** Previous simple abdominal surgery does not cause significant differences in operating time or conversion rate. However, major procedures or widespread intra-abdominal sepsis may produce different laparoscopic colorectal outcomes.

#### Robotic Colon and Rectal Surgery – Experience from 64 Cases

(P241)

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**Purpose:** Our goal was to report feasibility, safety and efficiency of robotic colorectal resections in 64 cases.

**Methods:** This is a retrospective study of 64 patients who underwent robotically-assisted colorectal procedures at Advocate Lutheran General Hospital from August 2005 through November 2007.

**Results:** There were 64 patients (33 female, 31 male), with an average age of 65.1 (range 28-90), and an average BMI of 31.4. The indications for surgery included: cancer/polyp (40 patients), diverticulitis (12), rectal prolapse (5), ulcerative colitis (3), familial polyposis (3) and rectal injury from robotic prostatectomy. There were 30 right colon resections (RCR), 18 low anterior resections (LAR) with splenic flexure mobilization (SFM), 5 LAR with rectopexy (RPX), 1 left hemicolectomy, 6 total proctocolectomies (TPC), 3 abdomino-perineal resections (APR) and

#### P239 30-days postoperative morbidity and mortality for LC vs. OC group.

Postoperative complications	Laparoscopic	Open	p value
Anastomotic leak	10 (4.5%)	7 (3.1%)	0.6
Intra-abdominal abscess	11 (4.9%)	10 (4.5%)	0.8
Ileus	21 (9.5%)	7 (3.1%)	0.01
Bleeding	2 (1%)	4 (2%)	0.4
Wound infection	10 (4.5%)	14 (6.3%)	0.4
Urinary infection	3 (1.3%)	5 (2.3%)	0.7
Pulmonary	7 (3.1%)	8 (3.6%)	0.8
DVT / PE	4 (1.8%)	2 (1%)	0.7
Cardiovascular	7 (3.1%)	9 (4.1%)	0.8
Overall morbidity *	56 (25%)	44 (20%)	0.2
30-day Mortality	2 (1%)	4 (2%)	0.4

DVT=deep vein thrombosis; PE=pulmonary embolism \* Some patients had more than 1 postoperative complication



one rectal repair. The average operative times were 150 min (RCR), 305 min (LAR SFM), 185 min (LAR RPX), 459 min (TPC), and 375 min (APR) respectively. The average lymph node harvest was 16. The average length of stay was 5.5 days for RCR, 4.3 days for LAR RPX, 6.4 days for LAR SFM, 5 days for TPC and 7.5 days for APR. In the rectal dissection group there were 10 complete total mesorectal excisions and 21 partial excisions. The hand assist device was used in 21 out of 23 LAR cases and 5 out of 6 TPC cases. The specimen was removed through the perineum in all APR cases. There were 2 colonic and 5 ileal J-pouches constructed. There was no mortality or intraoperative complication. No anastomotic leaks were observed, but one pelvic abscess (TPC group) was drained under tomography guidance. There were 7 cases of prolonged ileus/bowel obstruction and one port-site hernia requiring surgery.

**Conclusions:** From our experience, robotic colorectal resections can be safely performed without intraoperative complications. The main advantage for this technology seems to be the rectal dissection. The right colon resections are an excellent way of obtaining confidence with this technology.

#### Results of Laparoscopic Enterostomy Formation

(P242)

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**Purpose:** Purpose of this analysis is the evaluation of results of laparoscopic stoma formation for fecal diversion, with special interest on feasibility, safety, efficacy, indications and techniques.

**Methods:** All patients treated by laparoscopic enterostomy formation during eight years, were registered and evaluated prospectively. Comorbidity, variants of technique, conversions, morbidity, mortality and short-term complications were analyzed.

**Results:** A total of 71 patients (39 female, 32 male) with a median age of 52.5 years (range, 22-87) were treated by laparoscopic stoma formation. Loop ileostomies were created in 36 patients, sigmoid or transverse colostomies in 35 patients. Most common indications were persisting perianal and rectovaginal fistulas (n=18), unresectable advanced colorectal cancer (n=16), other pelvic malignancies (ovarian, vulvar and prostate cancer, n=9), perianal Crohn's disease with complex fistulas (n=9) and incontinence (n=9). In one male patient with untreated colonic Crohn's disease and a perianal fistula system, the procedure was converted to open left hemicolectomy due to the friable bowel condition. Postoperative complications were noted in 6 patients, including four major complications requiring reoperation: small bowel obstruction in three patients for adhesion formation and/or narrowing of the orifice, and one port-site hernia. One patient died during the postoperative course for his basic disease of severe perforating colitis despite emergency colectomy. The median operation time was 63.5 min (range, 31-171 min). Patients were discharged from the

hospital after a median of 9.5 days (range, 4-52). During a median follow-up of 2.4 years, no further complications were documented.

**Conclusions:** Despite frequent severe comorbidity, laparoscopic stoma formation has a low postoperative complication and reoperation rate and no procedure-related mortality. It is safely feasible, effective and should be the method of choice for fecal diversion.

#### Assessment of the Quality of Life in Patients Undergoing Elective Open or Laparoscopic Colorectal Surgery in a District General Hospital

(P243)

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**Purpose:** Laparoscopic colorectal resection, driven by patient demand and an improving surgical skill-base, is rapidly gaining acceptance as the technique of choice in suitable patients. This study prospectively evaluated the quality of life (QoL) in patients undergoing elective colorectal resection within a district general hospital setting.

**Methods:** A single assessor conducted a telephone-based study of all patients undergoing elective open and laparoscopic colorectal resection under the care of four colorectal surgeons, presenting over an eight-month period. All patients were surveyed using the European Organisation for Research and Treatment of Cancer quality of life scales specific to cancer and colorectal cancer (EORTC-C30 and EORTC-CR38) at three set points in their management: pre-operative, at 6-weeks and at 3-months post-surgery. Clinical and demographic data was also recorded. Data was entered into SPSS® (version 10) format and the student's t-test applied to test for significance.

**Results:** 40 patients (male=19, female=21) were included in the study. Of these, 26 (65%) underwent open surgery (including conversion to open surgery) and 14 (35%) were completed using the laparoscopic approach. Mean ages were 68.6 (SD=11.1) years and 70.4 (SD=7.4) years respectively. The global QoL scale showed a slight (non-significant) fall in both arms of the study at the 6-week set point, which recovered to pre-operative levels by the 3-month set point. No significant differences were found between the open and laparoscopic groups, with regard to the 5 main functional scales or the 3 symptom scales used by the EORTC-C30 questionnaire. An isolated statistically significant finding of increased reporting of levels of insomnia at the 6-week stage in the laparoscopic group was noted (p=0.001). All scales on the EORTC-CR38 questionnaire showed no significance in either arm of the study.

**Conclusions:** Laparoscopic and open colorectal surgery do not appear to differ significantly in terms of quality of life in the first few months after surgery. Each case must be considered individually so that the correct surgical technique is utilised to ensure optimal patient outcome is achieved.

### Teaching Laparoscopic Proctosigmoidectomy (LS) to Residents: A Comparison of a High Fidelity Synthetic Model and Live Porcine Model

(P244)

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**Purpose:** The technical challenge of laparoscopic proctosigmoidectomy (LS) and resulting prolonged learning curve have made effective teaching of the procedure difficult. This is particularly problematic in the era of the 80 hour work week and with the cost and complexity of using cadaver or animal models. We explored the effectiveness of a high fidelity synthetic model for use in resident training.

**Methods:** PGY 4 and 5 general surgery residents received a series of technical lectures on LS. Residents then performed LS using a high fidelity synthetic plastic model under faculty supervision. The residents then performed LS in a live, step-based porcine model. Residents were scored using one validated and one novel error scoring systems which utilize structured technical skills assessment to break-down the procedure into a series of discrete steps for performance evaluation. Faculty and residents also provided global scores for each model.

**Results:** Residents gave the plastic model (PM) and live model (LM) significantly higher global scores than faculty (PM: 6.0 vs 4.2 ( $p=0.02$ ); LM: 9.2 vs 7.7 ( $p=0.005$ )), and both residents and faculty gave higher global scores to the porcine model (8.70 vs 5.44 ( $p<0.001$ )). 100% of residents felt the models were of sufficient complexity for an adequate educational experience, and this was supported by the lack of a significant difference in the number of intraoperative errors during LM vs PM colectomy (mean 1.9 vs 2.1 per case ( $p=0.83$ )). However, summarized task specific analysis scores showed improved task completion and effectiveness when comparing LM to PM (7.5 vs. 5.1 ( $p=0.05$ )).

**Conclusions:** A high fidelity synthetic plastic model provides a potential adjunctive training aid for teaching residents laparoscopic colectomy. Although plastic models have less apparent face validity than cadaver or porcine models, they provide an additional training process that does not require the cost and complexities of laboratory based training with animal or cadaver models. This may become an important component of the LS training curriculum.

### Consequences of Not Closing the Mesenteric Defect after Laparoscopic Right Colectomy

(P245)

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**Purpose:** The controversy regarding closing the mesenteric defect after laparoscopic right colectomy (LRC) remains the sub-

ject of much debate. This study, the largest of its kind, describes the consequences of not closing the mesenteric defect.

**Methods:** A 7 year prospective database revealed 384 consecutive patients who underwent LRC for neoplasia. No mesenteric defects were closed. SBO was determined by clinical assessment substantiated by radiographs. Statistical analysis was performed with the t test and Fisher exact test.

**Results:** On average, the 384 patients (57% female) were 69 years old (range 26-95), had an ASA 2, BMI of 26.4 (range 15-67.4), OR time 177 minutes (range 50-385), incision length 5.6cm (range 2.2-24) and length of stay 6.6 days (range 3-40). 27 patients (7%) were converted. Mean follow up was 29 months (range 1-98). Two patients (0.5%) had complications attributed to the mesenteric defect. One patient had an SBO due to an internal hernia while the other had torsion of the anastomosis through the defect. Overall, 16 patients (4%) had an SBO during the follow up period. Non-operative treatment was successful in 7 patients. SBO in the 9 operated patients were due to adhesions (4), abdominal wall hernia (3), cancer recurrence (1), and internal hernia reviewed above (1). No statistical differences between the SBO and non-SBO groups were observed.

**Conclusions:** This data does not support routinely closing the mesenteric defect after LRC in patients with neoplasia. Studies are needed with extended long term follow up to further evaluate this practice.

### Hand-Assisted and Hybrid Methods Facilitate Minimally Invasive Sigmoid and Rectal Resections in Obese Patients and in Those with Complicated Disease

(P246)

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**Purpose:** The merits of laparoscopic-assisted colectomy (LAP) are well established unlike hand-assisted/hybrid laparoscopic methods (HAL). Proponents claim that HAL's methods yields similar outcomes and are appropriate for most patients (pts). Critics believe HAL's methods are rarely needed and are inferior. Our hypothesis is that selective use of HAL's methods will permit MIS operations in a larger proportion of pts.

**Methods:** A review of all consecutive elective colorectal resections performed from 10/04 to 10/06 was carried out. Office and hospital records were assessed; indication, type of surgery, operative data, and outcomes were recorded.

**Results:** A total of 498 pts were identified, 87% underwent MIS and 13 % had open surgery. Of the 432 MIS cases 71% (305) were LAP and 29% (127) were HAL's cases. Of the HAL's cases, 107 (84%) were for sigmoid/rectal resections which constituted 49 % of all sigmoid/rectal MIS cases. HAL's methods were used in 30 sigmoid/rectal pts with BMI < 25; 70% had large/bulky pathology or adjacent organ involvement. There was no LOS difference for the HAL's sigmoid/rectal pts (7.8+/-4.5 days) when compared

to the comparable LAP group (7.9 +/-5.8). The HAL's right, transverse or left segmental resections accounted for 7 % of hand cases and 6 % of the total right/transverse/left MIS cases. The rate of HALS usage in relation to BMI was: BMI  $\leq$  33, 23%; BMI > 33, 44%; BMI > 40, 50%. Differences in incision length (IL) with respect to BMI in LAP versus HAL group were: BMI  $\leq$  33, 5.6 cm vs 10 cm; BMI > 33, 7.7 cm vs 10.7 cm; BMI >40, 11.5 cm vs 11.4 cm.

**Conclusions:** Selective use of both LAP and HAL's methods allowed 87 % of all elective case to be done using MIS methods. HAL's methods were mainly used for sigmoid/rectal resections. Use of HAL's methods varied directly with BMI. IL differences between HAL and LAP methods decreased with increasing BMI. HAL's methods were also used in pts with bulky pathology and adjacent organ involvement. HAL's methods permit MIS surgery in a broader pt population than with LAP methods alone.

#### Laparoscopic Colorectal Resection and Anastomosis Omitting Cathartic Bowel Preparation

(P247)

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**Purpose:** To assess the technical feasibility and safety of laparoscopic colorectal resection omitting preoperative cathartic bowel preparation

**Methods:** Data were extracted from a prospectively collected database from two institutions regarding 149 consecutive patients brought to the operating room with the intention to perform elective laparoscopic colorectal resection with anastomosis. Select patients (those not anticipated to need intraoperative colonoscopy or diverting stoma) underwent surgery without cathartic bowel preparation. Primary end-points were the ability to complete the planned laparoscopic procedure and septic complications. Differences in outcome variables were assessed with Fisher's exact test and Student's t-test, where appropriate. Prestudy power analysis indicated that 130 total patients would be required to detect an absolute 20% increase in wound infection rates with alpha of 0.05 and 80% power.

**Results:** Of the 149 patients, 59 (40%) did not undergo cathartic bowel preparation. Procedures performed in the prepped and non-prepped groups respectively were right colectomy/ileocolic resection (41% vs. 51%,  $p=0.31$ ), left/sigmoid/anterior resection (43% vs.32%,  $p=0.23$ ), segmentectomy (1% vs. 2%,  $p=1.00$ ), total abdominal colectomy (10% vs.3%,  $p=0.2$ ) and proctocolectomy (2% vs.5%,  $p=0.39$ ). Nine patients (4 prepped, 5 non-prepped,  $p=0.48$ ) did not undergo anastomosis, for reasons unrelated to bowel preparation. There were no differences between the prepped and non-prepped patients in the rates of wound infection (5.6% vs. 6.8%,  $p=0.74$ ), intra-abdominal abscess/anastomotic leak (7.8% vs. 3.4%,  $p=0.32$ ), conversion to laparotomy

(7.8% vs. 1.7%,  $p=0.15$ ), median hospital stay (5 vs.5 days,  $p=1.00$ ) and 30 day mortality (0/90 vs. 0/59).

**Conclusions:** Omitting preoperative cathartic bowel preparation for elective laparoscopic colorectal surgery does not appear to adversely affect the ability to perform laparoscopic colorectal resection, and does not increase the risk of septic complications. Prospective, randomized trials are needed to validate these observations.

#### Laparoscopic Colorectal Resections Without Total Mechanical Bowel Preparation

(P248)

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**Purpose:** Preoperative total mechanical bowel preparation (MBP) is the standard approach for colorectal resections to reduce infections. There are concerns about difficult tumour localization without MBP in laparoscopic surgery. Our aim is to evaluate the approach of laparoscopic colorectal resections without total MBP

**Methods:** A prospective case series study of elective laparoscopic colorectal resections without total MBP was performed. Preoperatively all patients received oral Simethicone one day before operation. A phosphate enema was administered on the day of surgery for left sided resections without dietary restrictions. All operations were performed by a single experienced laparoscopic colorectal surgeon. Single dose of antibiotic was administered at the time of induction of anaesthesia. Clinically significant anastomotic dehiscence, wound infection and mortality were the outcome measures. Conversion rate and failure rate of tumour localization were noted.

**Results:** A total of 102 laparoscopic colorectal resections (95 carcinomas, 6 complicated diverticular diseases & 1 ulcerative colitis) were performed without total MBP. Resections included 27 right hemicolectomies, 19 sigmoid colectomies (6 due to diverticular disease), 2 left hemicolectomies, 36 anterior resections, 17 abdomino-perineal resections & 1 procto-colectomy (ulcerative colitis). Age range was 41-87 years (median age 72 years). Two anastomotic leaks requiring reoperation (2.3%) were recorded (in 2 cases of anterior resections). Wound infection occurred in 6 patients (5.8%). There was no mortality. One case of sigmoid colectomy (diverticular disease) & anterior resection (carcinoma) each were converted due to technical difficulties with dissection. A case of right hemicolectomy was converted due to bleeding. Conversion rate was 2.9%. Problem of failure to localize left colonic tumour was not encountered. However, in 8 cases (14%) flexible sigmoidoscopy was performed intra-operatively to confirm the level of the tumour

**Conclusions:** Laparoscopic colorectal resections without total MBP is safe. Difficulty with tumour localization and conversion can be avoided by administering Simethicone & single pre-operative phosphate enema and per-operative sigmoidoscopy

### The Weight Effect: With Endoscopic Surgery Is Getting Heavier Troublesome?

(P249)

J. Smith, A. Acheson, C. Gornall, J. Williams, C. Maxwell-Armstrong. . . . . Nottingham, United Kingdom

**Purpose:** Obesity and its effects are a growing concern. By 2010, it is expected that 33% of men and 28% of women will have a body mass index (BMI) over 30kg/m<sup>2</sup>. Not only does obesity increase the risk of developing colorectal cancer but it causes the intra and post-operative complications of surgery. In Nottingham, the incidence of obesity is greater than the UK national average. Therefore, the effect of obesity on Nottingham's laparoscopic colorectal outcomes were reviewed

**Methods:** Patients with Body mass index (BMI) over 30kg/m<sup>2</sup> were identified using the Nottingham University Hospitals' Laparoscopic Colorectal database from July 2003 to present day. Operative indication, data and outcomes were compared using Mann-Whitney U tests

**Results:** A BMI over 30kg/m<sup>2</sup> was documented in 26 out of 154 patients. Three patients were over 35kg/m<sup>2</sup>. The two groups were demographically equivalent except that the obese patients were significantly younger and fewer were undergoing procedures for malignancy. Intra-operative data was mostly homogenous between the groups. The conversion rate was greater in the >30kg/m<sup>2</sup> group for all operations (26.9% vs 12.5%; p = 0.061). Excluding conversions the median operative time was similar (>30 vs <30: 191 vs 175min). More obese patients were returned to theatre within 28 days (15.4% vs 1.7%; p = 0.001). Post-operative morbidity was also homogenous between groups, except for the incidence of microbiologically proven wound infections (19.2% vs 4.7%; p=0.009). Although mortality was different between the groups (7.7% vs 1.6%; p = 0.074), this was not significant. The mean length of stay in unconverted obese patients was increased (6.5 days vs 4.4 days), but did not reach significance.

