THE SOCIETY FOR SURGERY OF THE ALIMENTARY TRACT

50TH ANNUAL MEETING

May 30 – June 3, 2009
McCormick Place
Chicago, Illinois

PROGRAM BOOK ABSTRACT SUPPLEMENT
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# SSAT Schedule-at-a-Glance

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### Tuesday

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SSAT Plenary, Video, and Quick Shot Session Abstracts

Printed as submitted by the authors.

* indicates a paper that is also being presented at the Residents & Fellows Research Conference. Participation in and attendance at this conference is by invitation only.

Monday, June 1, 2009
8:15 AM – 9:15 AM
S504
PRESIDENTIAL PLENARY
(PLENARY SESSION I)

285
Effect of Multiple Pre-Operative Endoscopic Interventions on Outcomes After Laparoscopic Heller Myotomy for Achalasia
Christopher W. Snyder1, Ryan C. Burton2, Lindsay E. Brown2, Manasi S. Kakade1, Mary T. Hawn1
1Department of Surgery, University of Alabama-Birmingham, Birmingham, AL; 2School of Medicine, University of Alabama-Birmingham, Birmingham, AL

OBJECTIVE: Laparoscopic Heller myotomy (LHM) provides more durable relief of achalasia symptoms than endoscopic pneumatic dilation or botulinum toxin injection. The role of pre-operative endoscopic therapy in surgical candidates is controversial. We investigated the association between multiple pre-operative endoscopic interventions and objective and subjective outcomes after LHM for achalasia.

METHODS: Patients undergoing first-time LHM for achalasia between November 2001 and January 2008 were included. Demographics, comorbidities, pre-operative therapy, operative details, and clinical follow-up were obtained by chart review. Gastrointestinal (GI) symptom profile and health-related quality of life (HRQOL) was assessed pre-operatively using the GERD Symptom Assessment Scale (GSAS) and Short Form-36 (SF-36), respectively. Patients were classified on the number of pre-operative endoscopic interventions: zero or one intervention (group 1) versus two or more interventions (group 2). Outcomes were assessed at a median of 22 months post-operatively using mailed GSAS, SF-36, and achalasia-specific questionnaires. The primary outcome of interest was surgical failure, defined as requiring additional surgical or interventional endoscopic therapy. Secondary outcomes of interest included gastroparesis and changes in GI symptoms and HRQOL.

RESULTS: 134 patients met inclusion criteria; 88 (66%) were in group 1 and 46 (34%) in group 2. At the time of operation, patients in group 2 had a longer duration of symptoms (median 36 vs. 21 mos., p = 0.0026) and higher ASA classification (40% vs. 19% ASA 3–4, p = 0.009) than those in group 1. No perioperative leaks or deaths occurred in either group. Group 1 patients reported significant improvements in SF-36 bodily pain, energy, social function, and general health scores, while HRQOL in group 2 remained unchanged. Five patients (3.7%) were diagnosed with symptomatic gastroparesis post-operatively. Surgical failure rate was 14.2%, and was higher in group 2 vs. group 1 (28.3% vs. 6.8%, p = 0.001). On logistic regression modeling with adjustment for confounders, having >1 pre-operative endoscopic intervention was found to be a significant independent predictor of surgical failure (OR = 5.26, 95% C.I. 1.61–17.17, p = 0.006).

CONCLUSIONS: Multiple pre-operative endoscopic interventions are independently associated with a higher surgical failure rate after LHM for achalasia, suggesting that repeated interventions should be reserved only for patients who fail surgical therapy or are not surgical candidates. Potential associations between endoscopic intervention, gastroparesis, and LHM need further study.

286
The Extent of Resection and Insulin-Dependent Diabetes but neither Preoperative Chemotherapy nor (Chemotherapy-Induced) Liver Injury Influence Morbidity After Surgery for Hepatic Colorectal Metastases
Frank Makowiec1, Simone Moehrle1, Hannes P. Neeff1, Oliver G. Opietz2, Ulrich T. Hopt1, Axel zur Hausen3
1Department of Surgery, University of Freiburg, Freiburg, Germany; 2Comprehensive Cancer Center, University of Freiburg, Freiburg, Germany; 3Pathological Institute, University of Freiburg, Freiburg, Germany

Systemic chemotherapy (CTx) is increasingly used before surgery for colorectal liver metastases (CRC-LM). However, CTx may cause liver injury like steatosis, steatohepatitis and sinusoidal injury which may be associated with post-operative morbidity. Some recent data have even shown...
an increased mortality in patients with CTx-associated steatohepatitis. We, therefore, analyzed our recent experience with potential hepatic injury and its association with CTx and morbidity in patients undergoing surgery for CRC-LM.

METHODS: From 2001 to 2007 179 patients underwent primary liver resection for CRC-LM. Sufficient non-tumorous liver parenchyma could be re-evaluated for this study in 102 patients. In these 102 patients (66% male, median age 62 years, median BMI 26, 8% diabetes (IDDM); prospective perioperative database) liver injury was classified by an experienced pathologist using established criteria for steatosis and sinusoidal injury (SinDilat) and then compared with preoperative CTx and postoperative outcome. 59% of the operations were (extended) hemihepatectomies (ExtRes), 41% segmental or atypical resections (LimRes). Before resection 66% had received CTx (34% FU-based (FU), 20% oxaliplatin-based (Oxa), 10% irinotecan-based (Iri) and 3% Oxa + Iri. The interval between CTx and surgery was always ≥ six weeks.

RESULTS: Mortality was 3/102 (2.9%). Any complication occurred in 48%, hepatic insufficiency in 5.9%. Hepatic steatosis > 20% was found in 35% (half of them with steatosis > 50%). Patients with a BMI > 25 had a higher rate of steatosis > 20% (45% vs. 24%; p < 0.04). No risk factor for grade 2 and 3 SinDilat was found. Although there was a tendency Oxa and Iri were not significantly correlated with hepatic injury. Neither a CTx per se nor the different CTx-regimens nor the extent of hepatic injury showed any influence on mortality, complication rate or hepatic insufficiency. Patients with IDDM had a higher mortality (25% vs. 1% without IDDM); p < 0.03), complication rate (75% vs. 46%; p = 0.05) and a higher rate of hepatic insufficiency (25% vs. 4%; p < 0.05). Patients undergoing ExtRes also had a higher complication rate than patients with LimRes (p < 0.02). None of the 32 patients with preoperative Oxa or Iri died or developed hepatic insufficiency.

CONCLUSIONS: In our experience hepatic injury/parenchymal changes were influenced rather by BMI than by preoperative CTx (-regimen). Neither preoperative CTx nor liver injury increased perioperative morbidity. Patients with IDDM were at a rather high perioperative risk.

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Improvement in Peripheral Glucose Uptake After Gastric Bypass Is Only Observed After Massive Weight Loss and Is Associated with Altered Patterns of Gut and Pancreatic Hormone Secretion

Guilherme M. Campos1, Charlotte Rabl, Ruxandra Ciovica, Sofia Peeva, Madhu Rao, Morris Schambelan, Jean-Marc Schwarz, Kathleen Mulligan

Surgery, University of California San Francisco, San Francisco, CA

BACKGROUND: Altered gut hormone secretion may bolster resolution of insulin resistance after gastric bypass (GB). The independent effects of weight loss and hormonal secretions on insulin resistance are unknown. We sought to: 1) delineate short-term changes in insulin-mediated peripheral glucose uptake (M-Value), gut and pancreatic hormone secretion, and body composition, while controlling for energy balance; and 2) delineate the same changes after massive weight loss at 6 months after GB.

METHODS: Non-diabetic morbidly obese patients were randomized to GB followed by standardized calorie restriction (GB, n = 10) or to caloric restriction only (Diet, n = 10). Metabolic evaluations were done at baseline and at 15 days. Patients randomized to the Diet group underwent GB after completing the initial evaluation. The 10 GB patients were evaluated again at 6 months post-operatively.

RESULTS: Baseline body composition, fasting insulin, and HOMA-IR did not differ between groups. During baseline euglycemic hyperinsulinemic clamp, insulin resistance was profound in all subjects; average M-Value was about one-third of that for lean controls (2.3 ± 0.5 vs. 7.3 ± 0.3 mg/kg/min, p < 0.01). At 15 days, body composition and weight loss did not differ between groups (% Excess Weight Loss, EWL; Diet, 8.1 ± 0.9 vs. GB, 10.1 ± 0.9, P = 0.19). During a 5-hour meal test, only the GB group had altered patterns of glucose kinetics, GIP, GLP-1 and insulin secretions. At 15 days, fasting insulin and HOMA-IR decreased similarly in both groups. M-Values did not change in either group (Diet, 2.3 ± 0.4 vs. GB, 2.5 ± 0.5, P = 0.78), but average serum insulin concentrations during clamp decreased in the GB group (–22 ± 5 vs. –2 ± 6, P = 0.032). At 6 months, GB patients had significant weight loss (% EWL 52 ± 4.1), the altered pattern of glucose kinetics and gut and pancreatic hormones secretions persisted, fasting insulin and HOMA-IR decreased further, and only then did M-values improve significantly (4.3 ± 0.4, p < 0.01 vs. GB Group at baseline and 15 days). Average serum insulin concentrations during clamp remained low.

CONCLUSIONS: The decrease in fasting insulin and HOMA-IR at 15 days in both groups reflects primarily an improvement in hepatic insulin sensitivity. The same M-Value achieved with lower serum insulin levels in the GB group at 15 days suggests better hepatic insulin clearance with GB. This is likely a reflection of improved reduction in liver fat and altered hormonal secretions with GB. The altered pattern of glucose kinetics, gut and pancreatic hormone secretions around a meal is present early after GB and persists at 6 months, but M-Values only improved significantly after significant weight loss.

Transoral Endoscopic Esophagectomy

Bart P. Witteman1, Andres Gelrud2, George M. Eid3, Alejandro Nieponice3, Stephen F. Badyla4, Blair A. Jobe1

1The Heart, Lung and Esophageal Surgery Institute, University of Pittsburgh Medical Center, Pittsburgh, PA; 2Division of Gastroenterology, University of Pittsburgh Medical Center, Pittsburgh, PA; 3Division of General Surgery, University of Pittsburgh

INTRODUCTION: Because of the morbidity associated with esophagectomy, there has been an impetus to move towards esophageal preservation in patients with Barrett’s esophagus (BE) with dysplasia or superficial malignancy.
The introduction and success of endoscopic approaches such as endoscopic mucosal resection and radiofrequency ablation has resulted in a consumer demand for definitive endoscopic therapy. However, the primary limitations of these techniques are missed metachronous lesions, compromised histologic assessment, the need for subsequent procedures and stricture formation. Resection of the entire mucosal-submucosal complex (MSC) followed by an extracellular matrix scaffold substitution could potentially address these concerns. The objective of this study was to determine technical feasibility of transoral endoscopic sleeve resection of the esophageal MSC in an animal model.