**Conclusions:** Patients with an increased BMI have a significant increased incidence of wound infections and returning to theatre within 28 days. They also have a greater risk of conversion and slightly longer length of stay. This should be considered when consenting and planning laparoscopic colorectal procedures in obese individuals.

### Good Technique Preserves Sexual and Bladder Function after Laparoscopic Rectal Surgery

(P250)

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. . . . . Brisbane, QLD, Australia

**Purpose:** There have been reports from the CLASICC trial and Singapore of higher levels of bladder and sexual dysfunction in men after laparoscopic as compared to open rectal surgery. This has led some surgeons to question the

role of the laparoscopic approach to rectal surgery.

**Methods:** This study is a retrospective analysis of a prospectively-collected database for a single unit, comprising 2,406 patients undergoing laparoscopic colorectal surgery. Bladder function, potency and ejaculation were assessed at post-operative clinic visits for men undergoing laparoscopic low (LAR) or ultra-low anterior resection (ULAR) and abdominoperineal excision of the rectum (APR).

**Results:** 101 males were identified (median age 62: range 20-90). 40 (40%) patients had undergone laparoscopic LAR, 42 (42%) laparoscopic ULAR and 19 (19%) laparoscopic APR. No patient was converted through a midline incision to perform the abdominal part of the procedure. All 19 (19%) APR patients had a fully laparoscopic procedure with specimen extraction via the perineal wound; 44 (44%) patients having LAR or ULAR had laparoscopic rectal mobilisation and transection with an incision solely for specimen extraction. 13 (13%) had a lower midline and 25 (25%) a Pfannenstiel incision, usually as part of the planned procedure, for the pelvic part of the operation. Urinary dysfunction was reported by 6 (6%) patients (1 LAR, 2 ULAR, 3 APR). Two improved spontaneously whilst the another two were cured by TURP. 6 (6%) patients had sexual dysfunction, manifesting as permanent retrograde ejaculation in four patients (4 ULAR) and erectile dysfunction in a further two patients (2 APR), both of whom improved with pharmacological therapy.

**Conclusions:** The low rates of bladder and sexual dysfunction in this unit may be attributable to pelvic dissection only being undertaken by experienced, dedicated laparoscopic colorectal surgeons. Laparoscopic restorative surgery for rectal cancer has been performed here only since 2001 after considerable experience accrued in operating on benign rectal disease and colon cancer. Studies from elsewhere reporting poorer functional outcomes have probably included a significant number of patients on the surgeons' "learning curve".

### Increased Stress Response to Pelvic Compared with Abdominal Surgery: A Feature of Open but not Laparoscopic Resection

(P251)

S. Noblett, A. Horgan. . . . Newcastle Upon Tyne, United Kingdom

**Purpose:** Surgery involving pelvic dissection is considered more complex than pure abdominal resection, with longer operating times and increased morbidity. We measured serum IL-6 levels as a marker of the surgical trauma after abdominal and pelvic resection using both open and laparoscopic techniques.

**Methods:** Data were prospectively collected on all patients undergoing elective colon or rectal resection by both laparoscopic and open techniques. Procedures were



classified into 'abdominal' or 'pelvic' by the extent of dissection in relation to the peritoneal reflection. General demographic and perioperative data were recorded and blood samples taken pre-operatively, at 0(end of surgery)-, 6-, 24- and 48-hours for cytokine analysis. IL-6 levels were analysed using a cytometric bead array. This technique uses amplified fluorescence detection by flow cytometry to detect and quantify soluble analytes.

**Results:** Data were collected on 104 patients (73 open and 31 laparoscopic). The distribution of abdominal to pelvic procedures was similar for both the open and laparoscopic groups, as were general demographic details including age, ASA grade and POSSUM Physiology score. Pelvic procedures were associated with longer operating times with both open (137 v 169 minutes) and laparoscopic (129 v 223 minutes) techniques ( $p < 0.002$ ). IL-6 levels were found to reach peak levels 6 hours after abdominal and pelvic surgery by laparoscopic and open surgical approaches. The magnitude of IL-6 rise was significantly greater following open pelvic dissection (19694 v 14497 pg/ml,  $p < 0.0001$ ) compared to open procedures confined to the abdominal cavity proper. Using laparoscopic techniques perioperative IL-6 levels were similar after both pelvic and abdominal dissection (2144 v 2608 pg/ml,  $p = 0.429$ ).

**Conclusions:** Colorectal surgery is associated with increased levels of serum IL-6 which peak at 6 hours post-operatively. Open pelvic surgery is associated with an increase in magnitude of IL-6 levels in the immediate post-operative period not seen following laparoscopic pelvic surgery suggesting a difference in surgical stress response between the 2 techniques.

#### Is Cardiopulmonary Exercise Testing a Good Predictor of Morbidity and Mortality in Colorectal Surgery?

(P252)

I. Nikolopoulos, V. Patel, M. Ellwood, M. George, E. Carapeti, A. Williams . . . . . London, United Kingdom

**Purpose:** To assess the predictive value of Cardiopulmonary Exercise Testing (CPET) on mortality, cardiopulmonary complications and Hospital Length of Stay (HLOS) in patients undergoing elective colorectal surgery over an 8 month period.

**Methods:** Consecutive patients were prospectively assessed with CPET and those with an anaerobic threshold

(AT)  $> 11$  ml/min/Kg compared with those  $< 11$  ml/min/kg.

**Results:** 69 out of 103 patients (median age 60 years (range 25-85) 35 males) successfully completed CPET. 12 patients did not attend and 22 did not complete CPET. AT did not predict cardiopulmonary complications or mortality (2.8%). Median HLOS in the group with AT  $> 11$  ml/min/kg was significantly lower (9 days vs 6 days), ( $p = 0.0482$ ). The area under a Receiver Operating Characteristic curve was 0.667368 (95% CI = 0.4256 to 0.9091) suggesting that AT was not a strong predictor of cardiopulmonary complications.

**Conclusions:** Pre-operative measurement of AT predicted HLOS, but was unable to predict cardiopulmonary complications based on these data. A larger patient population may be required to establish CPET as a predictor of post-operative morbidity and mortality.

#### Urinary Bladder Catheter Following Pelvic Surgery – Do We Really Need It for That Long? A Prospective, Multicenter, Randomized Trial

(P253)

O. Zmora, K. Madbouly, H. Tulchinsky, A. Hussein, M. Khaikin . . . . . Tel Hashomer, Israel; Alexandria, Egypt; Tel Aviv, Israel

**Purpose:** Urinary bladder drainage for several days following pelvic surgery is a common surgical practice, despite the lack of evidence supporting its routine use. The aim of this study is to prospectively evaluate the utility of urinary bladder drainage after pelvic colorectal surgery.

**Methods:** Patients undergoing pelvic surgery were prospectively randomized into 3 groups. In group A, the Foley catheter was removed on post operative day (POD) 1, and in group B and C on POD 3 and 5, respectively. Male patients with severe prostatic symptoms (American Urology Association score of 20/35 and higher) were excluded from this study. Main outcome criterion was acute urinary retention requiring Foley reinsertion.

**Results:** Ninety eight patients (48 females, 50 males) at a mean age of 62 years were included in this study (group A- 34, group B- 33, group C-31). Overall, urinary retention following removal of the Foley catheter occurred in 8% of the patients: 3 (8.8%) in group A, 2 (6 %) in group B, and 3 (9.7%) in group C ( $p = 0.62$ ). Symptomatic urinary tract infection was diagnosed in 4 patients in group A, 3 in group B, and 7 in group C, but this difference did not reach sta-

#### P252

	AT $< 11$ (ml/min/kg) n=22	AT $> 11$ (ml/min/kg) n=47	P value
Cardiopulmonary Complications	3 (13.5 %)	4 (8.5%)	0.6716
Surgical Complications	9 (40.9%)	12 (25.5%)	0.2627
HLOS (median)	9	6	0.0482

Cardiopulmonary and Surgical Complications rates and median Hospital Length of Stay in 69 patients undergoing colorectal surgery. The AT cut off point is set at 11 ml/min/kg.

tistical significance. Likewise, there were no significant differences in anastomotic leak and intra-abdominal abscess rates between the 3 groups.

**Conclusions:** Routine prolonged urinary bladder catheterization following pelvic surgery is not required, and the Foley catheter may be safely removed on POD 1.

#### A Systematic Review and Meta-Analysis of Enhanced Recovery Programs after Colorectal Resections

(P254)

C. Walter, J. Collin, P. Drew, J. Monson . . . Hull, United Kingdom; Plymouth, United Kingdom

**Purpose:** The only previous systematic review and meta-analysis of Enhanced Recovery Programmes in colorectal surgery (ERPCS) omitted some of the larger-numbered studies and was contaminated by data from non-colorectal procedures. The aim of this meta-analysis was to produce a comprehensive and up-to-date analysis of all available data exclusively exploring the safety and efficacy of ERPCS.

**Methods:** A definition of ERPCS was agreed by the reviewers. Key-Word and MESH-heading searches of MEDLINE, EMBASE and the Cochrane Databases from 1966 to February 2007 identified all available controlled studies. Two independent reviewers assessed studies for inclusion and exclusion criteria and methodological quality prior to undertaking data extraction. Summary estimates of treatment effects using a fixed effect model were produced, with RevMan4.2, using weighted means for the length-of-stay (LOS) and relative risks for the morbidity, mortality and readmission rates.

**Results:** Six papers containing a total 660 patients were analysed. Primary LOS and Total LOS (Primary + readmission LOS) were significantly less ( $p < 0.001$ ) in the ERPCS groups: with weighted mean differences of -3.44 days [95% CI -4.32 to -2.56] and -3.37 days [95% CI -4.25 to -2.50] respectively. Morbidity was significantly reduced in the ERP groups (relative risk 0.50, 95% CI 0.40-0.64  $p < 0.001$ ) with no differences in mortality or readmission rates.

**Conclusions:** In accordance with the findings from the previous meta-analysis, our results suggest ERPCS can significantly reduce Primary and Total LOS, and morbidity, without increasing readmission or mortality rates. The reductions in LOS demonstrated in this analysis were greater than 3 days; higher than previously recorded.

#### Use of a Clinical Nurse Practitioner to Decrease Primary Care Workload Following Early Discharge after Laparoscopic Colorectal Surgery

(P255)

J. Stewart, J. Beresford, A. Acheson, C. Gornall, J. Smith, C. Maxwell-Armstrong . . . Nottingham, United Kingdom

**Purpose:** Laparoscopic colorectal surgery within an

enhanced recovery programme has dramatically reduced post operative in patient stays, in some cases down to 2 days. Post operative complications commonly occur at around 5-7 days. Early Clinical Nurse Practitioner(CNP) telephone follow up was implemented to assess for these complications and to provide a first point of contact for these patients. It was hoped that this would maintain their safety within the community. In addition we wanted to assess whether early discharge increased workload within primary care.

**Methods:** A review of a prospectively collected database. Results were collated from 60 consecutive patients who underwent laparoscopic colorectal surgery between August 2006 and August 2007. They received CNP telephone follow up on the 3rd and 10th days after hospital discharge.

**Results:** Sixty patients with a median age of 67 (range 30-91) years received CNP follow up. All patients had laparoscopic colorectal resections performed by 3 surgeons, within an enhanced recovery program. Median length of stay was 3 (range 2-16) days. Of all the patients reviewed, none had an anastomotic leak. Six patients contacted the CNP outside of the consultation slots, 5 required advice only but 1 was readmitted following review for analgesia. Twelve patients contacted their GP despite being advised to contact the CNP first. Of those, fewer than half had problems directly related to their surgery. One was readmitted with a high output stoma and was found to have *Clostridium difficile*.

**Conclusions:** Our data indicates that patients can be discharged early following laparoscopic colorectal surgery safely. The CNP was able to assess them for potential problems and surgical complications and if needed bring them back into secondary care for a review. The CNP was also able to act as a contact for patients to provide explanations and reassurance as necessary with the intention of reducing the need for this patient group to use primary care services. The reasons 12 patients contacted their GP first are unclear and this needs to be addressed as these patients could have been managed or given advice by secondary care.

#### Fatigue after Colorectal Surgery and its Relationship to Patient Expectations

(P256)

A. Hill, F. Frizelle, J. Paddison, R. Booth. . Auckland, New Zealand; Christchurch, New Zealand

**Purpose:** Feelings of fatigue are pronounced even after uncomplicated colorectal surgery. Patient expectations are associated with a variety of post-surgical outcomes, but few data about fatigue prevalence, nature and timeframe, are available for patients and health professionals. Therefore this study sought to investigate the effect of patient expectations on fatigue experiences following major colorectal surgery.

**Methods:** Prior to surgery 51 patients were asked to complete questionnaires assessing their perceptions of likely timeframe and ability to control their return to normal

functioning after surgery using a subset of questions from the Revised Illness Perceptions Questionnaire (IPQ-R). Experience of fatigue and impact of fatigue were also assessed for two months post-surgery using the Identity-Consequences Fatigue Scale (ICFS).

**Results:** Using mixed model linear regression, baseline depression scores exerted significant main effects on both Fatigue Experiences and Fatigue Impacts scores of the patients. Further, after controlling for depression there remained significant expectation interactions with both Fatigue Experiences and Fatigue Impacts scores.

**Conclusions:** Postsurgical Fatigue after colorectal surgery is multidimensional and this should be considered in studies investigating this phenomenon. Patients who, before surgery, reported shorter expected fatigue resolution timelines and a higher degree of expected control, experienced more persistent fatigue following major colorectal surgery.

#### Assessment of Postoperative Ambulation with the use of a Pedometer: Does Walking Really Help?

(P257)

V. Obias, V. Champagne, H. Reynolds, Y. Joh, C. Delaney  
..... Cleveland, OH

**Purpose:** Although multiple studies have stressed the importance of ambulation after major abdominal surgery for accelerating recovery, this has not been demonstrated in a quantitative manner. This study prospectively assesses ambulation in the postoperative period after laparoscopic and open colorectal surgery in patients on a standardized postoperative care plan

**Methods:** After IRB approval, 44 patients undergoing a variety of colorectal procedures from 12/06 to 10/07 were evaluated. Digital pedometers were positioned in the recovery room and the number of steps taken and number of walks attempted measured on each postoperative day (POD). Demographic, operative, and postoperative data including length of stay (LOS), complications, and readmissions were documented.

**Results:** Average age was 58.9 years, ASA was 2.5, and BMI was 29.2 kg/m<sup>2</sup>. Average hospital stay was 5.2 +/- 2.8 days, with no mortality. 25% of patients developed postoperative ileus (absent BM or flatus or tolerance of diet by POD 4). Mean number of steps per patient increased daily with a peak at POD 3 (1,407 +/- 3131 steps). Subset analysis comparing ileus to non-ileus patients, showed no significant difference in age, ASA, BMI, EBL, or operative time. Patients with ileus had increased LOS than non-ileus (8.7 vs 4.0 days; p=0.0001), and significantly less ambulation between POD1-4 (196.4 vs 888.3 steps; p=0.0366). Patients without ileus were more likely to have undergone a laparoscopic procedure (p<0.01).

**Conclusions:** These are the first data to quantify ambulation in the postoperative period after major abdominal

surgery. The results provide evidence supporting the importance of ambulation as a potential means of reducing ileus and shortening LOS. Laparoscopy facilitates early ambulation and is less likely to be associated with ileus. Future studies assessing postoperative outcomes should incorporate pedometers to better quantify ambulation after surgery.

#### Does Neostigmine Reversal Influence Gastrointestinal Function Return after Colorectal Resection?

(P258)

M. Fulmes, K. Lee, B. Bogard, S. Ayad, P. Raj, R. Williams  
..... Cleveland, OH

**Purpose:** We hypothesized that reversal of muscle relaxant during surgery might have some beneficial effect on restoration of motility in postoperative period.

**Methods:** A cohort of 201 consecutive patients who underwent elective colon or rectal resections during 2005-2007 for malignant or benign disease was undertaken. Three groups of patients depending from the dose of neostigmine were analyzed: 1st - 3 mg, 2nd - 2 or 2.5mg and 3rd - none. The time of passing flatus, frequency of ileus, gastroparesis, were analyzed. Neostigmine was used by anesthesia in combination with robinul in purpose of reversal of muscle relaxant in order to facilitate extubation.

**Results:** Neostigmine in dose 3 mg was used in 79 patients (group I), 2 - 2.5mg in 57 patients (group II) and none in 34 pts (group III). Patients in group I (3mg) on average started passing flatus on postoperative day 2.97 in group II (2 or 2.5 mg) on day 3.92, and in group III (none) on day 4.12. Difference was statistically significant for groups with 3mg neostigmine and none (P<0.0085). Ileus developed in 6 pts (7.6%) in group I, in 9 pts (15.8%) in group II and in 10 pts (29.4%) in group III. Gastroparesis was also most prominent in group III - in 7 pts (20.6%) compared to group II which had 9 patients (15.8%) and group I with 8 patients (10.5%). No patients in the neostigmine/robinul group developed bradycardia or hemodynamic instability. Twenty six patients (32.5%) in group one and 2 patients (6.0%) in group three flatus was noticed on postoperative day two. Thirty one patients were excluded from the analysis due to poor documentation, using different medication or higher then usual doses of reversal medication.

**Conclusions:** Neostigmine was safe in all pts when used in combination with Robinul. Return of bowel function was 24 hrs sooner in patients who received 3 mg of neostigmine compared to none or a lower dose. Frequency of development of ileus was minimal (7.6%) in the group receiving 3mg of neostigmine compared to groups using a lower dose (15.8% pts) or using no reversal (29.4%); Gastroparesis most frequently developed in the group with no reversal (20.6%) and was less common in the group receiving low dose (15.8%) or 3mg neostigmine (10.0%).

# Oesophageal Doppler-Guided Fluid Optimization in Colorectal Surgery

(P259)

V. Patel, I. Nikolopoulos, M. Ellwood, M. George, E. Carapeti, A. Williams . . . . . London, United Kingdom

**Purpose:** Hypovolaemia and poor organ perfusion can pass undetected during major surgery, and is thought to be an important factor determining postoperative complications. In particular, perioperative fluid management is difficult in patients undergoing colorectal surgery because patients are often elderly with multiple co-morbidities. In addition, bowel preparation, preoperative fasting, and perioperative blood loss can have a significant dehydrating effect. This prospective study assesses whether optimising intraoperative fluid management using oesophageal Doppler goal directed fluid therapy increases oxygen delivery index (DO<sub>2</sub>i) and improves postoperative outcome.

**Methods:** All patients followed an intraoperative oesophageal Doppler guided fluid protocol with standardised postoperative care in a multimodal 'fast-track' programme. DO<sub>2</sub>i measurements were correlated with length of stay, restitution of bowel function, mobility and postoperative morbidity.

**Results:** Of the 44 patients enrolled 42 had an adequate Doppler trace. Patient age correlated with DO<sub>2</sub>i ( $p < 0.001$ ,  $r = -0.5$ ), although did not correlate with length of stay. Median length of stay was reduced in patients who had a supranormal DO<sub>2</sub>i for more than 75% of the length of surgery (8 (n=17) vs. 12 (n=25) days). These patients were more ambulant (1.4 vs. 0.8 walks/day) and had fewer postoperative complications (6 vs. 14 patients). There were no differences in the demographics, operative severity or physiology of those achieving optimisation and those who did not.

**Conclusions:** Although DO<sub>2</sub>i could not be optimised in all patients, this study supports the hypothesis that DO<sub>2</sub>i can predict outcome in colorectal surgery. Patients who have a supranormal DO<sub>2</sub>i have a reduced postoperative length of stay with less morbidity.

# Endogenous Morphine Levels Do Not Rise after Laparoscopic Colectomy: A Possible Mechanism for Decreased Postoperative Ileus

(P260)

K. Madbouly, A. Senagore, C. Delaney . . . Alexandria, Egypt; Grand Rapids, MI; Cleveland, OH

**Purpose:** Although the negative effects of exogenous narcotics on recovery after open (OSC) and laparoscopic colectomy (LSC) have been defined, the impact of endogenous morphine (EM) on inflammatory response and gastrointestinal function has not been well defined. The purpose of this study was to assess the responses of EM, stress hormones (ACTH, cortisol) and cytokines (IL-6, IL-1ra, and IL-10) following LSC and OSC

**Methods:** 20 consecutive laparoscopic segmental colectomy (LSC) patients were compared with 9 open segmental colectomy (OSC) patients. All patients received identical non-morphine analgesia post-operatively and followed a standard enhanced recovery program. Data collected included age, sex, EBL, OR time, time of return of peristalsis, time to pass flatus. Plasma EM was measured preoperatively, immediately postoperatively and at 3, 24, and 48 hours after wound closure.

**Results:** LSC and OSC patients were of similar age (54.8 vs 52.3), however the OR time (92.2 vs 61.1 min), time to regular diet (14.8 vs 32.6 hrs), and hospital stay (2.9 vs 5.6 days) were all significantly different between the groups, respectively ( $p < 0.05$ ). EM levels rose significantly in the postoperative period compared to baseline only for OSC and these levels were higher when compared to LSC patients immediately after surgery (8.69 vs. 1.97 ng/ml), at 3 h (10.36 vs 0.52), and at 24 h (2.62 vs 0.81 ng/ml). At 48 hours the levels were similar for LSC and OSC (see Table for other results).

**Conclusions:** These novel findings demonstrate a greater degree of EM synthesis following OSC compared to LSC. The results are consistent with the concept that EM may contribute to increased post-operative ileus after OSC but not LSC. These data may indicate a different role for the newly developed family of narcotic receptor antagonists in LSC and OSC in an enhanced recovery program

## P260

	Pre-operative	Immediate post-operative	After 3 hours	After 24 hours	After 48 hours
Cortisol (ug/ml) LSC	17.16± 19.58	39.34± 25.54	23.51± 16.38	16.85± 10.49	5.83± 3.22
OSC	31.89±4.09	91.05± 22.56 *	43.56± 19.74 *	21.34± 12.05	7.67± 0.98
ACTH (pg/ml) LSC	55.79±45.64	138.21±79.32 *	46.84±14.45	33.60±8.16	31.08± 18.71
OSC	53.94±8.84	32.14± 5.53	71.52±14.94 *	114.33 ± 167.14 *	40.16± 6.87
IL-1ra (pg/ml) LSC	1410.23± 1631.78	1923.09± 1647.50	1954.06± 1792.00	416.1 ± 204.34	752.69 ± 774.00
OSC	2729.9 ± 1411.72	1461.05 ± 1555.55	2383.85 ± 1890.22	441.45 ± 611.78	490.53± 215.35
IL-6 (pg/ml) LSC	13.47 ± 18.96	31.55 ± 36.26	27.54 ± 50.85	18.2 ± 23.31	9.842± 13.688
OSC	19.7 ± 17.78	28.02 ± 32.87	103.38 ± 91.16 *	23.12 ± 22.65	14.11 ± 18.24
IL- 10 (pg/ml) LSC	187.75 ±125.97	247.66 ±187.19	167.14 ± 105.15	177.05 ±153.62	166.4 ± 172.34
OSC	79.96± 15.27	83.93 ± 37.81	244.43 ± 21.46 *	100.74 ± 49.89	206.05 ± 182.91

\* =  $p < 0.05$  (Fisher's exact test )



### Anastomotic Leak Testing in Left-Sided Colorectal Anastomoses: What is the Evidence?

(P261)

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**Purpose:** The evidence for anastomotic leak testing (ALT) is sparse despite its routine use. We examined our experience with ALT in left-sided colorectal anastomoses.

**Methods:** We reviewed all consecutive left-sided anastomoses from our prospectively enrolled colorectal database from 1/2001 through 12/2006. We recorded the type of anastomosis, method of anastomosis (hand-sewn vs. stapled), performance of ALT, method of repair if positive ALT, and the development of postoperative clinical leak. Statistical significance was determined with Fisher's tests at a p value < 0.05.

**Results:** In a database of 2314 colorectal anastomoses, a total of 857 (37%) were left-sided without planned proximal diversion. A stapled anastomosis was constructed in 773 (90%) patients while 84 (10%) had a hand-sewn anastomosis. Of all anastomoses, 702 (82%) underwent ALT: 687 (89%) of all stapled anastomoses but only 15 (18%) of all hand-sewn anastomoses. An intraoperative air leak was noted in 57 (8.1%) tested anastomoses: 2/15 (13.3%) hand-sewn and 55/687 (8.0%) stapled anastomoses. A clinical leak developed in 43 patients or 5.0% of all anastomoses: 4.5% of all stapled anastomoses and 9.5% of all hand-sewn anastomoses (p=0.06). A clinical leak was noted in 5.3% of all positive ALTs as compared to 4.3% of all negative ALTs and 8.4% of all non-tested anastomoses (p<0.05). The clinical leak rate was particularly high in the absence of ALT for circular stapled anastomoses, where 5/25 (20%) nontested anastomoses developed a clinical leak. If ALT was positive, then suture repair alone (n = 36) had the highest rate of postoperative clinical leak as compared to diversion or reanastomosis (n = 21), 8.3% vs. 0%, respectively (p=0.3).

**Conclusions:** Our data reveal a high rate of air leaks with ALT in left-sided anastomoses, regardless of anastomotic method (i.e. hand-sewn or stapled). In addition, we note a high rate of clinical leaks when ALT is not performed, leading us to recommend that all left-sided anastomoses should have ALT. While commonly practiced, suture repair of a positive ALT was associated with a higher rate of clinical leak compared to diversion or reanastomosis.

### Evaluation of the Safe and Effective Performance of the Compression Anastomosis Ring (Endo CAR) for Colorectal Anastomosis in Comparison to Circular Stapler in a Porcine Model

(P262)

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**Purpose:** To compare different characteristics of rectal compression anastomoses created by the NiTi EndoCAR

device to traditional circular stapled anastomoses at multiple time points.

**Methods:** 51 domestic pigs were included. Each pig underwent a rectal anastomosis with a 27mm EndoCAR device or a 29mm circular stapler. They were sacrificed at zero-time, 2 days, 1 week, 1 month, and 3 months. Burst pressures, internal diameters, and radiographic leak rates were assessed. Note was made of whether the anastomosis burst vs native tissue adjacent to the anastomosis. Maximal tolerated pressure of the system (MTP) was defined as the pressure at which tissue burst, whether at the anastomosis or native tissue. Adhesions were compared at 1 week, 1 month, and 3 months. Tissue was processed for desmosine levels.

**Results:** MTP for the EndoCAR was greater than the stapler at time-zero (105 vs 32mmHg), 1 week (192 vs 151mmHg), 1 month (215 vs 168mmHg), and 3 months (210 vs. 167mmHg). 10 out of 27 (37%) compression anastomoses burst, while 14 out 24 (58%) stapled anastomoses burst. Anastomotic burst pressures were higher for the EndoCAR at time-zero (107.5 vs 42.5mmHg), 2 days (111.7 vs 96mmHg), 1 month (220 vs 150mmHg), and 3 months (200 vs 178.5mmHg). There were no clinical or radiographic leaks. The mean circumference was greater for the EndoCAR at 1 week (8.2 vs 7.4 cm), and 3 months (11 vs 10 cm). The mean anastomotic index (AI) was higher for the EndoCAR at 1 week (0.9 vs. 0.69), and 3 months (1.0 vs. 0.88). There were denser adhesions noted with the stapler at 3 months, but no difference noted at 1 week and 1 month. There was no difference in desmosine levels at any time point.

**Conclusions:** In the porcine model, rectal anastomoses with the EndoCAR appear to be at least as safe and effective as traditional circular stapled anastomoses up to 3 months post-operatively. There was less long-term anastomotic narrowing and fewer late adhesions with the EndoCAR. Further studies in humans are warranted to determine any long-term clinical advantage associated with these findings.

### Multiple Synchronous Colon Anastomoses: Are They Safe?

(P263)

S. Holubar, M. Soop, B. Wolff, V. Poola . . Rochester, MN

**Purpose:** Our aim was to evaluate short-term outcomes in patients who underwent multiple segmental colonic resections and anastomoses without a stoma.

**Methods:** Using a prospective procedural database, we identified all adult general surgery patients who underwent two segmental colon resections and anastomoses at our institution from 1992-2007. Patients who required a diverting stoma or an end-colostomy were excluded. Demographics, operative techniques, and 30-day outcomes were retrospectively reviewed. Results are reported as number (percent) of patients or median (interquartile range).

**Results:** Over a 15-year period, 69 patients underwent synchronous segmental colon resections and anastomoses (40 males, age 63 (45-76) years, BMI 25.3 (22.9-28.7)

kg/m<sup>2</sup>). A total of 16,214 patients had colon resections during this time at our institution; multiple colon anastomoses occurred in 1 in 231 (0.4%). The operation was urgent or emergent in 25 (36%), and purulent contamination was present in 11 (16%). Anastomotic sites and techniques are shown in Table 1. Proximal indications were neoplasia in 47 (68%), Crohn's disease in 20 (29%), and diverticular disease in 2 (2.9%); distal indications were neoplasia in 35 (51%), Crohn's disease in 20 (29%), and diverticular disease in 14 (20%). Ten (17%) cases were performed using minimally invasive techniques, with a 50% conversion rate. Length of stay was 7 (5-10) days. Overall 30-day morbidity was 36% including 9 (13%) surgical site infections, 3 (4.3%) partial bowel obstructions, 2 (2.9%) intra-abdominal abscesses requiring percutaneous drainage, and 1 (1.4%) dehiscence. No anastomotic leaks or fistulas were identified. Two patients (2.9%) died within 30 days; one due to pulmonary sepsis, and one due to multi-system organ failure after distal anastomotic bleed and multiple transfusions.

**Conclusions:** Multiple synchronous colon anastomoses are associated with a morbidity and mortality similar to those reported for single anastomoses, supporting the safety of constructing two colonic anastomoses without fecal diversion in select patients.

#### A Global Multimedia Simulation Platform for Training in Anterior Resection

(P264)

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**Purpose:** To develop a multimedia simulation model for operative training in open anterior resection.

**Methods:** Multiple task analyses of operative video images captured during anterior resection procedures were initially performed to delineate the individual stages of the operation. These key steps were then further broken down to derive a number of sub-steps reflecting the specific tasks performed by the operating surgeon and assistants. The operative images were then edited using professional Adobe software and an individual narrative was scripted for each pro-

cedure utilizing cognitive load theory principles. Video clips were graded according to complexity such that appropriate material for the novice, intermediate and advanced user was included in the final model. This selection was subsequently authored with animation and still imagery for presentation on a high capacity dual layer, double sided DVD.

**Results:** A task and subtask analysis map was produced and formed the basis for the educational model. This map identified 8 key steps for anterior resection. For each step of the procedure a number of video clips were selected representing differing contexts with respect to difficulties in access, anatomical variation and pathology encountered. As an aid to intra-operative decision-making, specific narrative was formulated and incorporated into each video clip. Animation sequences and still images were also constructed to reflect the analysis map with narrative applied in a similar fashion to the video clips. These elements were combined with a navigational framework in the final authored DVD. This framework allows unrestricted user interaction with multiple media clips provided for each step, which can be viewed sequentially or individually.

**Conclusions:** A cognitively efficient multimedia simulation model has been developed for operative training in open anterior resection surgery. The training model produced permits user interaction with relevant material available for all levels of surgical experience. The global approach to teaching anterior resection surgery allows for all aspects of the procedure, including team interaction, decision-making strategies and operative technique, to be taught simultaneously in one discrete model.

#### An Analysis of Fecal Diversion Methods Following Low Rectal Anastomoses

(P265)

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..... Merseyside, United Kingdom; Manchester, United Kingdom

**Purpose:** Diversion of the faecal stream is routinely performed in patients undergoing low rectal anastomoses. The

#### P263 Anastomotic Sites and Techniques

	Proximal Anastomosis n = 69	Distal Anastomosis n = 69
Ileocolic resection	30	0
Right hemicolectomy	33	0
Transverse colectomy	6	1
Left hemicolectomy	0	2
Sigmoidectomy with colocolostomy	0	28
Sigmoidectomy with colorectostomy	0	39
Handsewn : Stapled	33 : 36	45 : 24

optimal method, loop ileostomy or loop colostomy still remains a contentious issue. We examined current surgical practice and preferences in Northwest England by questioning surgeons, stoma nurses and patients. A systematic review and meta-analysis of the literature was also performed to determine whether the evidence supported current practice.

**Methods:** Postal questionnaires were sent to surgeons and stoma nurses in Merseyside assessing preferred method of faecal diversion along with stoma specific quality of life questionnaires to patients with both types of stoma. An extensive literature search was performed for randomized controlled trials comparing the two methods and data extracted were subjected to a meta-analysis to determine odds ratios for outcome measures including mortality and morbidity following both construction and closure of stomas.

**Results:** Most (59%) colorectal surgeons in Northwest England prefer loop ileostomy as their method of faecal diversion. Analysis of the quality of life questionnaires revealed no difference in the mean overall scores between each group ( $p=0.8$ ). Five randomized controlled trials satisfied the inclusion criteria and the outcomes of 334 patients were measured. 166 patients underwent loop colostomy and 168 underwent loop ileostomy. There was no overall difference in mortality or morbidity between the two groups with either formation or closure of the stomas, however, loop colostomy was associated with a greater incidence of stomal prolapse ( $p=0.0002$ ).

**Conclusions:** Most surgeons in Northwest England prefer loop ileostomy to divert the faecal stream following low rectal anastomosis. Current evidence would appear to support this practice, with loop colostomy being associated with a greater incidence of stomal prolapse, although quality of life scores in our patient group did not reflect this finding. The optimal method of faecal diversion following low rectal anastomosis remains unclear; a larger multicentre prospective trial may provide a more definitive answer.

#### Differential Lymph Node Retrieval in Rectal Cancer: Associated Factors and Effect on Survival

(P266)

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**Purpose:** Recent publications have identified a positive association between the number of lymph nodes pathologically examined and five-year overall survival (5-yr OS) in colon cancer. However, focused examinations of the relationship between survival of rectal cancer and lymph node counts are less common. We conducted a single institution, retrospective review of rectal cancer resections to determine whether there were any clinical factors associated with lymph node counts and if lymph node counts were independently predictive of 5-yr OS.

**Methods:** From 1/1/95 through 12/31/05, 131 rectal cancers (AJCC stages 1-3, located within 15 cm of anal verge) were treated at our institution. Clinico-pathologic data were reviewed. Hazard ratios were determined for year of diagnosis (1995-2000/2001-2005), age ( $<70/>70$ ), stage (AJCC 1, 2, or 3) and lymph node counts using Cox Proportional Hazards model. Five-year OS was estimated by the Kaplan-Meier method and log rank testing was used to assess differences.

**Results:** Patient age ( $<70$ ), increasing AJCC stage, and year of diagnosis (2001-2005) were associated with greater lymph node retrieval ( $p<0.05$ ). There was no association between lymph node counts and 5-yr OS (Kaplan-Meier, log rank test  $p>0.05$ ; Cox Proportional Hazards, confidence intervals for HR include one).

**Conclusions:** Adequate lymph node retrieval in colorectal cancer is likely to improve the accuracy of staging. However, very few studies have examined lymph node retrieval exclusively in rectal cancer. This study looks exclusively at rectal cancers and suggests that the same rules may not necessarily apply. We demonstrate that nodal retrieval was significantly increased based on younger age, increasing stage, and period of diagnosis (2001-2005). However, when controlling for age and stage, the number of nodes did not effect survival. Future studies with larger sample sizes are needed to determine if these results persist.