METHODS: Six adult female swine underwent transoral endoscopic esophagectomy (TEE). Beginning at 20 cm from the dental arch, a 1 cm circumferential plane was created between the MSC and the muscularis propria (MP) using cap endoscopic resection and insulated needle knife dissection. A vein stripper was passed retrograde into the esophagus through an endoscopic gastrostomy and secured to the MSC sleeve. Drawing back on the vein strip facilitated MSC inversion and enabled dissection away from the MP over the entire length of the esophagus. MSC tissue specimens were retrieved and autopsy was performed. Endpoints included procedure time, number of cap resections, MSC and MP mural integrity with leak testing, hemorrhage events requiring intervention, resection length and residual MSC adherent to MP.

RESULTS: In all animals TEE was successfully completed. Mean procedure time was 195 minutes (range 135–320). Mean number of cap resections to reach a circumferential plane was 2.8 (range 1–5). No transmural MSC or MP perforations occurred. A mean of 2 (range 1–3) hemorrhage events per procedure required endoscopic intervention. Macroscopic and histological assessment demonstrated 100% longitudinal resection in 5 of 6 animals and complete resection margin depth in 97% (range 90–100) of the total surface area removed.

CONCLUSION: TEE is feasible in this animal model and results in an intact and unaltered specimen. This natural orifice surgical technique may lead to a one step diagnostic and/or therapeutic approach in the treatment of BE and early stage malignancy, which will enable esophageal preservation and avoid the morbidity associated with traditional esophagectomy.

10:30 AM – 11:15 AM
$504
PRESIDENTIAL PLENARY B
(PLENARY SESSION II)
**METHODOLOGY:** DJE bypasses the duodenum and first 10 cm of the jejunum with a 15 cm jejunal limb. IT involves transposing a 10 cm segment of ileum into the jejunum, 10 cm distal to the ligament of Treitz. We performed a DJE, IT, DJE Sham, and IT Sham on male, 14 week old GK rats (n = 9 per group), and monitored the responses for 5 wk. An oral glucose tolerance test (OGTT) was performed at 0, 2, and 4 weeks post-operatively. At 5 weeks a jugular catheter was inserted and incretin hormones were measured after a mixed meal gavage.

**RESULTS:** There was no difference in body weight or food intake among any of the GK groups at the end of the 30 day study period. A statistically significant improvement in the OGTT was noted at 4 weeks in DJE and IT rats (mean glucose at 120 min ± SE: DJE 198.4 ± 10.6 vs. DJE Sham 241.2 ± 15.0, p = 0.03; IT 191.7 ± 17.4 vs. IT Sham 242.4 ± 8.2, p = 0.02). Insulin concentrations during the OGTT did not differ in the DJE/IT and Sham rats, nor did the response to an insulin tolerance test. Plasma GLP-1 levels 30 min after a mixed meal were elevated in both DJE and IT rats (DJE: 4.51 ± 0.36 vs. DJE Sham 2.75 ± 0.22, p = 0.001; IT 4.38 ± 0.52 vs. IT Sham 3.06 ± 0.25, p = 0.005).

**CONCLUSIONS:** In GK rats, DJE and IT improve glucose tolerance, suggesting that hindgut stimulation is the responsible factor. This is supported by the comparable increase in the incretin GLP-1 after both surgical procedures. Neither surgery resulted in a statistically significant increase in insulin secretion or improvement in insulin sensitivity, leading us to postulate that the primary mechanism in this model is an extra-pancreatic action of GLP-1.
than one positive margin. The median follow-up for the entire cohort was 25.7 months. Estimated blood loss, complications, median length of postoperative stay, readmission rates, median survival, and one year survival rates for the R0/MP/PB/PX groups are shown in the accompanying table. The 30 day perioperative mortality for the entire cohort was 1.6%. Both deaths were in the RO group (3.5%).

**CONCLUSIONS:** Palliative surgery for advanced stage pancreatic adenocarcinoma in highly selected patients can be performed safely with low perioperative morbidity and mortality. Further work to determine the role of adjuvant treatment and longer term follow-up are required to assess the durability of survival outcomes for patients undergoing MP resection.

2:15 PM – 4:30 PM  
S503  
**VIDEO SESSION I:**  
**CLINICAL HPB/UPPER GI**

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**442**  
**Totally Laparoscopic Anatomic Segment 6 Liver Resection**  
Carlos U. Corvera*1,2  
1Surgery, UCSF, San Francisco, CA; 2Surgery, Veterans Affairs Medical Center, San Francisco, CA  
After positioning, the operation begins with a standard cholecystectomy. The liver is mobilized and short caudate venous branches to the inferior vena cava are secured with clips and divided. Hilar dissection is focused on the posterior sectoral pedicle. The arterial branch to the posterior sector is isolated and divided. A partial caudate hepatomy is done to expose the bifurcation of the portal venous branches to segment 6 & 7. The portal vein branch to segment 6 is divided with a vascular stapler resulting in a zone of perfusion demarcation. The parenchyma is transected using a bipolar cautery device and vascular stapler. The specimen is removed through a limited umbilical incision.

**443**  
**Robotic Liver Tumor Resection**  
Awad M. Jarrar*1, John J. Fung2, Eren Berber2  
1Colorectal Surgery, Cleveland Clinic Foundation, Cleveland, OH; 2General Surgery, Cleveland Clinic Foundation, Cleveland, OH  
The experience with Robotic-assisted laparoscopic liver resection is still very limited and indications for such surgery have not been extensively reported. Some of the advantages of such technique are the 3-dimensional view along with a 360-degree range of motion. We, hereby, report our experience with of a well-differentiated HCC located in segment 5 in an 83-year old patient. This video illustrates a unique technique for laparoscopic robotic liver tumor resection using radiofrequency ablation to pre-coagulate the resection line. Intra-operative laparoscopic liver ultrasound is also included. The tumor was completely resected with macroscopically negative free margins.

**444**  
**Management of Anatomic Hilar Variations During Laparoscopic Right Hepatectomy**  
Aziz M. Merchant, Edward Lin, Juan M. Sarmiento*  
Surgery, Emory University Hospital, Atlanta, GA  
We present 3 scenarios of hilar dissection: 1-Portal vein (PV) trifurcation and lowering of the hilar plate. The hilar plate is lowered on the right and left side to take the right hepatic artery and then the right anterior and posterior PV separately. 2-High bifurcation of the PV and lateral transection of the cystic plate. The anterior and posterior branches of the right hepatic artery are taken separately. By transecting the gallbladder plate, there is access to the PV bifurcation. 3-Continuation of the hilum into the Incisura Dextra of Gans. The Incisura is visible in the hilum in the right lobe without liver parenchyma interposition and is easily identified and dissected.

**445**  
**Key Images and Technical Considerations for Minimally Invasive Robotics in Pancreaticobiliary Surgery**  
Shawn MacKenzie*, Kambiz Kosari, Timothy D. Sielaff  
Virginia Piper Cancer Institute, Minneapolis, MN  
Advances in robotic surgery have allowed the frontiers of minimally invasive surgery to expand to Pancreaticobiliary surgery A discussion of minimally invasive robotic operative techniques, with video illustrations for the Whipple procedure, distal pancreatectomy, and a choledochal cyst excision, will be presented. Focus will be on key technical maneuvers in pancreaticobiliary surgery; including robotic visualization & magnification, portal vein dissection, sewing the pancreatic duct anastomosis, dissecting in the porta hepatitis, and transection of the uncinate process during a pancreaticoduodenectomy.
Completion of Pancreatectomy for IPMN Recurrence After Pylorus-Preserving Pancreatoduodenectomy with a New Pancreaticogastrostomy Technique
Laureano Fernández-Cruz, Raquel Garcia-Roca, Mario A. Acosta Pimentel, Jaume Comas, Miguel Angel López-Boado Surgery, Hospital Clinic, Barcelona, Spain

Woman 82 years old underwent 2 years ago a pylorus-preserving pancreatoduodenectomy with gastric partition and pancreaticogastrostomy anastomosis for invasive IPMN main-duct variant. Pancreatic resection margins showed low-grade dysplasia. She developed recurrence in the pancreatic remnant. This video emphasizes the technical steps taken to maximize the opportunity to achieve free of disease following resection. With our technique distal pancreatic resection is performed en-block with the segment of the stomach involved in the pancreaticogastrostomy anastomosis. She made excellent postoperative progress and was discharged on the 8th postoperative day.

Laparoscopic Resection of a Gastroesophageal Junction Leiomyoma
Timothy E. Oppermann, Patrick R. Reardon*, Fariba Dayhim, Garth Davis, Robert Davis, Brian J. Dunkin The Department of Surgery, The Methodist Hospital, Houston, TX

In this video presentation we are presenting a patient with a submucosal mass at the gastroesophageal junction (GEJ). At time of laparoscopic surgery, the mass was adherent to the GEJ and extended into the distal left esophagus. Resection of the mass included a portion of the lower esophageal sphincter and distal left esophagus. This area was then reconstructed primarily over a 42 Fr tapered Bougie with running 3.0 and 2.0 Vicryl® suture in two layer fashion. The patient did well post-operatively and was discharged home on day six.

Medical and Surgical Treatment of Chronic Anal Fissure: Prospective Longer-Term Results
Pierpaolo Sileri*, Vito M. Stolfi, Marco Venza, Michele Grande, Stefano D’Ugo, Marco D’Eletto, Alessandra Di Giorgio, Achille Gaspari Surgery, University of Rome Tor Vergata, Rome, Italy

BACKGROUND: We previously assessed the efficacy of different medical and surgical treatments for chronic anal fissure (CAF). In this prospective audit we present longer-term results of this study in a larger series.

PATIENTS AND METHODS: From 01/04 to 09/08, 294 patients with typical CAF were enrolled. All patients were treated with 0.2% nitroglycerin ointment (GTN) or anal dilators (DIL) for 8 weeks. Those patients in which no improvement in symptoms was observed after 8 weeks were crossed to the other treatment (GTN or DIL) or switched to a combination of the two. Persisting symptoms after 12 weeks or recurrence were indications for either botulinum toxin injection into the internal sphincter and fissurectomy (BTX) or LIS. Primary end-point was fissure healing at last follow-up. Secondary end-points were symptomatic improvement, need for lateral internal sphincterotomy (LIS), and side effects. Differences between treatment groups were evaluated by chi square test.