#### Surgical Treatment of C. Difficile Colitis: Rarely is it Subtotal Colectomy

(P268)

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 . . . . . Los Angeles, CA

**Purpose:** C. difficile colitis has shown an increased incidence and virulence over the last decade. Traditionally, subtotal colectomy has been regarded as the treatment of choice for patients with progressive or fulminant disease. We hypothesized that there are variations in care, and that a significant number of patients are treated with surgical options other than subtotal colectomy. In testing this hypothesis we sought to identify the impact of variations in care on patient outcomes and characterize patient and hospital characteristics that predict patterns of practice.

**Methods:** We used the Nationwide Inpatient Sample dataset from 1996 – 2005 to identify a population-based cohort of patients with C. difficile colitis who underwent colectomy. Patients with diagnosis codes that pertain to other indications for colectomy (GI malignancy, appendicitis, diverticulitis, inflammatory bowel disease, obstruction, etc) were excluded. The presence of sepsis was identified on the basis of ICD coding and employed as a control variable. We used ICD codes to categorize patients as having undergone subtotal vs. segmental colectomy. Weighted logistic regression with cluster adjustment at the hospital level was used for significance testing.

**Results:** We identified 884 patients that underwent a colectomy for *C. difficile* colitis. Of these, 25% were treated with a subtotal colectomy, with the vast majority undergoing segmental colectomy or colostomy only. Older patients were slightly less likely to have a subtotal colectomy, and sicker patients (higher Charlson score) were slightly more likely. We found no variations in rates of subtotal colectomy or mortality based on hospital teaching status or location (urban vs. rural). Mortality was significantly higher {45% vs. 27%} (AOR 1.6 [1.1 – 2.3]) in those patients undergoing subtotal colectomy.

**Conclusions:** Subtotal colectomy is performed in only a minority of patients undergoing surgery for *C. difficile* colitis. The lower mortality in patients that had a more limited operation is difficult to explain, and is possibly the result of differences in the timing of surgery. Subtotal colectomy may not be the optimal treatment for all patients taken to surgery for *C. difficile* colitis.

#### Polypectomy the Old Fashioned Way: Still Safe and Sound (P269)

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**Purpose:** Colonoscopic polypectomy is routine yet concerns about complications have prompted time consuming techniques such as the saline lift. Here we report the results of a large series of consecutive polypectomies done without these techniques, to show the risks inherent in this method of management.

**Methods:** From 1995 to 2007 all polyps seen by a single endoscopist during colonoscopy were recorded in a database along with the outcomes. Complications included immediate hemorrhage (bleeding requiring treatment, occurring at the time of polypectomy), delayed hemorrhage (bleeding occurring after discharge and resulting in admission to hospital), and post polypectomy syndrome. Saline lift was not used, all snare polypectomies were done with standard mini or regular sized snares, and hemorrhage was treated with re-snaring a stalk or injection of adrenalin.

**Results:** 8942 polyps were removed endoscopically, 5019 by cold biopsy, 583 by hot biopsy and 3328 by snare excision. There were 42 complications out of 8942 endoscopic polypectomies (0.45%). 19 patients had an immediate hemorrhage and 19 had a delayed hemorrhage. 4 patients had post polypectomy syndrome. There were no perforations and no deaths. No patient needed surgery. The risk of complications from snare was 35/3328 (1.1%), from hot biopsy was 2/583 (0.3%) and from cold biopsy was 5/5019 (0.01%). Excluding immediate hemorrhage the risk of complications was 0.6%, 0 and 0 respectively. 1064 of the snared polyps were >10mm in diameter and 554 were >20mm. 1877 of the snared polyps were right sided. Most hemorrhage came from right sided polyps (immediate = 16/19, delayed = 15/19) and most were from snare (immediate 12/19, delayed 19/19) of sessile/flat (immediate

18/19, delayed 16/19) polyps. All four post polypectomy syndromes occurred after snare excision of sessile polyps from the right colon. 12 polyps causing immediate hemorrhage were >10mm in size and 10 were >20mm. Numbers for the size of polyps associated with delayed hemorrhage were identical. 11 of the polyps with immediate hemorrhage were histologically advanced while 12 of those with delayed hemorrhage were advanced.

**Conclusions:** This series shows that colorectal polyps can be treated safely, without the need for a saline lift.

#### Does Propofol-Assisted Monitored Anesthesia Increase Perforation Rates During Colonoscopy?

(P270)

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**Purpose:** Adequate sedation is an important component of successful colonoscopic examination. Propofol assisted monitored anesthesia (PAM) is a popular method of sedation during colonoscopy and may provide deeper sedation than traditional methods using demerol or fentanyl. Deeper sedation diminishes feedback between patient and endoscopist and may contribute to an increased perforation rate. The aim of this study was to evaluate the rate of colonoscopic perforation when sedation by PAM is used compared to traditional methods of sedation.

**Methods:** The records of all patients undergoing a colonoscopy from January 2003 to January 2006 were reviewed to identify mode of sedation, indication for procedure, incidence and cause of perforation, and treatment following perforation.

**Results:** A total of 63,437 colonoscopies were performed. There were 29 perforations (0.05%). The perforation rate with PAM was 0.11% and 0.04% when other modes of sedation were used (p=0.122). Seventeen of the 29 patients had a biopsy or polypectomy prior to perforation. In those patients complicated by perforation, bleeding was the most common indication for colonoscopy. Only four of the 29 perforations were treated in non-operative fashion.

**Conclusions:** Overall, perforation rates at our institution are comparable to other reported series. Although there seems to be an increased association between PAM and perforations in patients undergoing colonoscopy, the results are not statistically significant.

#### Impact of Pelvic Radiotherapy on Patient Quality of Life after Abdominoperineal Resection for Rectal Cancer

(P271)

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**Purpose:** Pelvic radiotherapy (XRT) is associated with improved oncologic outcomes in patients (pts) undergoing



abdominoperineal resections (APR) for locally advanced rectal cancer. The impact of XRT on patient quality of life (QOL) however has not been rigorously evaluated. We assessed and compared QOL of APR pts receiving and not receiving XRT using validated instruments.

**Methods:** At a single institution from 1994-2004, 374 pts underwent APR for rectal cancer, of which 204 (55%) received XRT. After 70 months (mo) of median follow-up (range 25-148 mo) 129 pts receiving XRT (77 preoperative and 52 postoperative) and 90 pts not receiving XRT were alive and mailed the EORTC QLQ-C30 and EORTC QLQ-CR38. Response rate was 65% (88 XRT and 55 no XRT). Responders were younger (61 vs. 67 years (yr),  $p<0.001$ ) but had similar gender distribution (males, 71 vs. 61%,  $p=0.07$ ) compared to non responders. Data are on a 0-100 scale [100=best (functional scales) or worst (symptom scales); mean (SD)].

**Results:** Pts receiving XRT were younger (59 vs. 66 yr,  $p<0.001$ ) but not different in gender distribution (males, 70 vs. 71%,  $p=0.5$ ) or median follow-up (71 vs. 70 mo,  $p=0.8$ ) compared to pts not receiving XRT. There were no clinically significant differences on the EORTC QLQ-C30 global health status, functional subscales and most symptom subscales, except nausea/vomiting [6(11) vs. 1(3),  $p=0.001$ ], appetite loss [10(18) vs. 5(15),  $p=0.048$ ], constipation [13(24) vs. 3(10),  $p=0.006$ ], and financial difficulties [26(30) vs. 15(24),  $p=0.03$ ], which were worse in pts receiving XRT. No clinically significant differences were noted in the majority of functional and symptom subscales of the EORTC QLQ-CR38, except body image [62(29) vs. 74(23),  $p=0.03$ ], future perspective [61(28) vs. 77(23),  $p<0.001$ ], GI tract symptoms [17(15) vs. 11(11),  $p=0.009$ ], and female sexual problems [75(31) vs. 17(24),  $p=0.003$ ], which were worse in pts receiving XRT.

**Conclusions:** After APR for rectal cancer, XRT does not affect patient QOL in most functional and symptom domains. However, patients experience decreased QOL and increased symptoms in specific areas of their lives.

#### Quality of Life after Pelvic Exenteration Surgery. A Retrospective Review

(P272)

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**Purpose:** Pelvic exenteration is the only treatment option which is potentially curative for patients presenting with locally advanced primary or recurrent pelvic cancer. Without surgery, less than 5% of people survive to 5 years whereas overall survival rates between 35 - 45% have been reported following surgery. To date there is little information about the impact of pelvic exenteration on patients' subsequent function and quality of life (QoL). The aim of this study was to assess QoL and functional outcomes for surviving patients after pelvic exenteration, and identify factors that affect survival and QoL following surgery.

**Methods:** A retrospective review of patients who had undergone pelvic exenteration for advanced primary or recurrent pelvic cancer between 1996-2007 was undertaken, in order to determine clinical and survival outcomes. Telephone interviews with surviving patients to assess current QoL was performed using the following instruments: the SF-36 a generic health-related quality of life measure, the FACT-C a colorectal cancer specific quality of life measure and the FACIT-TS-G a measure of patient satisfaction with treatment. Statistical analysis was performed using SAS.

**Results:** A total of 107 eligible patients (36 male, 71 female) underwent pelvic exenteration. Origin of cancer included 46 (43%) primary rectal, 35 (33%) recurrent rectal, 6 (6%) primary gynaecological, 11(10%) recurrent gynaecological and 9 (8%) other type cancer. 22 Patients had a total pelvic exenteration and 85 underwent partial pelvic exenteration. Of the 107 patients 66 patients were still alive and eligible for interview. Of this group 36 (54.5%) patients completed QoL assessment with 20 awaiting assessment. Detailed results will be presented.

**Conclusions:** Although survival is improved after pelvic exenteration quality of life is not known and needs to be determined in order to continue to justify such radical surgical treatment.

#### Avoiding a Permanent Stoma When all Else Fails: Do the Long-Term Functional Results after a Turnbull-Cutait Pull Through Procedure Justify its Use?

(P273)

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..... Cleveland, OH

**Purpose:** The Turnbull-Cutait abdomino-anal pullthrough (TC) procedure is used as a last resort to salvage patients with complex anorectal conditions that would otherwise mandate permanent diversion. We compare outcomes for patients undergoing TC to a matched group undergoing coloanal anastomosis (CAA).

**Methods:** Data for all patients undergoing TC from 1996-2007 were retrospectively reviewed to determine demographics, indication and postoperative complications. Patients were contacted to determine longterm functional outcome including bowel movements, sexual, urinary function and quality of life (QOL) using SF-36 and the Cleveland Global Quality of Life (CGQL) scale (0 worst and 10 best). Functional results and QOL were compared with matched patients for age, gender and body mass index from cancer database undergoing hand-sewn one-stage straight CAA for rectal cancer (1:2 match).

**Results:** During the 11 year period, 67 patients (40 male) underwent TC for rectal cancer (n=27, 40.2%), Crohn's (n=15, 22.3%), prostate cancer (n=9, 13.4%), complex anal/rectovaginal fistula (n=14, 20.9%), bowel involvement by ovarian/cervical cancer (n=2, 3.2%). Indications includ-

ed multiple failed fistula repair (n=19, 28.4%), failed colorectal or coloanal anastomosis (n=13, 19.4%), technical difficulty in primary coloanal anastomosis (n=13, 19.4%), Crohn's fistulas/strictures (n=11, 16.4%) and post-radiation damage (n=11, 16.4%). Complications included stricture/stenosis (n=16, 36.4%), anastomotic dehiscence (n=5, 11.4%), prolapse of the colon (n=5, 11.4%). There were no early postoperative mortality. After a mean follow-up of  $54 \pm 23$  months, 23 patients (34.3%) did not have

their ileostomy closed. Continence ( $p=0.06$ ), urinary ( $p=0.6$ ) and sexual problems ( $p=0.08$ ) and QOL for the remaining 44 patients was similar to the matched CAA patients (table).

**Conclusions:** The Turnbull-Cutait abdomino-anal pull-through procedure safely salvages patients with complex anorectal conditions that might otherwise require permanent fecal diversion. Longterm functional results and QOL are comparable with coloanal anastomosis.

P271 Table 1

	XRT (N=88) Mean (SD)	No XRT (N=55) Mean (SD)	p-value (Kruskal-Wallis-test)
EORTC QLQ-C30			
Global health status/QOL	70 (20)	72 (21)	0.48
Functional scales:			
Physical functioning	85 (18)	84 (19)	0.68
Role functioning	81 (28)	87 (25)	0.27
Emotional functioning	82 (21)	86 (18)	0.27
Cognitive functioning	84 (19)	88 (12)	0.50
Social functioning	73 (27)	79 (24)	0.24
Symptom scales:			
Fatigue	26 (23)	22 (22)	0.19
Nausea and vomiting	6 (11)	1 (3)	<0.001
Pain	16 (24)	11 (20)	0.14
Dyspnea	13 (24)	13 (23)	0.98
Insomnia	26 (31)	20 (25)	0.40
Appetite loss	10 (18)	5 (15)	0.048
Constipation	13 (24)	3 (10)	0.006
Diarrhea	17 (24)	10 (17)	0.09
Financial difficulties	26 (30)	15 (24)	0.03
EORTC QLQ-CR38			
Functional scales:			
Body image	62 (29)	74 (23)	0.03
males	63 (30)	71 (25)	0.18
females	62 (29)	84 (17)	0.04
Sexual functioning			
males	74 (23)	70 (27)	0.77
females	89 (17)	73 (31)	0.20
Sexual enjoyment			
males	48 (26)	52 (31)	0.70
females	73 (37)	52 (33)	0.30
Future perspective	61 (28)	78 (23)	<0.001
Symptom scales:			
Micturition problems			
males	25 (19)	24 (17)	0.93
females	16 (13)	17 (21)	0.63
Chemotherapy side effects	14 (15)	12 (14)	0.62
Symptoms of the GI-tract area	17 (15)	11 (11)	0.01
Male sexual problems	72 (30)	61 (39)	0.26
Female sexual problems	75 (31)	17 (24)	0.003
Defecation problems	30 (23)	24 (20)	0.11
Weight loss	12 (23)	6 (17)	0.08

### Factors Predictive of Long-Term Failure of Artificial Bowel Sphincter

(P274)

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**Purpose:** To assess the risk factors for late-stage complications associated with ABS implantation.

**Methods:** Patients who had an ABS implanted for FI were included in the study. The patients whose ABS was explanted prior to device activation were excluded from analysis. Kaplan Meier survival curve was applied to evaluate the cumulative risk.

**Results:** January 1998 to May 2007, 51 ABS devices were implanted in 47 patients; 18 were explanted prior to activation because of early stage infection. 33(64.7%) functional ABS device implantations were included in the study. Mean age was 49+13 (19-79) years; 7 (21.2%) were male. Mean Cleveland Clinic Florida (CCF) FI score was 18+1.4 (16-20). In 18 patients (54.5%), the etiology of FI was secondary to imperforate anus, 8 (24.4%) patients had obstetric injury or anorectal trauma, 3 had low anterior resection for rectal cancer, 3 were secondary to neurogenic causes, and 2 were related to spinal injury. 10 (30.3%) patients had prior ABS implantation and 18 (54.5%) had a history of sphincteroplasty, perineal reconstruction, or sphincter repair; 6 had a preoperative stoma. During a mean follow up of 39+28(5-108) months, 9 patients had device malfunction and recurrent FI, 6 developed skin or rectal erosion, 5 had persistent perianal pain, 2 developed device migration, 2 suffered from constipation, and 1 developed a hematoma over the labia majora. 13 (39.4%) ABS devices were explanted for late-stage complications. Evaluation showed that the one and two year cumulative risk of ABS explantation was 9.7% and 13%, respectively. After 2 years, the risk of ABS explantation sharply increased and the third and fourth year risk increased to 47% and 53%, respectively, 5 year cumulative risk was 58%. Cox regression analysis

showed that explantation of ABS was not related to patient's age, gender, etiology of FI, CCF FI score, body mass index, history of perianal procedure or infection, presence of a defunctioning stoma, or the timing of the procedure.

**Conclusions:** The number of ABS devices explanted increased over time. The majority of late stage complications were technical and related to the device, no predictive patient-related factors were identified. Refinement of the device and technique may be necessary.

### Randomized Comparison of Protocols of Equipment Management and Cleaning for Rigid Sigmoidoscopy

(P275)

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**Purpose:** There is disparity between existing guidelines for cleaning of equipment and prevention of cross patient contamination during rigid sigmoidoscopy, a frequently performed colorectal investigation. The evidence base in the literature is poor.

**Methods:** 104 rigid sigmoidoscopies were performed in the rooms of two colorectal surgeons between December 2006 and May 2007, using standard techniques without collection of individual patient data. A 3 way randomisation was performed between the following techniques : 1 Enzymatic washing versus steam sterilisation of metal head 2 Disposable versus reusable bellows 3 Use with versus without air filter During the sigmoidoscopy, specimens were collected on 3 occasions : 1 Air was insufflated through clean equipment set prior to the sigmoidoscopy, onto an agar plate 2 After the procedure, the disposable plastic shaft was replaced and air again insufflated onto an agar plate 3 The set was dismantled and air insufflated directly from the bellows onto an agar plate Plates were then assessed for colony growth of either gram negative enteric bacterial colonies, or

### P273

Comparison	Turnbull-Cutait	Colo-anal	P value
Bowel movements			
Day	3.5	3.8	p=0.97
Night	1.3	1.5	p=0.4
Incontinence			p=0.06
Never	30(68.1%)	74(82.3%)	
Rarely	4 (9.1%)	1(1.1%)	
Sometimes	0	1(1.1%)	
Usually	5(11.4%)	3(3.3%)	
Always	5(11.4%)	11(12.2%)	
SF 36			
Physical function Mean (SD)	55(10)	58(17)	P=0.6
Social function Mean (SD)	47(8)	42(11)	P=0.12
Mental health Mean (SD)	52(11)	55(13)	P=0.3
CGQL	7.4 ±2	7.9 ±1	P=0.2

gram positive environmental bacteria. Each plate was qualitatively and quantitatively assessed for bacterial colonies.