RESULTS: patients’ demographics, fissure characteristics and treatment results are resumed in Table 1. Mean follow-up was 36 ± 17 months. Recurrence rate after 12 weeks treatment was similar between GTN and DIL (11.5% vs. 9.3%). Overall fissure healing after medical treatment was 69.7% without significant differences between GTN (57.2%), DIL (66.9%) or a combination of the two (59.5%). Side effects (GTN) or severe discomfort (DIL) were observed in 13.2% of the patients. Thirty patients were treated with BTX and 64 underwent LIS (including BTX failures). At the end of the follow-up healing rates were 83.3% after BTX and 100%
after LIS. No morbidity or postoperative incontinence were observed in both surgical groups.

CONCLUSIONS: This study confirms that LIS is far more effective than medical treatments for CAF. However, BTX injection/fissurectomy as first line treatment may significantly increase the healing rate while avoiding any risk of incontinence.

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Disparities in Presentation and Treatment of Diverticular Disease: Impact of Socioeconomic Status
Nicholas Csikesz, Anand Singla, Melissa M. Murphy, Jennifer F. Tseng, Shimul A. Shah
Surgery, University of Massachusetts Medical School, Worcester, MA

Clinical models in surgery have identified disparities in surgical care including race, income and insurance status individually as potential causes. We attempted to determine if socioeconomic status (SES) affects presentation, treatment and health care burden in medical/surgical care using diverticular disease as a model.

METHODS: The 2006 New York (NY) State Inpatient Database was used to query 10,481 cases of diverticular disease occurring in patients 60–85 years of age. SES was assessed by creating a composite score based on race, primary insurance payer, and median income bracket (by residence zip-code). Patients were grouped into SES thirds. Propensity scores were used to create a case controlled analysis of low (1/3) and middle/high (2/3) SES groups to eliminate differences in patient demographics in an attempt to identify possible etiologies of differences in outcome. Primary outcomes were differences in disease presentation, use of elective surgery, complication rates and mortality after surgery, and prolonged length of stay (LOS).

RESULTS: On univariate analysis, low SES-patients were less likely to be treated with surgery (10.4% vs. 16.9%, p < 0.0001) in emergent/urgent cases (7.4% vs. 9.4%, p = 0.001) and elective cases (58.3% vs. 64.8%, p = 0.06). When surgery was performed, patients of lower SES had higher complication rates (23.8% vs. 17.4%, p = 0.005), more often required blood transfusion (48.7% vs. 34.2%, p < 0.0001), ICU stay (48.5% vs. 38.0%, p = 0.0002), higher hospital charges ($65K vs. $53K, p = 0.003) higher overall in-hospital mortality (7.4% vs. 3.6%, p = 0.002) and more prolonged LOS (15.2% vs. 8.4%, p < 0.0001). In matched groups, these differences persisted including rates of surgical complications and operative mortality (p < 0.05; Table 1).

Table 1. Surgical Outcomes in Propensity Matched Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Low SES (n = 3,989)</th>
<th>High SES (n = 3,989)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery – Urgent</td>
<td>10.1%</td>
<td>17.1%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Surgery – Elective</td>
<td>58.5%</td>
<td>65.6%</td>
<td>0.07</td>
</tr>
<tr>
<td>ICU Stay</td>
<td>49.3%</td>
<td>38.6%</td>
<td>0.0006</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>49.8%</td>
<td>36.7%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hospital charges</td>
<td>$66.1K</td>
<td>&lt;$57.7K</td>
<td>0.04</td>
</tr>
<tr>
<td>Operative complications</td>
<td>24.4%</td>
<td>18.1%</td>
<td>0.01</td>
</tr>
<tr>
<td>Operative mortality</td>
<td>7.7%</td>
<td>3.7%</td>
<td>0.004</td>
</tr>
</tbody>
</table>

CONCLUSIONS: After controlling for patient and hospital characteristics using a matched cohort, SES impacts disease presentation, likelihood to receive surgical intervention and resource utilization in cases of diverticular disease. Future studies to identify the causes of disparities in surgical outcomes due to differences in SES should focus on access to prevention, disease severity and operative care.
Improved Mortality for Same Hospital Readmission Following Rectal Cancer Resection
Hiroko Kunitake*, David S. Zingmond, Clifford Y. Ko1
1Surgery, David Geffen School of Medicine at UCLA, Los Angeles, CA; 2General Internal Medicine and Health Services Research, David Geffen School of Medicine at UCLA, Los Angeles, CA

PURPOSE: To determine whether readmission to the same hospital as the index resection results in better outcomes following resection for rectal cancer.

METHODS: All patients undergoing surgical resection for rectal cancer in California (1994–2005) were retrospectively identified by ICD-9 procedure codes (48.5, 48.61–48.69) using the California Office of Statewide Health Planning and Development (OSHPD) Patient Discharge Database linked with the California Cancer Registry and 2000 US Census. Univariate and logistic multivariate analysis were used to determine significant outcome predictors.

RESULTS: 24,368 patients underwent resection for rectal cancer in 1994–2005. 9,608 (39%) had at least one readmission within the first year (11% within 30 days, 21% within 90 days, median time to first readmission 74d). For all patients who were readmitted, 85% had a surgical complication and 40% required a rectal cancer resection-related procedure. The most common procedures were peritoneal adhesiolysis, percutaneous abdominal drainage, large bowel stoma revision, and partial large bowel excision. 81% of patients returned to the index hospital for their first readmission. Index hospital readmission was associated with significantly lower 1yr mortality (15.9% vs. 20.8%, p < 0.001) and 7% shorter length of stay (p < 0.008) compared with patients readmitted to a different hospital. Multivariate logistic regression confirmed lower 1yr mortality with return to the index hospital controlling for revised Charlson score, age, cancer stage, hospital volume, and unscheduled admission (Odds Ratio: 0.92, p < 0.002). Patients readmitted within the first 30 days and patients younger than 65 had the most benefit from index hospital readmission with a combined 42% reduction in 1yr mortality (p < 0.001). Older age, higher revised Charlson score, higher cancer stage, and unscheduled admission were significant predictors of readmission. Race, poverty, and hospital volume did not predict readmission.

CONCLUSION: Care of the rectal cancer resection patient requires close follow-up and often coordination of multiple medical and surgical services. Continuity of care results in significantly lower long term mortality.

Activation of Hepatic AMP-Protein Kinase (AMPK) Is Mediated by LKB1 After Roux-en-Y Gastric Bypass in Obese Rats
Yanhua Peng1,3, Drew A. Rideout*1,2, Steven S. Rakita1,3
William R. Gower1, Min You2, Michel M. Murr1,3
1Department of Surgery, University of South Florida, Tampa, FL; 2Molecular Pharmacology & Physiology, University of South Florida, Tampa, FL; 3Departments of Surgery & Research, James A. Haley Veterans Administration, Tampa, FL

BACKGROUND: Roux-en-Y gastric bypass (RYGB) reduces liver weight, hepatic triglycerides and oxidative stress in obese rats. AMP-activated kinase (AMPK) has been targeted in the treatment of the metabolic syndrome because of its role in reducing fatty acid synthesis and oxidative stress as well as increasing beta oxidation. LKB1 (a serine/threonine kinase also called STK11) can activate AMPK by phosphorylation. PKC-ζ is known to phosphorylate LKB1 and plays a role in cellular stress and cytokine production. We, therefore, hypothesize that the improvement in hepatic steatosis after RYGB in obese rats is associated with an upregulation of the LKB1-AMPK signaling pathway.

METHODS: Obese Sprague-Dawley male rats underwent RYGB or sham. Liver tissue was obtained at 9 weeks postoperatively. Protein levels of LKB1, p-LKB1, AMPKα, p-AMPKα and p-PKC-ζ were measured. PKC-ζ mRNA levels were also measured. Protein associations of LKB1 with each of AMPKα and PKC-ζ were determined by both co-immunoprecipitation and co-immunofluorescent staining. Data are mean ± SD; for t-test, p < 0.05 was significant.

RESULTS: RYGB increased protein levels of both hepatic AMPKα and phosphorylated-AMPKα (p-AMPKα) as compared to sham (5,431 ± 150 vs. 2,323 ± 117; 3,665 ± 120 vs. 1,534 ± 60; all p < 0.001). While protein levels of hepatic LKB1 did not increase, phosphorylated-LKB1 increased significantly after RYGB (6,574 ± 125 vs. 3,265 ± 89; p < 0.001 vs. sham). PKC-ζ mRNA and phosphorylated-PKC-ζ did not change after RYGB (data not shown). However, interactions between LKB1 and AMPK were increased after RYGB (6,325 ± 142 vs. 2,132 ± 87; p < 0.001 vs. sham) as well as interactions of LKB1 and PKC-ζ (4,356 ± 102 vs. 2,354 ± 78; p < 0.001 vs. sham). Both LKB1-AMPK and LKB1-PKC-ζ co-localized most strongly in the cytoplasm of liver cells by co-immunofluorescence; LKB1-AMPK also co-localized in the nucleus to a lesser extent.

CONCLUSION: RYGB increased hepatic levels of AMPK and p-AMPK. Increased phosphorylation of LKB1 after RYGB is associated with increased LKB1-AMPK interaction and co-localization within liver cells. While PKC-ζ levels were not increased after RYGB, PKC-ζ interaction and co-localization with LKB1 was increased. Further elucidation upstream signaling of the LKB1-AMPK pathway may provide greater clarity into the benefits of RYGB on Non-Alcoholic Fatty Liver Disease.
CONCLUSIONS:

and there was one unrelated death at 2 years.

have been hospitalized for hypoglycemic complications

(p = 0.001) and visual analog scale (p < 0.001). No patients

improved in all domains (p < 0.005), including total score

than 1 year ago,” respectively (p < 0.0001). MPQ-SF scores

82% and 67% of patients felt that they were “better off

scales (p < 0.05). At 6-months and 1-year after surgery,

SF-36 physical component scores were higher at 6-month

was 2566 ± 3639 and 841 ± 2536 for each procedure,

13,889 ± 50,832 and islet equivalents per gram of pancreas

cases, islet equivalents infused was 77,227 ± 179,429 and

43 pancreatic resections with IAT were identified. For the

METHODS: All patients undergoing pancreatectomy with

IAT from April 2005 to December 2008 were evaluated.

Data were collected by chart review and query of hospital

databases. Quality of life was measured by the Short Form-

36 (SF-36) and severity of pain was measured by the

McGill Pain Questionnaire-Short Form (MPQ-SF). Surveys

were completed preoperatively, at routine 6-month and 1-

year follow-up visits, and after distribution by mail. Norm-

based scoring was used for the SF-36 so scores were stan-

dardized to the general population mean. The MPQ-SF

includes a visual analog scale in addition to written ques-

tions. Results are reported as median ± interquartile range

or as a percentage. Statistical analyses were conducted

with SAS version 9.3.1.

RESULTS: Forty-two consecutive patients who underwent

43 pancreatic resections with IAT were identified. For the

29 total pancreatectomy and 14 pancreatodudodenectomy

cases, islet equivalents infused was 77,227 ± 179,429 and

13,889 ± 50,832 and islet equivalents per gram of pancreas

was 2566 ± 3639 and 841 ± 2536 for each procedure,

respectively. At median follow-up of 6.1 ± 11 months,

cessation of narcotic use was reported by 70% of patients.

RESULTS:

provide effective pain relief, and improves quality of life.

Patients with severe chronic pancreatitis should be consid-

ered for pancreatic resection with IAT at a center with this

capability.
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**Impact of Institutional Case Volume on Inpatient Morbidity and Mortality After Paraesophageal Hernia Repair**

Surgery, Oregon Health and Science University, Portland, OR

**INTRODUCTION:** For many complex surgical procedures, high volume centers have been shown to have less morbidity and mortality than low volume centers. No studies to date have examined the affect of case volume on morbidity and mortality for paraesophageal hernia (PEH) repair. The aim of this population-based study is to assess the impact of hospital case volume on inpatient morbidity and mortality following PEH repair.

**METHODS:** The Nationwide Inpatient Sample database was queried from 1996–2006 by ICD-9 diagnosis and procedure codes for laparoscopic, transthoracic, and open abdominal approaches to PEH repair. Institutional volumes were classified by increasing case volume in increments of five cases per year. The corresponding morbidity and mortality was assessed for each increment. Data was analyzed using Rao-Scott Chi-Squared test.

**RESULTS:** 97,757 PEH repairs were performed during the study interval: 9,577 laparoscopic repairs, 74,949 repairs by laparotomy and 13,231 repairs were completed by a transthoracic approach. Overall morbidity and mortality are shown and were significantly different across approaches, p < 0.0001 and p = 0.004 respectively (see table). For laparoscopic and open abdominal repairs, mortality was significantly different across the procedural increments. For the transthoracic approach, only morbidity was different. Hospitals that performed greater than 15 laparoscopic PEH repairs per year had no associated mortality compared to hospitals that performed 15 or fewer cases per year (p = 0.004).

<table>
<thead>
<tr>
<th>Cases/Year</th>
<th>Overall</th>
<th>&lt;5</th>
<th>6–10</th>
<th>11–15</th>
<th>16–20</th>
<th>&gt;20</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morbidity(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laparoscopic</td>
<td>7.6</td>
<td>10.9</td>
<td>8.3</td>
<td>6.3</td>
<td>9.4</td>
<td>4.0</td>
<td>0.0603</td>
</tr>
<tr>
<td>Open Abdominal</td>
<td>9.8</td>
<td>14.2</td>
<td>11.1</td>
<td>10.4</td>
<td>8.7</td>
<td>6.1</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Transthoracic</td>
<td>12.8</td>
<td>16.3</td>
<td>14.9</td>
<td>8.6</td>
<td>15.9</td>
<td>9.5</td>
<td>0.0051</td>
</tr>
<tr>
<td>Mortality(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laparoscopic</td>
<td>0.9</td>
<td>1.7</td>
<td>0.8</td>
<td>1.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0278</td>
</tr>
<tr>
<td>Open Abdominal</td>
<td>1.3</td>
<td>2.3</td>
<td>1.1</td>
<td>0.8</td>
<td>1.5</td>
<td>0.4</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Transthoracic</td>
<td>1.4</td>
<td>2.0</td>
<td>1.0</td>
<td>1.9</td>
<td>0.5</td>
<td>0.6</td>
<td>0.2837</td>
</tr>
</tbody>
</table>

**CONCLUSION:** This data demonstrates that institutional case volume impacts inpatient morbidity and mortality after PEH repairs. However, the impact of case volume is not equivalent for all surgical approaches. The laparoscopic approach had the lowest overall morbidity and mortality and had no associated mortality at institutions performing greater than 15 cases per year. These results suggest that for laparoscopic PEH repairs, the best morbidity and mortality are seen at institutions with annual volumes of greater than 15 cases per year.

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**Endoluminal Fundoplication (ELF) for GERD: 12 Month Follow-Up**

Riccardo Rosati1, Uberto Fumagalli*1, Roberta Barbera2, Alberto Malesci2, Alessandro Repici2
1General and Minimally Invasive Surgery, Istituto Clinico Humanitas, Rozzano (Milan), Italy; 2Gastroenterology, Istituto Clinico Humanitas, Rozzano (Milan), Italy

**AIM:** to evaluate the short term results of Endoluminal Fundoplication (ELF) with Esophyx™ in a group of patients treated for gastroesophageal reflux disease.

**METHOD:** 64 patients presenting during the period June 2006–April 2008 with a history of chronic reflux esophagitis (>6 months), with either endoscopic or pH-metric diagnosis, needing long term acid suppressive therapy, were asked to take part to the study. Patients with a hiatal hernia larger than 3 cm or Barrett esophagus were excluded. Twenty patients (median age 47.5 yrs) were included into the study. ELF procedures were performed under general anesthesia with orotracheal intubation by expert endoscopist and surgeon.

**RESULTS:** Twelve patients (60%) had a small hiatal hernia (<3 cm); 5 had LA grade B/C esophagitis. The median total reflux time was 2.5%. The mean duration of the procedure to construct a 220° valve (range 180–270°) was 62 minutes. A median of 14 fasteners (range 6–18) were placed. There were no major intraoperative complications. Two patients had an haematemesis on the 1st and 8th postoperative day, which needed prolonged or re-hospitalization and were treated conservatively (major complication: 10%). Fifteen patients have reached a 6 month follow up and 7 a 12 month follow up. Symptom improvement was 60% at 6 months and 57.1% at 12 months. GERD-HRQL score decreased from a median of 43 to a median of 7 (p < 0.005, Mann-Whitney U test); one patient still had grade B esophagitis at 6 month follow up; at physiopathologic evaluation improvement was recorded in 16.6% of cases, while 16.6% remained unchanged, and 66.7% worsened at one year follow up. Six patients (30%) with persistent symptomatic reflux underwent laparoscopic Nissen fundoplication with good results.

**CONCLUSION:** ELF is maybe the most attractive endoscopic technique for GERD. Patients treated with the procedure had a symptom improvement but laboratory results at 6 and 12 months on gastro-esophageal reflux are unsatisfactory and there is a high number of reoperations. We therefore conclude that ELF with Esophyx™ is an investigational procedure with no role in routine treatment of GERD.
Gastric Pacing Can Eliminate Dependency on Supplemental Nutrition and Improve Medically Refractory Gastroparesis

Jill Zink*, Joseph A. Talarico, Amy Cha, Fady Moustarah, Matthew Kroh, Stacy A. Brethauer, Bipan Chand

Bariatric and Metabolic, Cleveland Clinic Foundation, Cleveland, OH

INTRODUCTION: Gastric stimulation has been shown to improve the symptoms of medically refractory gastroparesis. With enough symptomatic improvement, patients should be able to decrease or eliminate their dependency on supplemental nutrition (parenteral or enteral) in the post-operative period.

MATERIALS AND METHODS: This is a review of a single surgeon’s operative experience from 9/02 to 7/08. Patients with a diagnosis of diabetic or idiopathic gastroparesis that had a gastric pacer placed were selected for analysis. Chart review included age, gender, weight, symptom improvement, and the requirement of additional nutritional supplementation at baseline, six, and 12 months.

RESULTS: Fifty-two patients had interrogation and programming of the gastric pacer (Enterra) at time of implantation. As part of follow-up, patients were assessed for symptom improvement and were adjusted appropriately if no improvement was seen. Patients included eight males and 44 females. The average age was 38 years (range 20–87). Thirty-one had a pre-operative, 6 month, and 12 month weight recording. Average weight was 151.9 lbs, 153.2 lbs, and 155.1 lbs at those respective times. In 47 patients with a mean follow-up of 19 months, 34 (72%) reported improvement in symptoms, nine (19%) reported no improvement in symptoms, and four had initial resolution of symptoms but return to baseline at last follow-up. Preoperatively, 10 patients were receiving jejunal feeds (TF) and two were receiving total parenteral nutrition (TPN). Subsequently after device implantation, seven patients at six months and an additional three at one year were off all forms of supplementation and receiving nutrition solely by mouth. No statistically significant weight change was seen in this group. Seven patients had a jejunostomy tube placed at the time of device implantation for subsequent enteral feeds. Three patients at six months had enteral feedings stopped and the remaining four continued tube feeds at one year. No patient in this group had an infectious complication secondary to concomitant gastric stimulator and jejunal tube placement. One Enterra system was replaced due to device malfunction, two revised secondary to generator malposition, and one removed due to lead erosion.

CONCLUSIONS: The majority of patients demonstrated weight stability after gastric pacer placement. 72% of patients reported improvement in symptoms. Patients receiving supplemental nutrition preoperatively showed decreased reliance on enteral feeds or TPN after gastric stimulation. Concomitant jejunal tube and gastric pacer placement did not demonstrate a higher infectious complication rate.

Outcome Based on Management for Duodenal Adenomas: Sporadic Versus Familial Disease

Michael D. Johnson*, Richard A. Mackey, Nancy Brown, James M. Church, Carol A. Burke, Matthew Walsh

Cleveland Clinic Foundation, Cleveland, OH

Management and outcomes for duodenal adenomas may vary based on etiology, familial versus sporadic. We reviewed the records of patients managed at our institution for duodenal adenomatous polyps for the 20-year period ending July 2006. Methods of polyp resection (endoscopic, local surgical resection, or definitive surgical resection) within both sporadic and familial patient groups were compared. Patients with known cancer were excluded. Two hundred seventy-eight patients with duodenal polyps were followed during this time period: 110 patients (39.6%) with sporadic polyps and 168 (60.4%) with FAP. Sporadic patients presented at a mean age of 66.5 years. Endoscopic resection was attempted in 44 patients (40%) with morbidity in 9% and local recurrence rate of 52% with a mean follow-up of 43 months. Surgical resection was performed in 46 patients (42%): 27 by definitive resection and local resection in 19. At a mean follow-up of 41 months there were no local recurrences in the patients treated by definitive resection and 6 recurrences (32%) after local resection. Morbidity was 16.2%. There was a significant difference in local recurrence when comparing definitive resection to both endoscopic and local resection (p < 0.001, p = 0.002 respectively), but no significant difference between endoscopic and local excision (p = 0.13). Cancer was discovered in the surgical specimens of 11 patients (24%) with benign preoperative biopsies. FAP patients began surveillance at a mean age of 39.5 years and mean surveillance duration was 100 months. Endoscopic resection/ablation was attempted in 40 patients (24%) with a morbidity of 7.5%. With a mean follow-up of 77.5 months the local recurrence rate was 72.5%. Surgical resection was performed in 50 patients (30%) with a mean follow-up of 44 months. Definitive resection was performed in 47 and local excision in 3 with local recurrence rates of 9% and 100%, respectively. Surgical morbidity was 48%. Local recurrence was significantly lower following definitive resection compared to endoscopic or local resection (p < 0.001) but there was no difference in local recurrence between the latter 2 groups (p = 0.29). Four patients (8%) undergoing surgery were discovered to have invasive cancer despite benign endoscopic biopsies. In summary, endoscopic and local surgical management for both sporadic and familial duodenal polyps are associated with a high rate of local recurrence. Definitive resection in the form of pancreaticoduodenectomy, pancreas-sparing duodenectomy, or segmental duodenumectomy offers the best chance for polyp eradication and prevention of carcinoma, regardless of polyp etiology.
Duodenal Switch Provides Superior Resolution of Metabolic Comorbidities Independent of Weight Loss in the Super-Obese (BMI ≥ 50 kg/m²) Compared with Gastric Bypass