**Results:** Gross faecal contamination of the rigid sigmoidoscope did not occur during any of the procedures. One plate (post procedure bellows) grew a single gram negative colony, all other contaminated plates showed environmental flora only. Reusable bellows in combination with an air filter showed lower mean colony counts (environmental flora) from the pre-procedure cultures as well as from the bellows cultures.

**Conclusions:** Enteric flora are rarely aerosolized and the use of an air filter may decrease this likelihood even more. There is no advantage in using disposable insufflation bellows when compared with the reusable type, allowing considerable cost saving. Washing the light head with enzymatic solution is safe cheap and as effective as autoclave sterilisation.

### Is the Barium Enema an Outdated Study?

(P276)

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**Purpose:** The double contrast barium enema has remained a popular investigation for colorectal disease. Its uses range from first line investigation in symptomatic patients to screening tests in average risk patients under the American Cancer Society guidelines. This has led to an increase in radiographers both performing and reporting the examination. Although it remains a cheap and simple investigation, it is now becoming increasingly replaced by examinations such as colonoscopy and CT colonography. The aim of this study was to determine how conclusive barium enemas are in giving a definitive diagnosis.

**Methods:** A retrospective analysis of prospectively collected data was performed for all surgical barium enemas between October 2006 and November 2007. Studies were deemed inconclusive if the reports commented on contrast failing to reach the caecum, examination not tolerated by patient, further investigations recommended or areas where mucosal lesions could not be excluded. The number of positive findings were identified, and the number of patients undergoing further investigations were analysed.

**Results:** 504 examinations were performed within the 13 months (male-161,female- 343). The median age was 69 years (range 29- 92). The main indications for the investigation included; change in bowel habit, PR bleeding, abdominal pain and anaemia. 359 studies were reported by a radiologist with 36% found to be inconclusive, and 145 studies were reported by a radiographer with 45% found to be inconclusive  $p=0.0002$  (Fishers exact test). Colonic lesions were identified in 29 patients (5.8%)-13 patients with possible malignancy and 16 with polyps. Postoperative histology confirmed malignancy in 12/13 patients. 29 patients underwent a further CT scan revealing a further 2 malignant lesions and 72 patients underwent a further colonoscopy.

**Conclusions:** The double contrast barium enema exami-

nation maintains a high diagnostic yield for certain neoplastic lesions. However 38% of all examinations reported are inconclusive, leading to many patients requiring alternative investigations, and increasing outpatient clinic workload. This questions the rational for using barium enema as a first line investigation for colorectal disease with the availability of other investigations.

### Optimal Number of Lymph Nodes Harvested: Should it be Location Dependent?

(P277)

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**Purpose:** Identifying lymph node metastasis is pivotal to determining the pathologic staging and thus prognosis of colorectal cancer and if adjuvant chemotherapy is warranted. The purpose of this study was to report our institutions data on the number of lymph nodes harvested following varying types of colorectal resections and to determine whether the density of lymph nodes(number of nodes per centimeter of colon) varied within the colonic mesentery.

**Methods:** Pathology reports were reviewed on 688 colorectal cancer specimens between 2001 and 2006. The number of lymph nodes harvested was identified and lymph node density was calculated based on length of colon or rectum resected. Statistical analysis was used to determine significance between the various locations in the colon and rectum.

**Results:** The mean number of lymph nodes harvested from right colectomy specimens was significantly higher ( $p<0.0001$ ) when compared to left, transverse, and rectal resections. Calculated lymph node density (#lymph nodes/cm) was highest for a transverse colectomy, followed by left colectomy, right colectomy and proctectomy but there was no statistical difference in nodal density between any of the resected regions (see table 1). In addition the number of lymph nodes resected in the rectum was the same with or without pre-operative radiation.

**Conclusions:** Although the optimal number of lymph nodes to be harvested remains a matter of debate, 12 lymph nodes has been set as the recommended number, with some studies showing improved survival with increased lymph node retrieval. Several studies have reported higher numbers of lymph nodes retrieved while performing a right colectomy compared to left sided resections. Therefore the question arises; should the recommended minimum number of lymph nodes harvested be different depending on the segment of colon removed. However based on this data, lymph node density appears to be constant throughout the colon mesentery thus supporting the current recommendation of a single number through out the entire colon and rectum. This may be related to the longer specimens often removed with a right colectomy. In addition this data shows no change in lymph node retrieval for rectal resections with and without radiation.



# Value of MRI after Neoadjuvant Chemoradiotherapy in the Preoperative Assessment of Rectal Cancer

(P278)

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**Purpose:** The aim of this study was to examine the accuracy of MRI staging after long course neoadjuvant chemoradiotherapy (LCCRT) for locally advanced rectal cancer prior to resection, by comparing the images to the subsequent histological findings.

**Methods:** This was a prospective review of ten rectal cancers undergoing neoadjuvant chemoradiotherapy and definitive surgery in 2007. Eight patients had a restorative procedure and two required an abdomino perineal resection. All patients had a rectal protocol MRI prior to long course chemoradiotherapy and again one month after completion of their treatment. Comparisons of MRI with histological findings were made.

**Results:** The median age was 60 (range 42-83), two female. Prior to LCCRT the median distance of the tumour from the circumferential margin (CRM) by MRI criteria was five mm (0-8mm). After treatment the median CRM was six mm (0-20mm). Nodal involvement was anticipated in nine patients prior to LCCRT whereas post treatment MRI anticipated nodal involvement in only three. Comparison with histology revealed that post LCCRT MRI staging predicted an accurate CRM in four patients, overestimated the distance by only two mm in two patients, and underestimated the distance in four patients by 2,2,9, and 15 mm respectively, which included two patients who had AP resections. A positive margin was incorrectly predicted in one of these patients. Nodal status correlated with histology and MRI in eight patients.

**Conclusions:** Post neoadjuvant chemoradiotherapy MRI was accurate in predicting a clear CRM in nine cases and within two mm in eight. Correct nodal status was predicted in eight. Post treatment MRI is a useful tool in preoperative assessment of surgical resectability of tumours, but more importantly perhaps, assists in providing a road map for surgery.

# No Benefit From Routine Ileostomy Formation Prior to Neoadjuvant Chemoradiotherapy for Rectal Cancer

(P279)

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**Purpose:** There is a wide variation in the use of a defunctioning stoma prior to neoadjuvant chemoradiotherapy (CRT) for rectal cancer. There is a perceived advantage that pre-CRT stoma formation may improve compliance with CRT and this may offer an oncological advantage. However these potential benefits must be balanced against the additional cost and morbidity of a stoma. In this study we set out to determine whether there was an advantage to the routine versus selective use of a stoma prior to neoadjuvant CRT.

**Methods:** In our institution from 2000-3 all patients with a rectal cancer received a defunctioning ileostomy prior to long course neoadjuvant CRT (45Gy over 5 weeks with 5FU). We compared outcomes from this cohort with patients from 2004-6 during which time pre-CRT stoma formation was selectively performed for advanced symptoms. Sub-groups of patients having pre-CRT versus intra-operative stoma formation were also compared. Patients who had an abdominoperineal resection were excluded.

**Results:** All patients completed CRT. There was no increased morbidity or treatment interruption in the group where a stoma was used selectively. Furthermore with a selective stoma policy there was no significant difference in the pathological staging (TNM) of the resected specimen. However routine formation of a pre-CRT stoma resulted in a significantly longer total inpatient hospital stay. There was no significant difference between the time for stoma reversal between groups.

**Conclusions:** The routine formation of a defunctioning stoma prior to neoadjuvant CRT for rectal cancer was not associated with an improved oncological response. However this policy incurs the inevitable costs and morbidity of an additional operation and hospital stay.

## P277 Number of colorectal resections performed by location as well as the mean number of lymph nodes harvested, mean length, and mean calculated lymph node density.

	N (688)	# of Lymph Nodes Harvested	Length Resected (cm)	Density of Lymph Nodes(/cm)
Right Colectomy	312	14.2 *	23.9 **	0.587
Left Colectomy	262	11.6	18.8	0.591
Transverse Colectomy	27	11.5	17.9	0.612
Proctectomy	87	11.3	21.0 ***	0.528
(+) Neoadjuvant	47	10.9	20.7	0.526
(-) Neoadjuvant	40	11.6	21.5	0.538

\* P Value <0.0001 compared to left, transverse and proctectomy nodal counts. \*\* P Value <0.0001 compared to left and transverse colectomy lengths. \*\*\* P Value <0.0001 compared to transverse colectomy lengths.

# Outcomes Improved after Total Mesorectal Excision (TME) Workshops in British Columbia (BC)

(P280)

P. Phang, C. McGahan, G. McGregor, J. MacFarlane, C. Brown, M. Raval, R. Cheifetz, H. Kennecke, J. Hay  
 . . . . . Vancouver, BC, Canada

**Purpose:** In a province-wide audit in BC in 1996, local recurrence for rectal cancer management was 16% overall and 27% for stage 3 cancers using non-standardized rectal cancer surgery techniques and postoperative adjuvant chemoradiation. To improve these outcomes TME education workshops were held in BC in 2002 and 2003 with promotion of change to adjuvant short course preoperative radiation and surgical technique standardized to TME. To assess whether local recurrence was changed a province-wide audit was repeated for patients treated in the year after the workshops.

**Methods:** In 2003-2004, 396 patients had radical resection of rectal cancers with curative intent. Preoperative adjuvant radiation was given to 49% of patients. 33% of patients received adjuvant chemotherapy. Permanent colostomy was performed in 33% of patients. Median followup was 34.5 months with 91% of patients followed for at least 2 years.

**Results:** Overall, survival was 84%, disease-specific survival was 89%, pelvic recurrence was 7%, and distant recurrence was 14%. Pelvic recurrence was 5.2% (95% CI 1.9-8.5) for patients receiving preoperative radiation and 9.0% (95% CI 4.7-13.4) for surgery alone. For stage 3 rectal cancers pelvic recurrence was 10% and was significantly lower than in 1996 ( $P=0.03$ , Kaplan Meier). Overall recurrence risk was 0.57 (95% CI 0.25-0.94, Hazard ratio) compared to 1996.

**Conclusions:** We conclude that pelvic recurrence was improved after TME education workshops and increased use of preoperative radiation in a province-wide cohort. Knowledge translation with integrated strategy by surgeons and radiation and medical oncologists has been successful in improving outcomes for rectal cancer management in a population setting.

# Emergency Surgery versus Endoscopic Stenting and Elective Surgery for Left Sided Colonic Obstruction: A Prospective-Randomized Trial

(P281)

K. Ho, J. Lim, B. Ooi, C. Tang, K. Eu . . . . . Singapore, Singapore

**Purpose:** To evaluate the role of colonic stenting as a bridge to surgery in left sided colonic obstruction

**Methods:** Patients with left sided colonic obstruction with no evidence of peritonitis were recruited for the trial. Patients who had successful colonic stenting were discharged and re-admitted for elective surgery 1-2 weeks later, while the other group had emergency surgery. Patients in whom stenting was unsuccessful also underwent emergency surgery. The choice of surgery was up to the individual surgeon.

**Results:** There were 16 patients in the stent group (group 1) and 18 patients in the emergency surgery group (group 2). Stenting took a median time of 35 min. 12 patients had successful stenting. They resumed soft diet after a median of 2 days (range 1-4), and were discharged a median of 3 days (range 2-5) later. They returned for elective surgery at a median of 10 days later. Technical stent failure occurred in 3 patients, while 1 patient was stented but failed to decompress. There were no significant difference in the age, sex and distribution of the site of tumour. 12 stented patient underwent surgery, 11 with high anterior resection and 1 left hemicolectomy. 6 cases were done open, with median op time of 75 min, and 6 laparoscopically, with median op time of 142 min. 22 patients had emergency surgery, 11 high anterior, 1 low anterior, 1 left hemicolectomy, 6 extended right hemicolectomy and 1 subtotal colectomy. All were open surgery, with a median time of 148 minutes. 5 cases required on table decompression, and 7 on table washout. 9 patients had defunctioning ileostomy, and 1 defunctioning colostomy. There was less complications (8.3% vs 54.5%) and less mortality (0% vs 9%) in the stent group. Total cost for the stent group was less than cost for colectomy and closure of stoma.

**Conclusions:** Colonic stenting followed by interval elective surgery is safer, with less morbidity and mortality when compared with the current practice of emergency surgery for left sided colonic obstruction.

## P279

	Routine pre-CRT stoma	Selective pre-CRT stoma	Intraoperative stoma
n	50	12	12
Age	63.3 ± 9.1	62.6 ± 12.6	64.2 ± 8.9
Time from initial consultation to anterior resection (days)	164.3 ± 31.4	160.3 ± 31.5	153.3 ± 19.2
Total length of stay (inc stoma formation, resection and reversal) (days)	27.2 ± 10.0	20.7 ± 7.1*	16.5 ± 10.7*
pT0 (%)	18	16.7	25

\* $p \leq 0.05$

### Are Patients with Peutz-Jeghers Syndrome at Increased Risk of Cancer Mortality?

(P282)

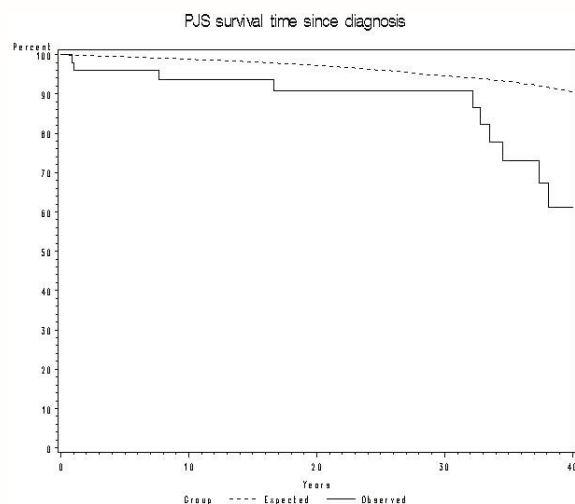
Y. You, B. Wolff, L. Boardman, R. Qin . . . Rochester, MN

**Purpose:** Peutz-Jeghers syndrome (PJS) is associated with increased risks of cancer. Whether these risks translate into curtailed survival in the long-term has not been investigated.

**Methods:** Patients with definitive diagnosis of PJS evaluated at our institution from 1949-2002 were reviewed for diagnosis, treatment, survival status and cause of death (median follow-up: 7.0 years; interquartile range: 2-20). Overall survival was compared to the expected survival of an age- and gender-matched, white, north-central American population.

**Results:** Among 54 patients with PJS, 27 (50%) were male. The median age at definitive diagnosis was 15 years, after patients presented with intestinal intussusception (43%), anemia (17%), pigmentation (9%), or a known family history (13%). Patients underwent a median of 3 operations each, most commonly for obstruction, bleeding or suspicious mass. Multiple enterotomies (1-8 per patient) and/or bowel resections (1-2 per patient) were performed. Malignancy was found in 2 resection specimens: a T1N0 jejunal and a T4N2 rectal adenocarcinoma. During the study period, 20 additional malignancies were treated in 17 patients: gynecologic (9), lung (3), prostate (2), and colon, breast, testicular, esophageal, thyroid, and adenocarcinoma of unknown origin (1 each). In the long-term, the overall survival of PJS patients after definitive diagnosis was significantly shorter than that of the reference population ( $p < 0.001$ ; Figure). Sixteen patients (30%) had deceased at a median age of 50.9 years. Mortality was exclusively due to malignancy: metastatic gynecologic (6), lung (3), esophageal (1), adenocarcinoma of the small bowel (1) and adenocarcinoma of unknown origin (1); 4 other patients died of unknown causes.

**Conclusions:** Patients with PJS face heightened risks for potentially life-threatening cancers in the gastrointestinal tract and other organs. Therefore, management should focus on early-stage detection and aggressive treatment with curative intent. Prophylactic surgery may play a role in the future.



### Colorectal Cancer (CRC) Surgery for Patients 80 Years and Older is Associated with Markedly Increased Morbidity and Mortality, and with Reduced Long-Term Survival

(P283)

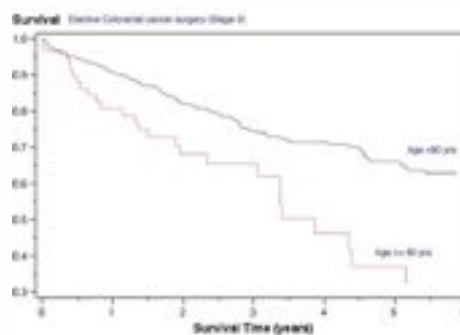
I. Faragher, A. Wong, I. Jones, S. McLaughlin, I. Skinner, I. Hayes, M. Croxford, I. Hastie, S. Shedda, P. Gibbs . . . Melbourne, VIC, Australia

**Purpose:** The number of elderly patients with CRC is increasing, but there is very limited data regarding short and long term outcomes. Further study of this population will inform initial management decisions, and may identify interventions that improve outcomes.

**Methods:** We examined our prospective, comprehensive CRC databases, dating from 1997 at Western Hospital, and 2003 at Royal Melbourne Hospital. Databases were analysed utilising the resources of the Molecular Medicine Informatics Model. There were no exclusions. Data was stratified by age ( $< 80$  /  $\geq 80$  years), elective/emergency operation and pathological stage. Endpoints were 30 day mortality, complications and survival. Data and statistical analysis used SAS.

**Results:** 1729 patients were identified. 1409 patients (81.5%) had elective and 276 (16.0%) emergency operations, 44 (2.5%) patients did not undergo surgery. Patients  $\geq 80$  years of age undergoing surgery ( $n = 238$ , 14.1%) had higher operative mortality, 5.3% v 2.1% (elective) and 27.0% v 8.3% (emergency). For the 137 elderly patients operated on from 2003 the incidence of major morbidity was greater, including acute confusional state, 7% vs 2% ( $p = 0.004$ ), and cardiac complications 16% vs 6% ( $p < 0.001$ ), and the average length of stay was increased (11 days vs 8 days  $p < 0.001$ ). For all 238 patients  $\geq 80$  years 5 year survival was inferior, 50% v 72% (elective) and 9% v 42% (emergency). Survival differences were maintained across all pathological stages. For example 5 year survival for elective stage III patients was 33% for  $\geq 80$  years of age vs 65% for  $< 80$  years ( $p < 0.01$ ). Further data on co morbidities, performance status and ASA scores will be presented.