Vivek N. Prachand¹, Marc Ward², John C. Alverdy¹
¹Surgery, University of Chicago, Chicago, IL; ²Pritzker School of Medicine, University of Chicago, Chicago, IL

OBJECTIVE(S): Increased BMI is associated with greater incidence and severity of obesity-related comorbidities and inadequate post-bariatric surgery weight loss. Accordingly, comorbidity resolution is an important measure of surgical outcome in super-obese individuals. We previously reported superior weight loss in super-obese patients following duodenal switch (DS) compared to Roux-en-Y Gastric Bypass (RYGB) in a large single institution series. We now report follow-up comparison of comorbidity resolution and correlation with weight loss.

METHODS: Data from patients undergoing DS and RYGB between August 2002 and October 2005 were prospectively collected and used to identify super-obese patients with diabetes, hypertension, dyslipidemia, and gastroesophageal reflux disease (GERD). Ali-Wolfe scoring was used to describe comorbidity severity. Chi-square analysis was used to compare resolution and two-sample t-tests used to compare weight loss between patients whose comorbidities resolved and persisted.

RESULTS: 350 super-obese patients [DS (n = 198), RYGB (n = 152)] were identified. Incidence and severity of hypertension, dyslipidemia, and GERD was comparable in both groups while diabetes was less common but more severe in the DS group (24.2% vs. 35.5%, Ali-Wolfe 3.27 vs. 2.94, p < 0.05). Diabetes, hypertension, and dyslipidemia resolution was greater at 36 months for DS (diabetes, 100% vs. 60%; hypertension, 68.0% vs. 38.6%; dyslipidemia, 72% vs. 26.3%), while GERD resolution was greater for RYGB (76.9% vs. 48.57%; p < 0.05). There were no differences in weight loss between comorbidity “resolvers” and “persisters”.

CONCLUSIONS: In comparison to RYGB, DS provides superior resolution of diabetes, hypertension, and dyslipidemia and inferior resolution of GERD in the super-obese independent of weight loss.

Tuesday, June 2, 2009

7:30 AM – 9:15 AM

VIDEO SESSION II:
BREAKFAST AT THE MOVIES
Combined Endoscopic and Transgastric Laparoscopic Resection of Gastric Gastrointestinal Stromal Tumors
Craig P. Fischer*
Surgery, The Methodist Hospital, Houston, TX
Gastrointestinal stromal tumors (GIST) of the stomach often require gastrectomy, by open or laparoscopic means. We describe a novel, minimally invasive technique to minimize incisions, and maximize patient recovery.

Laparoscopic Total Gastrectomy with Roux-en-Y Esophagojejunostomy for Hereditary Gastric Cancer
Gene Carrier
Winnie Tong¹, Jayleen Grams, Daniel M. Herron
Department of Surgery, Division of Laparoscopic Surgery, Mount Sinai Hospital, New York, NY
We present the case of a 60-year-old man with a family history of gastric and breast cancer. He was found to carry the CDH1 gene mutation that confers a 70% lifetime risk of diffuse gastric cancer. After discussion of surgical options, he underwent laparoscopic total gastrectomy with Roux-en-Y esophagojejunostomy. Although no consensus exists regarding prophylactic gastrectomy in mutation carriers, it is clear that endoscopic surveillance is of limited effectiveness and diffuse gastric cancer carries a grim prognosis. In this video, we demonstrate that prophylactic laparoscopic total gastrectomy can be performed safely and may be an excellent therapeutic option for these patients.

Single Incision Laparoscopic Colectomy: Right Hemicolectomy
Robert B. Lim¹, Deborah Nagle
Colorectal and Minimally Invasive Surgery, Beth Israel Deaconess Medical Center, Boston, MA
We present our case of a laparoscopic right hemicolectomy done through a single small incision. The patient is a 63 year old female with a cecal volvulus that caused intermittent right lower quadrant pain for one year. Her past medical history includes atrial fibrillation for which she takes Coumadin. Her colonoscopy was significant only for a hyperplastic polyp. An elective procedure was done through a Coumadin window. Using a flexible tip laparoscope, articulating instruments, and ultra-short ports, we were able to complete this procedure through a two centimeter incision. Total operating time was 75 minutes.
Triptolide and Anti-Death Receptor 5: An Effective Combination that Activates Both the Intrinsic and Extrinsic Apoptotic Pathways in Pancreatic Cancer Cells

Daniel Borja-Cacho*, Yumi Yokoyama, Rohit Chugh, Vikas Dudeja, Ashok K. Saluja, Selwyn M. Vickers
Surgery, University of Minnesota, Minneapolis, MN

BACKGROUND: Death receptor therapy induces apoptosis in different tumors but pancreatic cancer is resistant to this therapy. We have shown how triptolide decreases apoptosis resistance in pancreatic cancer. We hypothesized that triptolide increases the effectiveness of death receptor therapy in pancreatic cancer. Our aims were to evaluate the effects of combined therapy with triptolide and anti-Death Receptor 5 Antibody (anti-DR5Ab) on a) cell viability and apoptosis and b) anti-apoptotic protein expression in pancreatic cancer cells.

METHODS: 5 pancreatic cancer cell lines were exposed to triptolide (0–400 nM), anti-DR5Ab (0–100 ng/ml), or both (triptolide 100 nM + anti-DR5Ab 12.5 ng/ml). We assessed the effects of both drugs on cell viability, apoptosis, caspase-3, -8 and -9 activity, PARP and BID cleavage. XIAP protein levels were measured after 24 hours of treatment.

RESULTS: Pancreatic cancer cells were resistant to anti-DR5Ab. Combined therapy decreased cell viability, triggered apoptosis and caspase –3, –8 and –9 activity in all cell lines (Table) PARP and BID cleavage were only seen in combined therapy. Triptolide decreased XIAP levels, an inhibitor of caspase –3 and –9. (Figure)

CONCLUSIONS: Triptolide decreased XIAP protein levels. Pancreatic cancer cells are resistant to anti-DR5Ab but combined therapy with triptolide and anti-DR5Ab triggers apoptosis because it induces both apoptotic pathways. This effect is seen in anti-DR5 resistant cell lines.

Table 1. Effect of Anti-DR5Ab and Triptolide on Apoptosis and Caspase Activity on Pancreatic Cancer Cells

<table>
<thead>
<tr>
<th>Cell line</th>
<th>Control</th>
<th>Anti-DR5Ab</th>
<th>Triptolide</th>
<th>Combined Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Apoptosis</td>
<td>Caspase Activity#</td>
<td>Apoptosis</td>
<td>Caspase Activity#</td>
</tr>
<tr>
<td>MiaPaCa2</td>
<td>9 ± 1.9</td>
<td>–</td>
<td>14 ± 0.7</td>
<td>+</td>
</tr>
<tr>
<td>Panc-1</td>
<td>10 ± 2.1</td>
<td>–</td>
<td>9 ± 2</td>
<td>+</td>
</tr>
<tr>
<td>S2013</td>
<td>11.5 ± 5.1</td>
<td>–</td>
<td>10.46 ± 3.2</td>
<td>–</td>
</tr>
<tr>
<td>S2VP10</td>
<td>3 ± 1.9</td>
<td>–</td>
<td>4 ± 2.5</td>
<td>–</td>
</tr>
<tr>
<td>ASPC-1</td>
<td>9.64 ± 1.9</td>
<td>–</td>
<td>11.5 ± 1.3</td>
<td>–</td>
</tr>
</tbody>
</table>

n = 4.  
*p < .0001 compared to control or each drug alone.  
Date expressed as mean ± SEM # n = 3 Indicates caspase 3, 8 and 9 activity.

Effect of Anti-DR5 Ab and triptolide on S2VP10

| Triptolide | - | - | + | + |
| Anti-DR5 Ab | - | + | - | + |

PARP (cleaved)  
XIAP  
ACTIN  

Time: 24 hrs of exposure
Induced Expression of Interaction Molecule 1 (STIM1) Sensitizes Intestinal Epithelial Cells to Apoptosis by Modulating Store-Operated Ca2+ Influx

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1Surgery, University of Maryland, Baltimore, MD; 2VA Medical Center, Baltimore, MD

Apoptosis plays a critical role in the maintenance of gut mucosal epithelial homeostasis and is tightly regulated by numerous factors including intracellular Ca2+. Transient receptor potential canonical-1 (TRPC1) is expressed in intestinal epithelial cells (IECs) and functions as a store-operated Ca2+ channel. We have recently demonstrated that increased TRPC1 activity sensitizes IECs to apoptosis, but the upstream signaling initiating TRPC1 activation remains elusive. The novel protein, STIM1, is shown to act as a store Ca2+ sensor and it can rapidly translocate to the plasma membrane (PM) where it directly interacts with TRPC1. The current study determined whether STIM1 plays an important role in the regulation of IEC apoptosis by activating TRPC1 channel activity.

METHODS: Studies were conducted in IEC-6 cells (derived from rat intestinal crypts) and stable TRPC1-transfected IECs (IEC-TRPC1). Apoptosis was induced by tumor necrosis factor-α (TNFα)/cycloheximide (CHX), and intracellular free Ca2+ concentration ([Ca2+]c) was measured by fluorescence digital imaging analysis. Functions of STIM1 were investigated by specific siRNA (siSTIM1) and ectopic overexpression of the constitutively active STIM1 EF-hand mutants.