**Conclusions:** CRC surgery for patients  $\geq 80$  years is associated with increased 30 day mortality, increased complications and reduced long term survival. We can prospectively identify high risk patients (operative mortality  $> 20\%$ ) where initial surgery may be inappropriate or additional supportive measures need to be considered. Defining survival after surgery in patients over 80 years is important in clinical decision making.



### The Role of Carcinoembryonic Antigen (CEA) in the Identification of Recurrence of Colorectal Cancer

(P284)

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**Purpose:** Carcino-embryonic antigen (CEA) is a commonly used biochemical tumor marker in the follow-up of colorectal cancer. There is debate regarding the efficacy and cost-effectiveness of this approach. We aimed to assess the patterns of recurrence after colorectal cancer resection and the accuracy of CEA in the identification of recurrence.

**Methods:** All patients who had resection of colorectal cancer in 2002 at our institution were studied. Demographics of the patients, pathological staging, tumour recurrence and CEA levels were recorded. Minimum follow-up was 5 years. Survival was estimated by the method of Kaplan-Meier and Cox's regression model used to compare groups.

**Results:** One hundred and sixty seven patients had resection of colorectal cancer in 2002. Six patients were excluded due to incomplete data. Stage of tumor was Stage 1 (20 patients, 12%), Stage 2 (53 patients, 33%), Stage 3 (62 patients, 39%) or Stage 4 (26 patients, 16%). 44 (27%) patients had tumor recurrence within 5 years. Tumor recurrence was liver alone (7 patients, 4%), lung alone (9 patients, 6%), widespread (18 patients, 11%) or local (10 patients, 6%). Tumor recurrence was detected by raised CEA in 7 of the 44 patients (16%) and by clinical or radiological follow-up (with normal CEA) in 37 patients (84%). Tumor recurrence was resected in 10 of the 44 patients (22%) whilst 17 patients (39%) received palliative oncological treatment and 17 patients (39%) received palliative supportive care alone. Patients who had resection of recurrent disease had significantly improved survival (Resection of recurrence vs. no resection, 3-year-survival 80% vs. 29%, HR 7.2, 95% CI: 1.6-32.1, P=0.003). No patients with raised CEA had resectable tumor recurrence.

**Conclusions:** 16% of colorectal tumor recurrence was detected by a raised CEA level. None of these patients had recurrence that was resectable. Resection of recurrence, where possible, offered best survival after tumor recurrence. On the basis of these results, the value of routine CEA alone in the follow-up of colorectal cancer needs to be questioned.

### The Management of Stage IV Colorectal Cancer at Presentation – What is Happening in Routine Practice?

(P285)

S. Shedda, I. Faragher, I. Jones, J. Desai, M. Croxford, I. Hayes, S. Kosmider, I. Hastie, P. Gibbs  
 . . . . . Melbourne, VIC, Australia

**Purpose:** To evaluate the management of patients presenting with stage IV colorectal cancer (CRC) utilising a multi-institutional prospective database.

**Methods:** Patients with stage IV CRC at diagnosis from January 2003 until June 2007 were identified. Three patient groups were studied (i) IS = initial (<12 weeks from diagnosis) resection of the primary tumour (ii) DS = delayed primary resection and (iii) NS = no primary resection. The clinical features at presentation, subsequent management and overall survival of these groups were compared utilising the Melbourne Molecular Informatics Model.

**Results:** Of 959 patients with CRC, 170 (18%) had metastatic disease at presentation. 125 patients (74%) had IS, 0 DS, and 45 (27%) NS. Of the IS group, 72 (58%) were male with a median age of 65 . For the NS group 29 (64%) were male, the median age was 68. Eighty-three (53%) of the IS group had liver only disease versus 13 (32%) of the NS group. The incidence of multiple metastatic sites was higher in the NS group (41.4% vs 6.7% p value <0.01. Seventy-three (89%) of IS patients were ECOG 0-1 versus 23 (82%) in the NS group. Similar proportions of patients in both groups were smokers and/or had diabetes. In-patient deaths occurred in 4% of both groups. Seventy-six (61%) of the surgical patients versus 33 (79%) of the others received chemotherapy. 5FU and oxaliplatin was the most common first line therapy in both groups, 62 of 76 (82%) and 19 of 33 (58%) p<0.01. Median follow up was 23.9 months in the non-surgical group and 22.6 months in the surgical group. Median survival of IS group was 11months.5 days versus a median survival of 7months, 11 days for the NS group (p <0.001)

**Conclusions:** The majority of patients presenting with stage IV CRC undergo initial surgery. If not operated on within 12 weeks of presentation, resection of the primary tumour is a rare event (none in this series). Patients undergoing surgery were not markedly different with respect to age or performance status. There was a difference in the distribution and number of metastatic sites. The proportion of patients in the NS group receiving chemotherapy was higher yet the median survival less, indicating these were a worse prognosis group.

### Polishing the Crystal Ball: Knowing Genotype Improves Ability to Predict Desmoid Disease

(P286)

E. Elayi, E. Manilich, J. Church . . . . . Cleveland, OH

**Purpose:** Desmoid disease occurs in one third of patients with familial adenomatous polyposis (FAP) and is the third most common cause of death in this group. Patients likely to develop desmoids may be protected by changing surgical strategy and ability to predict risk for desmoids is therefore important. Using previous research we have designed a desmoid risk factor to allow prediction of desmoid risk. This study tests the value of adding genotype to the formula

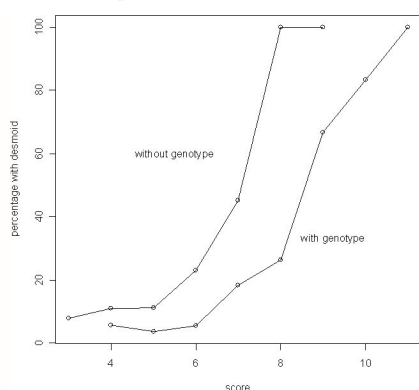
**Methods:** A desmoid risk factor (DRF) was calculated for patients in a prospectively accumulated FAP database, assigning numerical values to gender, presence of extra-colonic manifestations, and family history of desmoids. In a



subgroup of patients with known mutation, genotype was added this to the DRF. The performance of each score in predicting development of desmoid disease was analyzed.

**Results:** 839 patients (138 with desmoids) were analyzed without genotype and 154 (30 with desmoids) with genotype. In the group with genotype information, 13.6% of patients with a mutation 5' of codon 1309 had desmoids vs 25% of those with a mutation between 1309 and 1900, and 50% of those with a mutation 3' of codon 1900. 29% of women had desmoid disease vs 11.8% of men. 6.3% of patients without extracolonic manifestations had desmoids vs. 29% of patients with extracolonic manifestations. 11.4% of patients without a family history of desmoids had desmoids, vs 100% of those with a family history. The graph shows desmoid incidence according to score, with or without genotype.

**Conclusions:** Addition of genotype makes the DRF more sensitive and better separates low from high risk. It adds to the precision of the prediction.



### Are Preoperative Investigations Valuable to Select Patients with Fecal Incontinence for Sacral Nerve Stimulation?

(P287)

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**Purpose:** Sacral nerve stimulation (SNS) has been employed

to successfully treat faecal incontinence (FI). Patients are routinely investigated preoperatively with morphologic, dynamic and electrophysiologic tests. The purpose of our study was to evaluate the value of these tests for the selection of patients who may benefit most from SNS.

**Methods:** A total of 45 consecutive patients (41 females, median age 58 years) with FI (Wexner  $16.2 \pm 2.9$ ) were enrolled in a prospective trial. Patients were preoperatively investigated with clinical examination, endoanal ultrasonography, anorectal manovolumetry and electrophysiologic perineal tests. If temporary stimulation resulted in a good objective response (50 percent reduction in incontinence episodes (bowel-habits diary)), a neuromodulator was implanted. Patients were reviewed at 3 months and then at 6 monthly intervals.

**Results:** Forty-five patients were tested. Three temporary electrodes were not implanted (7%); in two patients there was neither an objective nor subjective response and in one the sacral foramina could not be found. Temporary stimulation was successful in 32 patients (71%). At a median follow up of 33 months, the neuromodulator remained in place in 25 patients (55%). 4 patients had undergone removal and three others had a Malone operation. Among those with a neuromodulator, 2 had switched it off, leaving 23 patients considered to have a successful outcome (51%) (Wexner  $11 \pm 4.8$ ). There was no statistically significant difference between the patients undergoing implantation ( $n=32$ ) and those not ( $n=13$ ) and between patients with a functioning stimulator ( $n=23$ ) and patients without a functioning stimulator ( $n=22$ ) for duration, cause, type and severity of FI, previous perineal procedure, age or gender. We also found no statistically significant difference between manometric data, anal ultrasound results and electrophysiologic perineal test findings (Table 1).

**Conclusions:** Our findings suggest that investigations for FI do not facilitate patient selection for SNS and cannot be used to predict outcome.

### P287 Results of preoperative investigations

		Implanted (n=32) vs Not-implanted (n=10) p value	Functioning stimulator (n=23) vs not functioning stimulator p value
Manometric data	Maximum anal resting pressure (cmH <sub>2</sub> O)	0.49	0.45
	Voluntary contraction pressure (cmH <sub>2</sub> O)	0.25	0.23
	Maximum tolerable volume (ml)	0.45	0.34
Anal ultrasound	Internal sphincter defect	0.40	0.67
	External sphincter defect	0.50	0.94
Electromyography	Pudendal neuropathy	0.69	0.65
	Lumbosacral plexopathy	0.83	0.67
	Normal	0.78	0.95

### The Natural History of Internal Rectal Prolapse

(P288)

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 ..... Oxford, United Kingdom; Rome, Italy

**Purpose:** The natural history of internal rectal prolapse is unclear. The prevailing view is, because defecographic abnormalities infrequently progress to external prolapse, no clear relationship exists. Lack of an appropriate prolapse grading system has impeded evaluation of the natural history. An alternative view suggests a single entity of 'rectal prolapse', with a progressive continuum of disease severity grade, minor internal prolapse and external prolapse representing either end of the spectrum. We aimed to explore the natural history of internal rectal prolapse by assessing any correlation between age and prolapse grade using the Oxford Prolapse Grade.

**Methods:** Pelvic floor clinic patients with dysfunction underwent defecography; prolapse was graded from 1 – 5 using the Oxford Prolapse Grade (high/low recto-rectal intussusception = grade 1/2; high/low recto-anal intussusception = grade 3/4; external rectal prolapse = grade 5). Prolapse grade was correlated with age, and speed of progression between grades calculated.

**Results:** 272 patients (90% female) with prolapse (193 internal / 79 external) were studied. Median age strongly correlated with prolapse grade ( $r = 0.45$ , 95% CI 0.35 – 0.54,  $p < 0.0001$ ). Median age [s.d.] increased progressively with increase in prolapse grade (grade 1: 38 yrs [8]; 2: 53 yrs [10]; 3: 57 yrs [14]; 4: 64 yrs [14]; 5: 72 yrs [16]). The median ages of each grade were significantly different except grade 2 and 3 (difference 4 yrs, 95% CI 0 – 8 yrs). The median speed of progression from grade 3 to 4 prolapse was 7 years, and from grade 4 to 5, 8 years. In men, the median age [s.d.] of grade 4 prolapse (51 yrs [15], difference 19 yrs, 95% CI 5 – 34 yrs) and grade 5 prolapse (54 yrs [23], difference 14 yrs, 95% CI 3 – 25 yrs) was significantly lower than in women, and speed of progression from grade 4 to 5 (3 versus 8 yrs) quicker.

**Conclusions:** This study supports the view that generally, internal prolapse progresses to external prolapse. This progression however is slow and variable, beyond the capacity of a prospective defecographic series to capture it. Men develop internal prolapse younger and progress to external prolapse quicker than women, indicating variability in aetiology and natural history.

### Cleft Lift May be the Procedure of Choice for Symptomatic Nonacute Pilonidal Disorders

(P289)

A. Abdelrazeq, M. Rahman, I. Botterill, D. Alexander  
 ..... Warrington, United Kingdom;  
 York, United Kingdom; Leeds, United Kingdom

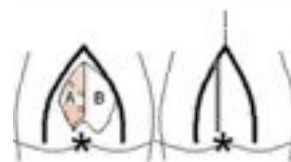
**Purpose:** We report the short- and long-term results of

the cleft lift procedure in the management of non-acute pilonidal sinus (PNS) disorders.

**Methods:** Seventy consecutive patients with chronic, complex, refractory or recurrent PNS who underwent a cleft lift for non-acute PNS were evaluated prospectively. A detailed short-term outcome was documented. Responses to a postal questionnaire were analyzed for long-term outcome.

**Results:** Surgery was carried out for chronic PNS in 24 patients, for complex PNS in 26 patients, for recurrent PNS in 17 patients and for refractory PNS in 3 patients. Patients with recurrent PNS had had between one and three previous operations (median 2). All patients who fulfilled the criteria for day-case were operated upon as such. Sixty-six patients achieved complete wound healing within 6 weeks. Delayed wound healing occurred in 3 patients and non-healing occurred in one. Fourteen patients had one or more complications: wound breakdown, superficial (7) and deep (1); wound infection (5); wound seroma (4); and early recurrence (1). The median time off work and to return to normal activities was 2 and 4 weeks, respectively (range 0.5–12). Forty-seven patients completed the questionnaire at a median follow-up of 24 months: 5 patients reported minimal tenderness in the sacral region; none reported recurrence of PNS symptoms; and all were satisfied.

**Conclusions:** The cleft lift procedure is easy to perform as a day-case procedure. It is associated with high rates of primary healing, durable low recurrence rates and early functional recovery. This technique may be the procedure of choice in the surgical management of non-acute PNS disorders.



### Transphincteric Repair of Rectovaginal Fistulas

(P290)

D. Howell, M. Snyder, D. Thompson, H. Bailey  
 ..... Houston, TX

**Purpose:** Rectovaginal fistulas (RVF) can result from a variety of etiologies. Most commonly they are the result of obstetrical trauma or inflammatory bowel disease. There are many approaches to the repair of RVF often with varying results. Transphincteric repair or layered closure has been shown to be an effective therapy. This procedure involves dividing the fistula tract by separating the rectovaginal plane. Subsequently, the rectal and vaginal openings are closed in layers and a levator muscle placcation is performed.

**Methods:** 18 patients with rectovaginal fistulas underwent transphincteric repair from February 2002 to August 2007. Patients were retrospectively evaluated for resolution of symptoms and complications. Repairs were performed by three sur-

geons at a single institution. RVF were the result of obstetrical trauma in 11 patients (61%), cryptoglandular in 5 (27%), inflammatory bowel disease in 2 (11%), and neoplasm in 1 (5%). Five patients (27%) had concomitant fecal incontinence and a sphincteroplasty was performed at the time of surgery.

**Results:** 16 of 18 (89%) patients had complete resolution of symptoms with a mean follow up of 2 months. The 2 failures underwent a second repair with resolution of symptoms. 1 patient (5%) had evidence of a persistent fistula but no drainage. 2 patients (11%) complained of persistent vaginal pain. Concomitant sphincter repair had no adverse effect on outcome.

**Conclusions:** Transphincteric or layered closure of RVF is a safe and effective modality for the treatment of RVF. The procedure is performed on an outpatient basis and there is no need for fecal diversion. In our study, transphincteric repair of RVF has a high rate of success and an acceptable complication profile.

#### Reintervention, Quality of Life and Long-Term Functional Outcome after Stapled and Excisional Hemorrhoidectomy

(P291)

K. Austin, C. Young . . . . . Sydney, NSW, Australia

**Purpose:** Stapled haemorrhoidectomy (SH) is associated with reduced pain, hospital stay and earlier return to work. However, it is also associated with higher recurrence and re-intervention rates compared to excisional haemorrhoidectomy (EH). The long-term benefits and effect on patients quality of life (QoL) of SH compared to EH still remains to be debated. The aim of this study was to compare the early and late post operative results and quality of life between SH and EH and identify factors which affect QoL after surgery.

**Methods:** A retrospective review of all patients who underwent SH or EH between 2000-2007 by a single surgeon was performed. The surgical outcomes studied included 30 day morbidity, late morbidity, resolution of preoperative symptoms, and reason for re-intervention. QoL was assessed by a generic health-related measure (SF-36), Cleveland Continence score, and long-term morbidity (>one year) by a symptom check list with particular interest to urgency.

**Results:** 244 patients had haemorrhoidal surgery. 190 patients underwent SH (110 male, 80 female) and 54 patients underwent EH (24 male, 30 female). The 30 day morbidity in the SH group: 11 (6%) developed urinary retention, 5 (2.6%) required readmission for bleeding, 3 (1.6%) developed thrombosis and 2 (1%) fissures. In the EH group: 3 (6%) developed urinary retention, 2 (3.7%) were readmitted for bleeding and there was no thrombosis or fissures. Re-intervention rates were 17% for the SH group and 9.3% for the EH group respectively (Fishers exact test  $p = 0.12$ ). Urgency rates in the SH and EH groups were preoperatively 6.3% vs. 3.7% (all resolved at six months), at six weeks post op 8.4% vs. 1.9% (Fishers exact test  $p = 0.08$ )

and at six months post op 3.2% vs. 1.9% (Fishers exact test  $p = 0.52$ ) respectively. QoL, continence and patient satisfaction was high and comparable in both groups.

**Conclusions:** SH and EH have acceptable morbidity rates, long-term QoL and patient satisfaction. SH has higher re-intervention rates and initially higher urgency rates which resolve in the long-term. SH and EH are complementary procedures in the treatment of haemorrhoidal disease.

#### Outcomes after Conversion of Failed Ileal Pouch-Anal Anastomosis (IPAA) to Continent Ileostomy (CI) in a Single Tertiary Center

(P292)

L. Lian, V. Fazio, D. Dietz, F. Remzi, B. Shen, J. Wu, R. Kiran . . . . . Cleveland, OH

**Purpose:** CI is considered a satisfactory option for patients who failed IPAA. The aim of this study is to investigate outcomes after conversion of failed IPAA to CI.

**Methods:** Patients with conversion of pelvic pouches to CI were identified from our prospectively maintained pouch database. Demographic and clinical data including intraoperative and postoperative factors were reviewed. Follow-up data were obtained by Cleveland Global Quality of Life Questionnaire (CGQOL; Range, 0-1, with 1 being the best), phone call, and office visit.

**Results:** Sixty-four patients underwent the conversion of failed IPAA to CI out of 3,338 patients between 1982 and 2007. 45 (70.3%) patients had synchronous pelvic pouch excision at CI. 15 (23.4%) had pouch excision previously. Pelvic pouch had been constructed and failed in the remaining 4 cases. 42.2% were males. The median age was 36.5 years (Range, 14-61). Final diagnoses included ulcerative colitis (44, 68.8%), and Crohn's disease (13, 20.3%). Other diagnoses were indeterminate colitis, familial adenomatous polyposis, Hirschsprung's disease, and colon inertia. 56.3% patients were converted for septic complications. 11 (17.2%) patients underwent repeat IPAA previously. The previous pelvic pouch was used to construct CI or partially excised in 12 (18.8%) patients. 30-day complication rate was 31.3%, including wound infection, postoperative ileus, urinary tract infection, pelvic abscess, fistula, and hemorrhage. There was no perioperative death. Long term CI dysfunction rate was 50%, including difficulty intubation and valve leak/incontinence. Overall complication rate was 57.8% and revision rate was 43.8%. The median revision-free pouch interval was 2.8 years (Range, 3 month-19 years). The overall survival rate of CI was 95.3% (61/64). Mean CI survival time was 4.2 years (Range, 1-19 years). 75% patients had recent follow-up. The median follow-up was 3.6 years. The median CGQOL score was 0.85.

**Conclusions:** Conversion of pelvic ileal pouch to CI is a safe procedure in selected patients. Despite the associated morbidity, this procedure is a useful alternative in terms of high long-term pouch survival rate and high patients' satisfaction.

### P292 Long-term outcomes after conversion of pelvic pouch to continent ileostomy

Complications	No.	Percentage
Valve slippage	19	29.7%
Peristomal hernia	10	15.6%
fistula	9	14.1%
Ileostomy stricture	3	4.7%
Delayed perineal wound healing	10	15.6%
Pouchitis	7	10.9%
Pelvic abscess	3	4.7%
C.difficile pouchitis	1	1.5%
Reversible short bowel syndrome	1	1.5%
Crhon's disease in the pouch	1	1.5%
Kock pouch status	No.	Percentage
Doing well	58	90.6%
Gas leakage	2	3.1%
Want to be converted to end ileostomy	1	1.5%
Converted to end ileostomy	3	4.7%

### Continent Ileostomy (Kock pouch) and Ileal Pouch-Anal Anastomosis. Success Rates and Complications

(P293)

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**Purpose:** To compare clinical outcome and surgical load in patients with Kock Pouch (KP) and Ileal Pouch-Anal Anastomosis (IPAA).

**Methods:** 304 patients with IPAA and 58 with KP operated during the period 1983-2006 were evaluated in a prospective observational study. In patients operated with IPAA 277 patients had Ulcerative colitis, ten Familial adenomatous polyposis (FAP), ten Indeterminate colitis and five Crohn's disease (CD) and in those with KP 52 had UC, three FAP and three CD. Observational time was 10 years (mean) (range 1-22) for IPAA and 14 years (mean) (range 1-23) for KP.

**Results:** Twenty pelvic pouches (6.5%) and 6 KP (10, 3 %) were excised (n, s.) Estimated failure rate at 22 and 23 years respectively were 11% ( $\pm 6$  %) for IPAA and 12, 5 % ( $\pm 9$  %) for KP (n, s.) Success rate of functioning pouch were 92.5% IPAA and 89.7 % for KP (n, s.). In 92 (30 %) IPAA patients 179 procedures were performed for complications: 102 major operations and 77 minor procedures, exclusive 254 dilatations for anastomotic strictures. In 27 (46 %) 61 reoperations were performed: 51 major and 10 minor procedures.

**Conclusions:** For IPAA and KP success rates are high and in the same order of magnitude. Complication rate is substantial in both procedures and numerous reoperations is the price the patients pay for keeping a functioning pouch

### Mucosectomy and Handsewn Ileal Pouch-Anal Anastomosis Reduces the Risk of Developing Neoplasia in the Anal Transitional Zone after Restorative Proctocolectomy for Familial Adenomatous Polyposis (P294)

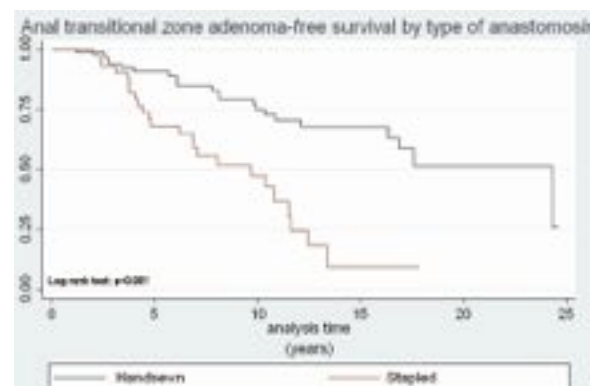
A. von Roon, O. Will, R. Man, K. Neale, S. Clark, P. Tekkis . . . . . London, United Kingdom

**Purpose:** To assess whether mucosectomy and handsewn ileal pouch anal anastomosis (IPAA) reduces the risk of developing neoplasia in the anal transitional zone (ATZ) compared to stapled IPAA without mucosectomy in a long-term follow-up study.

**Methods:** All available pouch endoscopy and associated histology reports for patients with FAP attending for annual surveillance after IPAA at St Mark's Hospital since 1978 were reviewed. The incidence, timing and histological characteristics of ATZ neoplasms were recorded. Cumulative adenoma-free survival was calculated using Kaplan-Meier survival analysis. Statistical significance was assessed with the Log rank test.

**Results:** Of 206 patients who underwent IPAA, 140 attended for endoscopic follow-up and were included in the analysis. The median follow-up time after IPAA was 10.4 years (range 0.7-24.5). Overall, 41% of patients remained adenoma-free in the ATZ at 20 years of follow-up. At 15 years, 68% of patients who had undergone handsewn IPAA remained adenoma-free, compared with 9% in the stapled IPAA group ( $p < 0.001$ ). Median adenoma-free survival was longer in the handsewn IPAA group than in the stapled group (10.1 vs. 6.5 years,  $p < 0.001$ ). Four patients developed large tubulovillous adenomas ( $> 5$ mm). Of these, 2 had stapled IPAA, one had handsewn IPAA, and the type of IPAA was not documented in one. All four were treated by local excision. One patient who was followed up at another institution developed adenocarcinoma in the ATZ following handsewn IPAA, and required pouch excision after 19 years.

**Conclusions:** The majority of patients with FAP develop adenomas in the ATZ over the long term. Although malignant transformation is rare, regular endoscopic surveillance is mandatory. Mucosectomy and handsewn anastomosis is associated with a significantly lower risk of developing neoplasia in the ATZ compared with stapled IPAA, and is recommended as the technique of choice.





### Post-CRT CEA is a Prognostic Factor for Distal Rectal Cancer after Neoadjuvant CRT

(P295)

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**Purpose:** CEA is the most frequently used tumor marker in rectal cancer. The decrease in CEA levels after radical surgery is associated with survival in these patients. This decrease after radical surgery could reflect the amount of excessive circulating CEA produced by the primary tumor as opposed to occult metastatic disease. Neoadjuvant CRT may lead to significant primary tumor downstaging in distal rectal cancer. Therefore, we hypothesized that a decrease in CEA levels after neoadjuvant CRT could reflect the extent of primary disease downstaging affecting final disease stage and ultimately survival.

**Methods:** Patients with distal rectal cancer managed by neoadjuvant CRT (50.4Gy and 5FU/Leucovorin) and available pre-treatment and post-CRT CEA levels were eligible for the study. Outcomes included final disease stage, recurrence and survival were compared according to initial CEA, post-CRT CEA and difference in CEA (Baseline CEA minus Post-CRT CEA).

**Results:** Overall, 170 patients were included. Post-CRT CEA levels <5ng/ml were significantly associated with increased rates of complete clinical response and decreased risk for cancer-related death. Additionally, Post-CRT CEA levels <5ng/ml were associated with increased overall and disease-free survival ( $p=0.01$  and  $p=0.03$ , respectively). There was no correlation between initial CEA levels or difference of CEA levels (Baseline minus Post-CRT) and any outcome or survival.

**Conclusions:** Post-CRT<5ng/ml CEA is a favorable prognostic factor for rectal cancer and is associated with increased rates of earlier disease staging. Post-CRT CEA levels may reflect tumor response to neoadjuvant therapy in distal rectal cancer and may be useful in therapeutic decision management.

### Close Distal Margin Predicts Local Recurrence in 485 Patients Undergoing Sphincter-Sparing Surgery for Rectal Cancer

(P296)

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**Purpose:** Negative distal margin (DM) is important for local control of rectal cancer (RC) treated with sphincter sparing surgery. However, the impact of close gross DM is not well established.

**Methods:** Data were extracted from a prospective database and the medical records of patients (pts) treated at a single cancer center from 1991 to 2001. Pts who underwent cura-

tive low anterior resection with total mesorectal excision for distal (2-6cm from anal verge (AV)) and mid rectal cancers (7-12cm from AV) were included. 289 pts received neoadjuvant therapy and 66 received post-operative adjuvant therapy alone. Data were retrospectively collected on margins, recurrence and survival. Pts were excluded when clinical follow up was less than 2 years without recurrence ( $n=109$ ) and for persistent local or distant disease after initial surgical resection. 2 pts were excluded for positive radial margins.

**Results:** The final cohort ( $n=485$ ) was divided into 3 groups. Group A had gross distal margin (DM) 1-7mm ( $n=77$ ), B had DM 8-19mm ( $n=162$ ), and C had DM 20-60mm ( $n=246$ ). Groups were evenly matched for lymphovascular invasion, N and M-stage, and adjuvant therapy. Distal RC was more common in A. T3/4 tumors were more common in B and C. Median follow-up was 6.8 years. Local recurrence (LR) occurred in 7.6% of the cohort. LR was more common in A compared to B and C combined (14 vs 6.2 and 6.6%,  $p=0.02$ ). 7-yr LR free survival (LRFS) was worse in A (86%  $p=0.02$ ) and equivalent in B and C (94 and 95% at 5 years). Mucosal recurrence (MR) occurred in 3.1% of the cohort. MR was more common in A than B and C (10.4% vs 1.2 and 2%,  $p<0.0001$ ). MRFS was worse in A compared to B and C combined (90 vs 99 and 98% at 7-yr,  $p<0.0001$ ). On multivariable analysis, DM <8mm was the only independent predictor of both LR (HR 3.3, 95%CI 1.5-7.3) and MR (HR 5.6 [2-15.4]) when controlling for T, N and M-stage, LVI, and location in the rectum. Disease specific survival was equivalent in A, B and C (87, 84 and 84% at 7 years). A minority of LR and MR pts underwent surgical salvage (24 and 40%).

**Conclusions:** Improved local control is associated with gross DM  $\geq 8$ mm. However, disease specific survival is not affected by DM <8mm.

### K-ras Mutations Predict Poor Outcomes in Rectal Cancer Patients Treated with Adjuvant Radiation and Curative Surgery

(P297)

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. . . . . San Francisco, CA

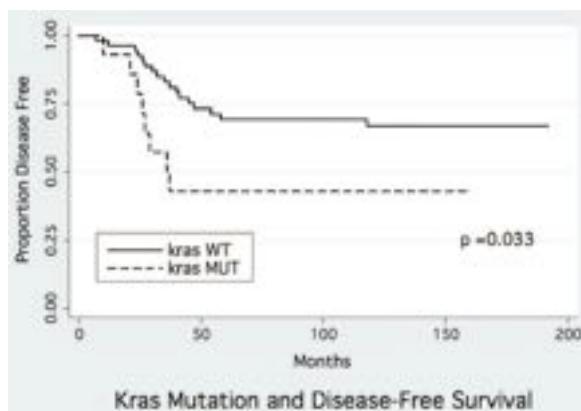
**Purpose:** Kras and p53 wild type has been associated with tumor response and improved survival in patients with advanced colorectal cancer treated with targeted therapy. We hypothesized that mutations of p53 and Kras had prognostic value in rectal cancer patients treated with neoadjuvant therapy.

**Methods:** A retrospective cohort study of 75 rectal cancer patients (47% females), with stage II (29%) or III (71%) disease treated with radiation followed by radical proctectomy (55% sphincter saving procedure). Kras and p53 mutations were detected by direct sequencing in PCR-amplified DNA obtained from the pre-treatment biopsies. K-ras mutations were identified in codons 12, 13, and 61. p53 mutations were identified in exons 5, 6, 7, and 8. Mean follow-up was

95 months. Comparisons of outcomes between groups were performed using Fisher's exact test. Disease-free survival was estimated with the Kaplan-Meier method and compared using the log-rank test.

**Results:** 15 (20%) patients had K-ras mutations, and 52 (75%) had p53 mutations. The proportion of tumors with K-ras and p53 mutations was similar in stage II and stage III disease. 11 (50%) patients had complete pathologic response. Complete response was less common with p53 mutations versus p53 wildtype (10% vs 28%) and K-ras mutations (6% vs 17%). However in both cases, the differences were not statistically significant. Twenty seven (38%) patients developed recurrence and 26 have died from their disease. p53 mutations had no impact on disease-free survival. Patients with K-ras mutation did have a lower disease-free survival when compared to those with wild type K-ras ( $p=0.033$ ). This effect remained significant even after adjusting for stage.

**Conclusions:** Patients with rectal cancer who have K-ras mutations have worse outcomes than those with wildtype K-ras.



#### Sexual Function after Surgery for Low Rectal Cancer: Results of a Prospective Trial

(P298)

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**Purpose:** Surgery for low rectal cancer is associated with a risk for impaired sexual function. This study evaluated sexual function after sphincter saving surgery.

**Methods:** Patients with low rectal cancer were entered in a multicenter trial. Sexual function (SF) was evaluated at preop, 4, 6, 8, 12 and 24 mths by the Sexual Health Inventory for Males which has 5 questions about the ability to have and maintain an erection graded from 0-5. Women were evaluated with a specific questionnaire.

**Results:** 364 patients randomized. 194 male and 84 female evaluated for SF. Mean age was  $60 \pm 12$  yrs. Median height of tumor above dentate line was 3.8cms (IQR 2-5.5). Males: SF declined significantly from preop to 2yrs in all the

scores. However significantly more men increased rather than decreased in the ability to maintain an erection at 12 and 24 mths from those at 4 mths postop ( $p < 0.001$ ). The number of patients who scored high on the ability to achieve sexual satisfaction on each question however did not significantly decrease from preop to 24 mths. Patients on radiotherapy (XRT) had similar baseline scores and significantly lower scores at 24 mths ( $p = 0.04$  adj for randomization), while patients with an anterior tumor had a tendency to higher scores. Females: SF declines from pre-op to 4 mths with respect to % activity (45% to 28%,  $p = 0.022$ ), % arousal (54% to 38%,  $p = 0.005$ ), frequency of intercourse (mean 2.5 to 1.1 per mth,  $p = 0.009$ ), and % who achieved orgasm (51% to 32%,  $p = 0.005$ ). % sexual activity shows some improvement from 4 to 24 months (28% to 35%,  $p = 0.07$ ). Other measures show no evidence of change between 4 and 24 mths. XRT, anastomosis level and anterior tumor location showed no evidence of associations with sexual activity. Posterior tumor location tended to be associated with lower sexual activity at all time points, and significantly at 24 mths (16 vs 42%,  $p = 0.05$ ).

**Conclusions:** Male SF after surgery for low rectal cancer plateaus after an initial decline. Men with high preop scores tend to remain higher than the mean in the post op, XRT causes a decline in SF. In the short term SF is affected by the level of anastomosis and the tumor location. Females SF also declines, low sexual activity was noted in women who had a posterior tumor and XRT had no effect on SF.

#### Career Decisions in Colorectal Surgery and Restructuring Training: Results of the ABCRS Blue Ribbon Committee Survey of Colorectal Residents

(P299)

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 . . . . . Minneapolis, MN; Rochester, MN

**Purpose:** To inform restructuring decisions, we surveyed three classes of colorectal residents about the timing and factors influencing their career decisions and their views on restructuring training.

**Methods:** An online, 10-item survey was administered spring, 2007, to 189 residents from the classes of 2005, 2006, and 2007. Responses were coded by class and general surgery program type. Open-ended responses were clustered by theme and read by 2 independent readers who reconciled final coding. Results were compared by year and program type using chi-square tests of proportional differences ( $p < .05$ ).

**Results:** Of 189 subjects, 145 (77%) responded. Response rates did not vary by class; about 2/3 had trained at a university program. A large majority (70%) reported spending more than 8 weeks on a colorectal (CR) service during general surgery (GS) residency. About half said their first exposure to CRS was in their PGY1 year; by the end of their PGY2 year, 70% had been exposed to the field. Nearly half

(47%) had decided on a CRS career by their PGY3 year and over 80% had decided by their PGY4 year. The top-ranked factors influencing career choice were: overall interest in CR (79%), encouragement by CR faculty during GS training (66%), high quality teaching by CR faculty (66%), a positive exposure to the field as a PGY3-5 resident (65%), and positive lifestyle (58%). The salary associated with specialty practice was a factor for a greater portion of the entering class (33%) than the current (26%) or previous class (17%). When asked, "Should GS training be restructured so that a CR residency could be done earlier in one's career?" 57% said "no," 28% said "yes," 11% were mixed or unsure, and 11% appeared to misunderstand the question. This pattern did not vary statistically by class or program type.

**Conclusions:** Most GS residents were exposed to CRS within the first two years of GS training and had decided on a CRS career by their PGY4 year. Desire to shorten GS training due to concerns over debt did not surface as a significant reason to restructure training. The question of restructuring training evoked both positive and negative responses.