RESULTS: Stable STIM1-transfected IEC-6 cells (IEC-STIM1) highly expressed STIM1 protein (~5-folds) and displayed a sustained increase in Ca2+ influx after Ca2+ store depletion (~2-folds). Susceptibility of IEC-STIM1 cells to TNFα/CHX-induced apoptosis increased significantly as measured by changes in morphological features, DNA fragmentation, and caspase-3 activity. Apoptotic cells were increased from ~30% in parental IEC-6 cells to ~70% in stable IEC-STIM1 cells 4 h after exposure to TNFα/CHX. In addition, stable IEC-TRPC1 cells also exhibited an increased sensitivity to TNFα/CHX-induced apoptosis, which was prevented by STIM1 silencing through siSTIM1 transfection. STIM1 silencing by siSTIM1 also decreased Ca2+ influx after store depletion in cells overexpressing TRPC1. Levels of Ca2+ influx due to store depletion were decreased by ~70% in STIM1-silenced populations. Similarly, exposure of IEC-STIM1 cells to the Ca2+ free medium also blocked increased sensitivity to apoptosis.

CONCLUSIONS: These results indicate that 1) STIM1 plays an important role in the regulation of IEC apoptosis by altering TRPC1 activity and 2) ectopic STIM1 expression sensitizes IECs to apoptosis through induction in TRPC1-mediated Ca2+ influx.
Expression of Chemokine Receptor CCR9 in Pancreatic Intraepithelial Neoplasia and its Progression to Invasive Cancer and Liver Metastasis

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INTRODUCTION: Chemokine receptors may have a critical role in the metastasis and progression of invasive malignancies. There is little data, however, regarding chemokine receptors and premalignant lesions. Our objective was to determine the potential role of chemokine receptors in pancreatic intraepithelial neoplasia (PanIN), the precursor lesion to invasive pancreatic duct cancer.

METHODS: The PanIN cell line, established from the PDX-1-Cre;LSL-K-RASG12D mouse, was assessed by cDNA microarray analysis (Affymetrix Mouse Genome 430 2.0 array) for chemokine receptor expression. The invasive pancreatic duct cancer (5143PDA) and liver metastasis (5143LM) cell lines from the PDX-1-Cre; LSL-K-RASG12D/p53R172H mouse and human pancreatic cancer cell line PANC-1 were obtained to further investigate microarray results. Paraffin-embedded murine PanIN tissues and human PanIN and invasive pancreatic cancer specimens were obtained to verify chemokine receptor expression.

RESULTS: Microarray analysis of cultured PanIN cells revealed CCR9 to have the highest gene expression of any chemokine receptor. CCR9 protein expression was verified by Western blot assay in PanIN, 5143PDA, and 5143LM cells. The level of CCR9 protein expression was observed to increase from PanIN to invasive cancer to liver metastasis. Of note the human pancreatic cancer cells PANC-1 exhibited the highest level of CCR9 expression. Immunohistochemistry of paraffin-embedded murine and human PanIN lesions verified CCR9 protein expression showing heterogeneous and moderately intense immunoreactivity for CCR9 within the cytoplasm and cell surface of PanIN lesions. More intense, homogeneous immunoreactivity for CCR9 was observed in human pancreatic cancer lesions.

CONCLUSIONS: This is the first report of chemokine receptor CCR9 expression in murine and human PanIN tissues. Our results suggest a potential upregulation of CCR9 expression during PanIN progression. Further work may prove this chemokine receptor to be a novel target for PanIN and its progression to invasive cancer.

Anti-ERBB2 si- and sh-RNAs Suppress Cell Growth in ERBB2-Overexpressing Upper Gastrointestinal Adenocarcinomas

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Surgery, University of Minnesota, Minneapolis, MN

The incidence of gastrointestinal adenocarcinoma has increased six-fold since 1970. As shown previously, ERBB2 is overexpressed in 15–25% of tumors. In breast cancers with ERBB2 amplification, ERBB2-targeted therapies have improved overall survival and disease-free rates of survival. In this study, we use a transient siRNA model and a stable lentiviral shRNA model to demonstrate that knockdown of ERBB2 in esophageal and gastric cancer cell lines with known ERBB2 amplification effectively decreases ERBB2 protein levels and decreases cell viability mainly via apoptotic pathways.

METHODS: An esophageal adenocarcinoma cell line no ERBB2 amplification (Seg-1) and two adenocarcinoma lines with ERBB2 amplification (MKN45 and OE19) were treated with ERBB2 siRNA or control siRNA for 6 hours. Protein lysates were collected on Day 3 and ERBB2 protein levels were analyzed via western blots. Cell viability was measured by MTS assay while apoptosis and cell cycle analysis were assessed by flow cytometry on Day 3 with flow cytometry. Once knockdown was shown in siRNA model, lentiviral ERBB2 shRNA vectors were generated. Cell lines were treated with one of three separate lentiviral GFP-labeled ERBB2 shRNA vectors or a control shRNA vector for 6 hours. Protein lysates were collected on Day 6, and cell viability assay was performed from Day 3 to Day 8. Statistical analysis was performed by Student’s T-test.

RESULTS: siRNA transfection efficiency was measured at approximately 75%. ERBB2 protein levels decreased by 80% with siRNA treatment. While ERBB2 knockdown significantly decreased cell viability and increased apoptosis in lines with high ERBB2 levels, there was no difference seen in the cell line with baseline ERBB2 (Table). In all cell lines, there was minimal change seen in cell cycle. Stable transfection using lentiviral ERBB2-shRNA vectors decreased ERBB2 protein levels significantly and cell viability decreased by 60% on Day 6.

Table 1. Effect of shRNA ERBB2 Treatment on Cell Viability

<table>
<thead>
<tr>
<th>Control Lentiviral</th>
<th>Lentiviral ERBB2</th>
<th>Lentiviral ERBB2</th>
<th>Lentiviral ERBB2</th>
</tr>
</thead>
<tbody>
<tr>
<td>shRNA #1</td>
<td>shRNA #2</td>
<td>shRNA #3</td>
<td></td>
</tr>
<tr>
<td>Seg-1</td>
<td>99.20 ± 9.93</td>
<td>98.59 ± 2.47</td>
<td>98.76 ± 7.12</td>
</tr>
<tr>
<td>OE19</td>
<td>91.5 ± 5.57</td>
<td>29.09 ± 8.01**</td>
<td>31.010 ± 6.06**</td>
</tr>
<tr>
<td>MKN45</td>
<td>88.17 ± 13.76</td>
<td>52.83 ± 3.36**</td>
<td>45.19 ± 4.48**</td>
</tr>
</tbody>
</table>

n = 5
**p < 0.001 when compared to Control Lentiviral shRNA treatments.
Data expressed as Mean of % Cell viability ± SEM.

CONCLUSION: ERBB2 suppression based on siRNA transfection and shRNA lentiviral vector effectively decrease cell viability mainly via apoptosis in cell lines with amplification of ERBB2 as compared to cell lines without overexpression. ERBB2-directed therapy may be of benefit in the subset of patients with gastrointestinal adenocarcinomas exhibiting overamplification of ERBB2.
SELDI-TOF Mass Spectroscopy of Serum Predicts Hepatocellular Carcinoma in Patients Prior to Liver Transplantation

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Surgery, Indiana University School of Medicine, Indianapolis, IN; Surgery, Richard L. Roudebush VAMC, Indianapolis, IN; Medicine, Indiana University School of Medicine, Indianapolis, IN

Treatment options for Hepatocellular carcinoma (HCC) are limited. Surgical resection or transplantation are most effective, but patients are often not candidates due to late presentation. Alpha fetoprotein (AFP) has traditionally been employed as a serum screening test, but is only 60% sensitive and 80% specific. Other serum markers are needed to compliment AFP in the early detection of HCC.

METHODS: In this study serum was obtained preoperatively in patients undergoing orthotopic liver transplantation. Whole serum was spotted onto immobilized metal affinity chips (IMAC30 ProteinChip) bound with copper and allowed to incubate. A mass range of 1400–50000 Daltons was analyzed by SELDI-Time of Flight mass spectroscopy (SELDI-TOF). SELDI-TOF proteomic spectra were then correlated with ex-planted liver pathology. Initially, 58 serum samples with a known surgical pathologic diagnosis were analyzed as a “training set”. Researchers were then blinded to the presence or absence of HCC in a subsequent prospective “test set”. Statistical analysis was performed using Biomarker Pattern Software (Bio-Rad, Inc.).

RESULTS: A total of 88 serum samples were analyzed; 29 from patients with cancer and 59 from patients without cancer. These were further divided into a training set (19 cancer, 39 non-cancer) and a prospective test set (10 cancer, 20 non-cancer) for statistical analysis. The training set produced two decision trees which classified the cancer samples from the non-cancer samples. The first decision tree used two peaks as nodes to split the groups (mass/charge values of 2783 and 2896Da). Using these two values, decision tree analysis on the prospective test set resulted in five false positive and four false negative classifications (sensitivity 71%, specificity 80%). The second decision tree used five peaks as nodes to split the groups (mass/charge values of 1966, 2783, 2896, 2945, and 4082Da). Using these five values, decision tree analysis on the prospective test set resulted in two false positive and four false negative classifications (sensitivity 71%, specificity 91%).

CONCLUSIONS: SELDI-TOF mass spectroscopy of preoperative serum samples is able to distinguish patients with HCC vs. patients without HCC prior to orthotopic liver transplantation with greater sensitivity and specificity than reported for AFP. Our proteomic analysis of these patient serum samples indicated that the SELDI markers identified on the IMAC chips increased the accuracy of identifying the presence of HCC nearly 30% by a combination of reducing the number of false positives identified by ~10% and reducing the number of false negatives identified by nearly 20%.

Selective Management of Patients with Acute Gallstone Pancreatitis

Kimberly Bowman, Dana A. Telem, John Hwang, Celia M. Divino

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OBJECTIVE: To establish a diagnostic algorithm, magnetic resonance cholangiopancreatography (MRCP) vs. endoscopic retrograde cholangiopancreatography (ERCP), to evaluate for common bile duct (CBD) stones in patients presenting with acute gallstone pancreatitis (AGP).

METHODS: A retrospective review of 125 consecutive patients presenting with AGP from 2002–7 was performed. Significance was determined by unpaired t-test and multivariate analysis.

RESULTS: Of the 125 patients, 26 underwent MRCP. 5 patients had positive MRCP and required ERCP. 38 patients underwent ERCP, 20 (52.6%) had CBD stones. Comparison of AGP patients with and without CBD stones demonstrated increased CBD size on ultrasound (US) (10.7 ± 6 vs. 6 ± 3 mm), admission alkaline phosphatase (AP) (341 ± 249 vs. 161 ± 102 u/l), total bilirubin (TB) (5.32 ± 6.0 vs. 2.02 ± 3 mg/dl) and direct bilirubin (DB) (4.5 ± 6 vs. 1.2 ± 2 mg/dl) as significant predictors of CBD stone (p < 0.05). Patients were stratified into low, intermediate and high probability groups based on mean and standard deviation of the 4 predictive criteria. Sensitivity, specificity and positive predictive value (PPV) for CBD stone were then calculated. (Table1) Patients meeting clinical criteria for high probability group had a 100% PPV and specificity of CBD stone and should undergo initial ERCP. AGP patients with CBD stone are effectively captured by the clinical criteria comprising the intermediate group (90% sensitivity) but the low PPV (37.5%) indicates that the majority will not have CBD stones and therefore not require intervention. These patients should undergo initial MRCP. Patients meeting low probability criteria are unlikely to have a stone and may be evaluated by cholangiogram at time of cholecystectomy.
Patients presenting acutely were older (79 vs. 65 years, \( p < .001 \)) and had higher prevalence of at least one cardiopulmonary comorbidity (56\% vs. 20\%, \( p < .001 \)). They suffered significantly greater mortality (22\% vs. 1\%, \( p < .001 \); all due to sepsis), major (30\% vs. 3\%, \( p < .001 \)) and minor (43\% vs. 19\%, \( p < .05 \)) complications than those with elective repair. On univariate logistic regression, urgent admission was strongly associated with in-hospital death, major complications, admission to ICU, return to OR, and minor complications (Table). Postoperative length of stay was also greater following acute presentation (median 9 vs. 4 days, \( p < .0001 \)).

CONCLUSION: Patients who meet high probability criteria should undergo ERCP as they have 100\% PPV and specificity of CBD stone. Intermediate group patients have a 90\% sensitivity but low PPV (37.5\%) of CBD stone and should undergo MRCP. Low probability patients may be evaluated by cholangiogram at time of cholecystectomy. Application of this algorithm effectively screens for patients with CBD stones and stratifies them to appropriate initial testing; potentially decreasing the amount of unnecessary studies and interventions.

Should Elective Repair of Intrathoracic Stomach Be Encouraged?
Marek Polomsky*, Boris Sepesi, Matthew O’Connor, Alexi Matousek, Virginia R. Little, Daniel Raymond, Carolyn E. Jones, Thomas J. Watson, Jeffrey H. Peters
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BACKGROUND: Given our aging population, patients with an intrathoracic stomach are an increasing clinical problem. The benefits of elective repair, risks of watchful waiting and the morbidity of emergent presentation are debated. As such, the timing of repair remains controversial, and most reports do not delineate emergent vs. elective presentations. The aim of the study was to compare the mortality and morbidity of elective and acute repair.

METHODS: 127 patients undergoing repair of an intrathoracic stomach from 2000–2006 were retrospectively reviewed. Surgical repair was elective in 104 and urgent in 23 patients presenting with ischemia, obstruction or GI bleeding. The approach was laparoscopic in 75, open transabdominal in 39, and transthoracic in 13. The majority of patients presenting acutely (17/23) had open transabdominal repair, while majority of elective repairs were laparoscopic (69/104). A fundoplication was added in 120 cases. Mean follow-up was 9.1 months (range 1–86). Outcome measures included perioperative complications, postoperative morbidity and mortality. Complications were graded via the classification reported by Clavien into major (III, IV & V) and minor (I, II). Factors associated with acute presentation were assessed via logistic regression.

RESULTS: Patients presenting acutely were older (79 vs. 65 years, \( p < .001 \)) and had higher prevalence of at least one cardiopulmonary comorbidity (56\% vs. 20\%, \( p < .001 \)).

<table>
<thead>
<tr>
<th>Compilation</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>( p )-Value (Wald ( ^2 ))</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-hospital Death</td>
<td>28.61</td>
<td>(3.16, 259.41)</td>
<td>0.003</td>
</tr>
<tr>
<td>Postoperative Major</td>
<td>14.73</td>
<td>(3.45, 62.90)</td>
<td>0.001</td>
</tr>
<tr>
<td>ICU Admission</td>
<td>14.17</td>
<td>(2.55, 78.69)</td>
<td>0.003</td>
</tr>
<tr>
<td>Return to Operating Room</td>
<td>7.66</td>
<td>(1.20, 48.77)</td>
<td>0.031</td>
</tr>
<tr>
<td>Postoperative Minor</td>
<td>3.23</td>
<td>(1.24, 8.42)</td>
<td>0.016</td>
</tr>
<tr>
<td>Intraoperative Complication</td>
<td>1.94</td>
<td>(0.67, 5.67)</td>
<td>0.225</td>
</tr>
</tbody>
</table>

CONCLUSION: Urgent surgical repair of an intrathoracic stomach was associated with markedly higher mortality and morbidity than elective repair. Although patients undergoing urgent surgery were older and had more comorbidities than those having an elective procedure, these data suggest that elective repair should be considered in patients with suitable surgical risk.
local recurrence. The pattern of recurrence was similar between the two groups (intrahepatic: 21.4% vs. 35.7%, p = 0.24. extrahepatic: 21.4% vs. 17.9%, p = 0.74, respectively).

CONCLUSION: For well selected patients, LLR is a feasible procedure without compromising peri- and post operative outcomes including early oncological outcomes for malignancy.

631 Characteristics at Presentation and Oncologic Outcomes for IBD Patients with Colorectal Cancer
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INTRODUCTION: The aim of this study is to evaluate the associated patient and tumor related characteristics in patients undergoing surgery for cancer complicating inflammatory bowel disease (IBD) and to assess differences between patients with Crohn’s disease (CD) and ulcerative colitis (UC).

METHODS: Data of all IBD patients with colon and rectal cancer (CRC) undergoing surgery were evaluated from prospectively maintained CRC and IBD databases. Clinical presentation, tumor stage, presence of associated dysplasia and short and long term outcomes after surgery were investigated.

RESULTS: 240 IBD patients (64 CD and 176 UC) with CRC were identified. At time of CRC diagnosis, 66% UC and 26% CD patients had pancolitis. 90.5% (n = 199 out of 220) of the patients who underwent preoperative colonoscopy were noted to have suspicious lesions (mass: 68.2%, polyp: 15%, stricture: 3.2% and chronic fistula or ulcer: 3.2%). Colitis at endoscopy (n = 16) was indication for surgery in 7.3%. Colonoscopy was normal in 4 cases (1.8%). 91% patients had a preoperative pathological diagnosis of cancer or dysplasia. Synchronous dysplasia was seen in 45% vs. synchronous cancer in 14%. Tumor site was the rectum in 36.7%, right colon in 27.6%, sigmoid colon in 17.2%, transverse colon 9.9% and left colon in 8.6% of patients. 70% of patients were enrolled in a colonoscopic surveillance program. Cancer stage (p = 0.9) and long term cancer outcomes (p = 0.5) were comparable for patients who were or were not under colonoscopic surveillance. When comparing the long term outcomes for IBD patients with CRC to sporadic CRC patients, a comparable local recurrence rate and overall 5 year survival rate were documented (5.6% vs. 6.7%, p = 0.78 and 77% vs. 72%, p = 0.5, respectively). CD patients were diagnosed at more advanced cancer stage. Local cancer recurrence rate was similar for both (p = 0.7).

CONCLUSIONS: Diagnosis of CRC in IBD patients is associated with a new endoscopic finding in most patients. Long term cancer outcome is comparable to sporadic CRC.

632 Variation in Number of Lymph Nodes Assessed in Colorectal Cancer Resection: Surgeon, Pathologist, or Hospital?
Hari Nathan, Andrew D. Shore, Robert A. Anders, Susan L. Gearhart, Timothy M. Pawlik
1Department of Surgery, The Johns Hopkins University School of Medicine, Baltimore, MD; 2Department of Pathology, The Johns Hopkins University School of Medicine, Baltimore, MD

INTRODUCTION: American Society of Clinical Oncology/National Comprehensive Cancer Network quality guidelines recommend the examination of ≥12 lymph nodes (LN) following colorectal cancer (CRC) resection. Compliance with this 12-LN standard may be a function of patient, surgeon, pathologist, or hospital factors. We sought to identify factors associated with adherence to the 12-LN guideline to better inform targeting of quality improvement (QI) efforts.

METHODS: SEER-Medicare data (1998–2002) were used to identify patients with Medicare Part A and Part B coverage undergoing a first CRC resection. The treating surgeons, pathologists, and hospitals were also identified. Multilevel mixed-effects logistic regression was used to evaluate adherence to the 12-LN standard.

RESULTS: Study criteria identified 31,815 eligible patients with median age 76 years, of whom 54% were female. Most patients had colon tumors (80%). CRC surgery was performed by a general surgeon in most cases (79%), and less commonly by a colorectal surgeon (13%) or other specialist (8%). The majority of patients were treated at teaching hospitals (54%), and 23% were treated at ACOSOG-participating hospitals. A median of 10 LN were evaluated per patient, and only 41% of patients had ≥12 LN examined. In the multivariable model (Table), predictors of increased adherence to the 12-LN standard included...
colon vs. rectal primary, resection by a colorectal vs. general surgeon, treatment at a teaching or ACOSOG hospital, and hospital CRC resection volume. Notably, neither surgeon nor pathologist case volume was associated with 12-LN examination. Of the variation in guideline compliance that was not explained by the factors in the model or by other patient-related factors, 82% was hospital-related, 17% pathologist-related, and 1% surgeon-related.

**CONCLUSIONS:** Adherence to the 12-LN standard for CRC resection is poor. Non-compliance is largely attributable to differences among hospitals and pathologists rather than variation among surgeons. QI efforts should be targeted at underperforming hospitals.

**Table 1. Predictors of Adequate Lymph Node Assessment**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (per decade)</td>
<td>0.94</td>
<td>0.91–0.97</td>
<td>0.001</td>
</tr>
<tr>
<td>Female vs. male</td>
<td>1.19</td>
<td>1.13–1.25</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Year of operation (per year)</td>
<td>1.10</td>
<td>1.08–1.12</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Colon vs. rectum</td>
<td>1.60</td>
<td>1.50–1.71</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Colorectal vs. general surgeon</td>
<td>1.11</td>
<td>1.00–1.22</td>
<td>0.04</td>
</tr>
<tr>
<td>Teaching hospital</td>
<td>1.29</td>
<td>1.13–1.48</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ACOSOG hospital</td>
<td>1.48</td>
<td>1.22–1.80</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Surgeon case volume (per 10×↑)</td>
<td>1.07</td>
<td>0.99–1.17</td>
<td>0.09</td>
</tr>
<tr>
<td>Pathologist case volume (per 10×↑)</td>
<td>0.98</td>
<td>0.88–1.08</td>
<td>0.6</td>
</tr>
<tr>
<td>Hospital case volume (per 10×↑)</td>
<td>1.19</td>
<td>1.03–1.37</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**Table 1. Top Five Litigation Payouts**

<table>
<thead>
<tr>
<th>Cause(s)</th>
<th>Injury</th>
<th>Cost in GBP (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator error</td>
<td>Delay in recognising complication</td>
<td>1.3m (2.0 m)</td>
</tr>
<tr>
<td>Delay in recognising complication</td>
<td>CVA</td>
<td>960,000 (1.5 m)</td>
</tr>
<tr>
<td>Operator error</td>
<td>BDI</td>
<td>605,000 (925,000)</td>
</tr>
<tr>
<td>Operator error</td>
<td>Visceral Injury</td>
<td>510,000 (790,000)</td>
</tr>
<tr>
<td>Operator error</td>
<td>Delay in recognising complication</td>
<td>BDI</td>
</tr>
</tbody>
</table>

**CONCLUSION:** Operator error, leading primarily to BDI, was the most frequent injury resulting in litigation and the most likely injury associated with a successful claim (p < 0.001). Vascular and visceral injuries were involved in relatively few claims, but when involved, were associated with a high rate of success. Vascular injury resulted in the highest average payout of 124,000 GBP (190,000 USD) (Figure).