#### Factors Affecting Primary Postoperative Ileus after Laparoscopic Colorectal Cancer Resection

(P300)

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 ..... Seoul, South Korea; Cleveland, OH

**Purpose:** The aim of this study was to identify factors affecting primary postoperative ileus after laparoscopic colorectal cancer resection.

**Methods:** Prospectively collected data was obtained from 570 patients who underwent laparoscopic resection for colorectal cancer from January 2001 to June 2006. They were divided into two groups based on the day which they passed flatus or tolerated soft diet; normal recovery group (Flatus <= POD 2 or oral intake <= POD 3 n=430) and late recovery group (Flatus >= POD 3 or oral intake >= POD 4, n=67). The patients who had severe complications which can affect hospital stay such as anastomotic leakage, reoperation and other medical problem, intravenous chemotherapy after operation and before discharge and unknown flatus were excluded. Age, Sex, Body mass index(BMI), operation type, intraoperative blood loss, operative time, previous abdominal operation, ASA score, hospital stays were analyzed between the groups by using unpaired T-test and chi-square test of R program (GNU project, Boston, USA)

**Results:** There were 430 patients in normal recovery group and 67 patients in late recovery group respectively. There was no statistical difference in sex, age, BMI and ASA score in two groups. Comorbidity did not affect postoperative ileus. There were more patients that underwent right hemicolectomy (17/67, 25.4%) in the late recovery group versus the normal recovery group (61/430, 14.5%, p=0.04). Previous abdominal operation did not affect postoperative ileus. Operating time (243.1 vs. 195.3 minutes, p<0.0001) was longer in the late recovery group. Blood loss (111.2 vs. 74.8 ml) was also higher in the late recovery group (p=0.04). Ileostomy was more frequent in late recovery (8.8% vs 17.9%, p=0.037). The length of hospital stay of the late recovery group (13.5 days) was longer than normal recovery group (9.1 days, p<0.0001).

#### P298 Results of sexual function at different time intervals in males and females

	Pre-op	4 months postop	12 months post op	24 months post op	p value for difference from 4 to 24 months
<b>Male Sexual Function</b>					
Q 1. Confidence of having an erection.	3.4 ± 1.4	2.6 ± 1.5	2.6 ± 1.5	2.5 ± 1.5	1.0
Q 2. How often was erection hard enough for penetration : Ans = Always	42.3%	22.7%	24.7%	25.3%	p=0.04
Q 3. Maintaining an erection during intercourse : Ans = Always	38.7%	19.1%	24.0%	25.3%	p=0.003
Q 4. Difficulty in maintaining an erection for completion of intercourse : Ans = Always	31.1%	15.6%	19.3%	19.4%	p=0.10
Q 5. Satisfaction with intercourse : Ans = Always	45.6%	25.0%	24.6%	24.7%	p=0.13
Total Score	16.4 ±8.8	10.6 ±9.7	11.5 ±9.4	10.9 ±10.2	p=0.76
<b>Female Sexual Function</b>					
Number Sexually active	45.2%	28.3%	33.3%	35.4%	p=0.07
Number who felt aroused with stimulation	53.6%	38.3%	41.3%	39.2%	p=0.40
Frequency of intercourse per month	2.5 ± 3.6	1.1 ± 2.3	1.3 ± 2.3	1.4 ±2.4	p=0.18
Number who achieved an orgasm	51.2%	31.7%	37.3%	32.9%	p=0.83

Question score range = 0-5; Answers for Q. 2-5: No sexual activity, never, few times, sometimes, most times, always.  
 Total score range = 0 - 25; Summary = mean ±SD

**Conclusions:** Primary postoperative ileus after laparoscopic colorectal cancer resection is more frequent after right hemicolectomy, ileostomy and with longer operative times and more blood loss, but it is not related to sex, age, BMI, ASA score, and previous abdominal surgery.

**Number of Lymph Nodes Can Not be Used as a Surrogate for Adequacy of Resection after Neoadjuvant Therapy for Rectal Cancer**

(P301)

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**Purpose:** Lymph node harvest of  $\geq 12$  is adopted as a goal and a marker for adequacy of resection for colorectal cancer. We've noted a paucity of lymph nodes in rectal cancer specimens after neoadjuvant therapy, positing the number of lymph nodes depends on the patient's response to radiation. The purpose of the study is to evaluate factors impacting and to determine standard lymph node harvest in patients with adenocarcinoma of the rectum after neoadjuvant therapy.

**Methods:** A prospectively maintained database of rectal cancer patients was queried to identify patients undergoing TME resection after neoadjuvant chemoradiation treatment between January 1997 and August 2007. Patients with recurrent cancer and previous pelvic irradiation were excluded. We compared patients with  $<12$  lymph nodes (LN) in the resected specimen to those with  $\geq 12$  LN relative to patient age, radiation dose, chemotherapy, time to surgery, amount of tumor downstaging and types of surgery. Average dose of XRT was 5450 cGy (4500-7380). Chemotherapy was 5FU based. Surgery performed on average 9 weeks post treatment (5.4-19.7). All specimens were analyzed pathologically using Carnoy's solution fat clearance technique.

**Results:** 176 patients were identified, 119 men, mean age 60.4 y.o. (22-87 y.o.). Median LN harvested were 9 (1-38). Only 28% had  $\geq 12$  LN and 31% had  $\leq 6$ . There was no difference in LN harvest relative to radiation dosage ( $<5400$  vs.  $\geq 5400$ ), age ( $<70$  vs.  $\geq 70$ ), time to surgery ( $<6$ , 6-12, vs.  $\geq 12$  weeks), tumor response (complete vs. good vs. minimal) or type of surgery (APR vs. LAR vs. CAA). The overall KM5YAS was 84.1% and 5Y-DSS was 88.3%. There was no difference in patients who had  $<12$  LN vs.  $\geq 12$  LN in KM5YAS (83.2 vs. 85.4%;  $p>0.05$ ) or 5Y-DSS (89 vs. 87.3%;  $p>0.05$ ).

**Conclusions:** Only 28% of patients after chemoradiation and TME resection for rectal cancer were found to have  $\geq 12$  LN and 31% had  $\leq 6$  LN. The numbers of LN found was not clearly affected by patient age, dose of radiation, tumor response, procedure or interval to surgery. LN harvest of  $\geq 12$  has no effect on survival. Number of LNs can not be used as a surrogate for adequacy of resection after neoadjuvant therapy for rectal cancer.

**Epidemiologic Changes in Colorectal Cancer after Increasing Access to Screening Colonoscopy: A Statewide Evaluation**

(P302)

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**Purpose:** The Center for Medicare Services implemented reimbursement for screening colonoscopy in 2001. Current trends in the incidence in colorectal cancer (CRC) have shown a steady decrease attributed to the use of endoscopic surveillance. We aim to evaluate incidence and mortality related to CRC in a statewide database related to the introduction of colonoscopy as a screening method.

**Methods:** The Rhode Island Cancer Registry was queried for tumors of the colon and rectum using ICD-O Version III codes. A parallel query of Rhode Island vital records was performed for deaths listing cancer of the colon or rectum as the underlying cause of death. Counts of newly diagnosed cases and deaths were combined with inter-censal estimates of the Rhode Island population and with the year 2000 U.S. standard population to compute age standardized incidence and mortality rates per 100,000 person-years at risk, controlling for gender and race. Average annual rates were computed to assess trends for the 1996-2000 (Period A) and 2001-2005 (Period B).

**Results:** A total number of 13,987 CRC were available in the registry. There was a decrease in the incidence of CRC between 1987 and 2005. Incidence rates declined after access to screening colonoscopy was enhanced and observed for all gender-race groups: 78.6 (A) vs. 72.1 (B) for Caucasian males ( $P<0.05$ ); 58.0 (A) vs. 49.2 (B) for Caucasian females ( $P<0.05$ ); 69.6 (A) vs. 53.4 (B) for African American males; 71.6 (A) vs. 53.2 (B) for African American females. A similar decrease was noted in the incidence of invasive rectal cancer, most remarkable in African American females 20.1 (A) vs. 7.5 (B). However, African American males experienced an increase in incidence between periods A and B: 16.3 vs. 18.1 (Table 1). All groups experienced decreases in age-adjusted mortality between periods A and B but only statistically significant in Caucasian populations.

**Conclusions:** Colorectal cancer incidence and mortality decreased in Rhode Island after the introduction of reimbursement for screening colonoscopy, although it was noted an increase in the incidence of invasive rectal cancer among African American males.

**P302 Table 1: Newly Diagnosed Cases per period**

		Period A 1996-2000	Period B 2001-2005
Caucasian	Males	1726	1630
	Females	1938	1628
African American	Males	30	33
	Females	45	40



### SSI Prevention in Colorectal Surgery: Evidence vs. Practice (P303)

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..... Toronto, ON, Canada

**Purpose:** Despite level I evidence for appropriate antibiotic prophylaxis, normothermia, supplemental oxygen, and appropriate hair removal in preventing surgical site infections, compliance with these measures may be poor. This retrospective chart review was undertaken at 7 teaching hospitals at one university to determine how well the evidence is employed in practice. The chart review was conducted as part of a larger initiative to shorten the gap between the time evidence is published and its use in practice across the University of Toronto.

**Methods:** A retrospective chart review was conducted at 7 teaching hospitals at the University of Toronto. A minimum of 50 consecutive elective colorectal procedures were identified at each of the hospitals prior to April 30, 2007. Emergency and outpatient procedures were excluded.

**Results:** A minimum of 50 charts were reviewed at each hospital (48 – 83). 52.2% of patients were male and 60% had a diagnosis of colorectal neoplasm. The ASA class was greater than III for 90.8% of patients and 91.4% had no unusual findings at the time of surgery. Preoperative oral antibiotics were administered in 20.5% of procedures primarily at 2 hospitals. Preoperative parenteral antibiotics were omitted in 21% of patients but when given were given prior to the incision 97% of the time. Metronidazole, cefazolin and gentamycin were the most common antibiotics. Postoperative antibiotics were administered 25.2% of the time primarily at two hospitals and of these 83% received postoperative antibiotics for greater than 24 hours. Hair removal was not documented at 5 hospitals (70%). Temperature was not documented in the perioperative record 18.9% of the time and only 30.2% of patients' minimum temperature was greater than 36 C. The FiO<sub>2</sub> was not documented in 57.9% of cases and only 7.2% had a FiO<sub>2</sub> > 80%.

**Conclusions:** Level 1 evidence for preventing surgical site infections in elective colorectal procedures is not uniformly employed in practice. In addition, important information regarding these practices is often not documented in the charts. Work is underway to improve both documentation and compliance with the evidence and second chart audit has been planned following implementation.

### Do Right-Sided Laparoscopic Colectomies Take Longer to Recover? An Analysis of 649 Cases

(P304)

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London, ON, Canada

**Purpose:** The objective of this study was to test whether right- and left-sided laparoscopic colectomies differ in terms of postoperative recovery of bowel function.

**Methods:** Consecutive patients undergoing laparoscopic colorectal procedures from 1991-2007 were analyzed from a prospectively-collected database. Cases were unselected, as all referred patients were offered laparoscopy. To standardize bowel function recovery, all conversions and defunctioning ostomies were excluded. Summary statistics and univariate analyses were performed. A multiple linear regression model was built to evaluate risk factors associated with prolonged return to normal diet.

**Results:** A total of 649 colectomies were retrieved from the database, including 280 right- (RT) and 369 left-sided (LT) resections. Both groups were comparable in terms of basic demographics, although the RT group was more likely to be taking steroids (10.0% vs. 1.9%,  $p < 0.0001$ ), to have had previous abdominal operations (28.6% vs. 19.2%,  $p = 0.0053$ ), and to have a diagnosis of colon cancer (57.5% vs. 47.4%,  $p = 0.011$ ). Intraoperative complication rates were similar between the two groups, although median operative times were significantly shorter among right-sided colectomies (146 vs. 175 min,  $p < 0.0001$ ). Postoperatively, the rate of surgical complications, including ileus and anastomotic leak, was similar between the two groups. However, medical complications were significantly more common within the RT group (17.9% vs. 10.0%,  $p = 0.0037$ ). The median times required to resume a normal diet (3 [IQR 3, 5] vs. 3 [IQR 2, 4] days,  $p = 0.0368$ ) and to discharge from hospital (5 [IQR 4, 7] vs. 4 [IQR 4, 6] days,  $p = 0.0198$ ) were significantly longer among right-sided resections, although the absolute differences were small. A multivariate model identified anastomotic leak ( $p < 0.0001$ ), ileus ( $p < 0.0001$ ), medical complications ( $p < 0.0001$ ), and right-sided resections ( $p = 0.0094$ ) as predictive factors of longer time to return to a normal diet.

**Conclusions:** Return of bowel function following laparoscopic colectomy is a complex phenomenon. Patients undergoing right-sided laparoscopic colectomies appear to be slower to recover than patient undergoing left-sided resections.

#### P303

Intervention	Overall (%)	Range - 7 hospitals (%)
Preoperative Oral Antibiotics administered.	20.5	0 - 86.7
Preoperative IV Antibiotics administered.	79.0	35.4 - 96.0
Postoperative IV Antibiotics Administered.	25.2	7.2 - 51
Perioperative Temperature Not Recorded	19.4	2.0 - 49.3
Proportion of patients with minimum temperature >36	30.2	15.0 - 38.5
Hair removal documented	37.1	0 - 94.0
Razor use documented	0.9	0 - 3.6
FiO <sub>2</sub> documented?	42.1	0 - 87.8
FiO <sub>2</sub> > 80%	7.2	0 - 32.7

# Laparoscopic Colon Surgery: Are We Realizing the Dream? (P305)

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**Purpose:** There is increasing patient and physician emphasis on minimally invasive therapies for malignant and benign colorectal pathology. As such, many clinical trials have addressed the utility of laparoscopy in colorectal surgery. We sought to ascertain the dissemination of laparoscopy in the surgical community through use of a large national database.

**Methods:** National Surgical Quality Improvement Program data were gathered for all patients undergoing elective colorectal resections (CPT codes 44140, 44145, 44160, 44204, 44205, 44207) during 2005 and 2006. Study endpoints included the 30-day occurrence of death, infection, thromboembolic events, and hospital length of stay. A variety of clinical, demographic, and operative variables were assessed with univariate and multivariate models to identify risk factors associated with the composite end point.

**Results:** A total of 7,668 colorectal resections were performed during the study period, 4800 (62.6%) open and 2868 (37.4%) laparoscopic. The percentage of cases performed via laparoscopy increased from 33.0 to 38.7% during the two years of the study period ( $p < 0.001$ ). Patients undergoing open procedures were older with significantly more comorbidities than patients undergoing laparoscopic procedures. Patients undergoing open procedures experienced a higher incidence of health-care - associated infections, thromboembolic events, and death than patients undergoing laparoscopy with a significantly longer hospital length of stay (Table 1).

**Conclusions:** During the study period, laparoscopic techniques were utilized in 37% of all colorectal resections carried out in the study population. However, the percentage of cases performed laparoscopically increased significantly during the two years of study. There was a significant selection bias in patients undergoing laparoscopic compared to open resection which may contribute to the disparity between outcomes.

## P305

	Open (N=4800)	Laparoscopic (N = 2868)
Age, years	62.8 ± 15.3	61.3 ± 15.0*
Diabetes, %	477 (9.9%)	237 (8.3%)*
Hypoalbuminemia, %	379 (7.9%)	74 (2.6%)*
BMI	28.0 ± 6.8	27.8 ± 6.1
Superficial SSI, %	475 (9.9%)	182 (6.3%)*
Pulmonary embolism, %	41 (0.9%)	9 (0.3%)*
Myocardial infarction, %	19 (0.4%)	6 (0.2%)
DVT %	66 (1.4%)	16 (0.6%)*
LOS	9.9 ± 33.2	6.21 ± 6.4*
Mortality, %	104 (2.2%)	21 (0.7%)*

\* $p \leq 0.5$ , data expressed as mean ± s.d. Abbreviations - BMI=body mass index, SSI=surgical site infection, DVT=deep venous thrombosis, LOS=length of stay

# Timing of Surgery for Diverticular Disease: Is It Possible That We're Waiting Too Long?

(P306)

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**Purpose:** Given our aging population, we are often operating on patients age 75 and older. The implications of colorectal surgery in this group, particularly for diverticular disease, has not been studied at the population level.

**Methods:** Colectomies for diverticulosis and diverticulitis were reviewed using the California Inpatient File (1999-2001). Patient demographics, complications, and mortality were determined for patients age  $\geq 75$ .

**Results:** Overall, 11,990 colectomies for diverticular disease were performed California from 1999-2001. 9,458 of these operations were performed in patients age  $< 75$ , while 2,532 were performed in patients age  $\geq 75$ . For patients age  $< 75$ , 41% of operations were done in an unscheduled manner compared to 57% for patient age  $\geq 75$ . Four percent of patients age  $< 75$  versus 13% of those age  $\geq 75$  who underwent emergent colectomy for diverticular disease died prior to discharge. One year mortality was 4% in patients age  $< 75$  and 18% in those age  $\geq 75$ . Sixty-one percent of patients age  $< 75$  versus 27% of patients age  $\geq 75$  were discharged home. Median length of stay on index admission was 10 days in the younger cohort versus 13 days in those age 75 or older. Median number of hospital days in the first year after surgery was 63% longer in the elderly compared to younger patients. Similarly, the elderly had 29% more hospital days in the second year after surgery and 33% more hospital days three years after surgery. Overall, 42% of all patients that were readmitted in the 3 years after surgery were admitted to a hospital other than where there colectomy was performed.

**Conclusions:** Elderly patients undergoing emergent surgery for diverticular disease fare poorly on several outcome measures compared to younger patients. Given these data, we may need to reevaluate our selection criteria for surgery for diverticular disease placing particular importance on patient age and performing operations on a scheduled basis to avoid operating emergently. Additionally, the fact that 42% of patients are readmitted to a hospital other than where they had their colectomy suggests the need for population-based studies rather than institutional databases to understand the true impact of our operations.