**Laparoscopic Cholecystectomy in the UK: A Decade of Litigation**

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**BACKGROUND:** Around 50,000 laparoscopic cholecystectomies (LC) are undertaken annually in the UK making it the most commonly performed elective intra-abdominal operation. In 2006/2007, litigation claims cost the NHS (National Health Service) over 600 million GBP (940 million USD). Despite surgical specialities accounting for the greatest number of claims over the last decade, no data has been published on litigation following LC in the UK. In this study, we looked at trends in litigation following LC over the last decade in an attempt to improve patient care.

**METHODS:** Data from the NHS Litigation Authority on claims following LC between 1995–2007 were obtained and analysed.

**RESULTS:** 379 claims were made of which 299 had been settled. 198 (66%) were successful resulting in a total cost of 20.4 million GBP (32 million USD) to the NHS. Operator error was the most likely cause to result in a claim and the only cause associated with a successful claim (p = 0.041). Bile duct injury (BDI) was the most frequent injury resulting in litigation and the most likely injury associated with a successful claim (p < 0.001). Vascular and visceral injuries were involved in relatively few claims, but when involved, were associated with a high rate of success. Vascular injury resulted in the highest average payout of 124,000 GBP (190,000 USD) (Figure).

**Conclusion:** Operator error, leading primarily to BDI, was the commonest cause of litigation and the only injury that predicted a successful claim. Approaches that can minimise bile duct injury should be adopted to minimise the litigation burden and improve patient care.

**634 Angiotensin II Regulates the Expression of Monocyte Chemoattractant Protein-1 in Pancreatic Cancer Cells**

Navdeep Chehl, Galina Chipitsyna, Qiaoke Gong, Charles J. Yeo, Hwyda A. Arafat*

*Surgery, Thomas Jefferson University, Philadelphia, PA*

**BACKGROUND:** Although acute inflammation is a critical protective response against injury and infection, persistent inflammation and the resulting oxidative stress drive the pathogenesis of numerous chronic degenerative diseases, including carcinogenesis. In human pancreatic ductal adenocarcinoma (PDA) and in animal models that recapitulate the disease progression, an intense fibroinflammatory reaction composed of stromal and immune cells accompanies the progression from normal histology to PDA. Angiotensin II
(AngII), the principal hormone of the renin angiotensin system, is actively generated in the pancreas and has been proposed as a key mediator of inflammation. Monocyte chemoattractant protein-1 (MCP)-1 is a chemokine that plays an important role in the recruitment of mononuclear cells into sites of inflammation.

**OBJECTIVE:** To investigate the potential proinflammatory role of AngII in PDA through studying its effect on MCP-1.

**METHODS:** PDA cells (AsPC-1, HS766T, MiaPaca) were cultured and treated with or without Ang II (10^{-8}–10^{-6} mol/L), in the presence or absence of AngII type 1 receptor blocker, losartan, or AngII type 2 receptor blocker, PD123319. MCP-1 mRNA was analyzed by real-time PCR and its protein by ELISA. Luciferase-labeled promoter studies evaluated the effect of AngII on the transcription of MCP-1 and nuclear factor-B (NF-B). The effect of receptor blockers on the endogenous and AngII-induced activation and nuclear translocation of NF-kB was examined by luminescence assay and immunohistochemistry.

**RESULTS:** AngII significantly increased the expression of MCP-1 mRNA and protein in PDA cells, and induced its promoter activity. Constitutive and AngII-induced MCP-1 mRNA and promoter activity were significantly reduced in the presence of losartan but were unchanged by PD123319. AngII induced the activation and nuclear translocation of NF-kB, an effect that was inhibited by losartan, but not PD 1233319. Blocking NF-kB activation by pyrrolidine dithiocarbamate decreased the AngII-mediated increase in MCP-1 mRNA.

**CONCLUSIONS:** Our data provide a novel insight into an AngII-initiated signal transduction pathway that regulates MCP-1 as a possible inflammatory mechanism in PDA, and suggest that AngII blockade may regulate chemokine-induced signal transduction to prevent or reduce inflammation in PDA.

### 635

**Acute Pancreatitis (AP) in Aging Animals—Loss of PAP Protection?**

Sophia Fu*, Albert Stanek, Ehab Hassanain, Okiremute Oyiborhoro, Cathy M. Mueller, Nefertiti A. Brown, Chongmin Huan, Michael E. Zenilman

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**INTRODUCTION:** In the pancreas, aging has been associated with reduced regeneration after resection, and reduced survival after AP. In this study, we investigated the effect of age on severity of AP using biochemical markers, histology and expression of the protective pancreatitis associated proteins (PAPs).

**METHODS:** AP was induced via intraductal injection of 4% sodium taurocholate in 3, 12 and 18 month old rats. Animals were stratified to normal, sham and AP groups. Sera and pancreata were assayed at 24 hr; statistical significance defined as (*P < 0.05). Data is presented as young vs. old AP, Mean ± SD, 4–8 animals per group.

**RESULTS:** Compared to young rats, histopathologic scores in older animals after AP had less inflammation (arbitrary scores 7.7 ± 1.3 vs. 5.8 ± 1.3*) but unchanged necrosis. While amylase and lipase were mildly depressed in aging, edema significantly decreased and CRP sig increased in the very old group when compared to young (1.52 ± 0.26 vs. 1.24 ± 0.07 U/L* and 0.24 ± 0.13 vs. 2.4 ± 1.2 mg/dL*, respectively). No differences were seen in tissue myeloperoxidase or monocyte-chemotactic-protein 1. Older normal rats expressed less pancreatic reg I and PAP 1 mRNAs, and in PAP 1 protein levels were depressed as well when compared to young (10 ± 4 vs. 4.7 ± 2.8 × 10^{13} OD, FIGURE); no changes were seen in reg I, PAP2 or 3. Regarding potential antimicrobial activity of PAPs, in AP there was an increase in pancreatic bacteria as measured by PCR of 16S bacterial DNA from the pancreatic tissue.

**CONCLUSIONS:** In the older pancreas, Reg I and PAP 1 levels are depressed. After AP, inflammatory infiltrates and biochemical markers are depressed, along with a blunted PAP1 protein response. Older animals have more bacterial infiltration, and more CRP. Since PAPs activate macrophages and bind bacteria, the loss of this protective effect could explain the increased complication rates noted in elderly patients after AP.

### 636

**Role of Vagal Innervation in Diurnal Rhythm of Intestinal Peptide Transporter 1 (PEPT1)**

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**BACKGROUND:** Protein absorption occurs mostly in the form of di- and tri-peptides transported exclusively by the intestinal H^{+}/peptide cotransporter 1 (PEPT1). We demonstrated a diurnal variation in expression and function of duodenal and jejunal but not ileal PEPT1 in rat small intestine (unpublished data). Various factors (diet, hormones) appear to regulate this rhythm; the role of CNS neural regulation is unexplored.
AIM: To define the role of vagal innervation in control of gene expression, function, and diurnal rhythm of rat intestinal PEPT1.

HYPOTHESIS: Complete abdominal vagotomy abolishes diurnal variations in gene expression and transport function of PEPT1 in rat small intestine.

METHODS: 24 Lewis rats underwent total abdominal vagotomy; 24 served as normal controls. Rats were kept in a 12-h light/dark room [lights 6 AM to 6 PM] with free access to chow and water; their feeding pattern was monitored. Rats were sacrificed 4 wks later, and duodenal, jejunal, and ileal segments were harvested at 9 AM, 3 PM, 9 PM, and 3 AM (n = 6 rats at each time point). mRNA and protein levels (expressed relative to the housekeeping gene GAPDH) were determined by real time RT-PCR and Western blots, respectively, and transporter-mediated uptake of di-peptide (Gly-Sar) was measured by everted sleeve technique. Histomorphology was quantitated.

RESULTS: Diurnal variation in expression of mRNA for PEPT1, as in controls, was retained in duodenum and jejunum after vagotomy (peak at 3 PM, p < 0.05) but not in ileum; however, diurnal variation in expressions of protein and Gly-Sar uptake was abolished throughout the small intestine of vagotomized rats (p > 0.3). As in controls, uptake was greater in jejunum compared to duodenum and ileum at all time points after vagotomy (V_m, in nmol/cm/min: jejunum vs. duodenum and ileum; 163 vs. 88 and 71 at 3 AM; p < 0.04); K_m remained unchanged. There was no difference in protein expression between anatomic segments. Nocturnal feeding of rats resumed at 2nd wk post-op (>70% of food intake occurred during dark cycle). Villous height remained unchanged after vagotomy.

SUMMARY: After vagotomy, PEPT1 retained a diurnal pattern of mRNA expression in duodenum and jejunum but not in ileum, similar to controls. Diurnal variation in protein levels and transport function of PEPT1 was abolished in all three intestinal segments after vagotomy. Maximal uptake was in jejunum.

CONCLUSIONS: Vagal innervation does not mediate diurnal rhythm of mRNA expression of PEPT1, but does appear to mediate in part diurnal variation in protein expression and transport function of PEPT1, possibly via posttranscriptional/ posttranslational processing. (Support: DK39937 MGS).

637

EP300—A miRNA Regulated Metastasis Suppressor Gene in Ductal Adenocarcinomas of the Pancreas
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BACKGROUND: The ductal adenocarcinomas of the pancreas belongs to the most aggressive malignancies with an overall 5-year survival rate of less than 5%. Characteristics of this particular tumor entity are the early local invasion and the development of distant metastases. Genetic and epigenetic alterations during development and progression of pancreatic ductal adenocarcinomas (PDAC) are well known. Orthotopic models were used to correlate genetic and epigenetic data with tumor biology to find specific alterations responsible for metastasis formation.

METHODS: 16 human PDAC cell lines of varying invasive and metastatic potential and different origin were used in murine orthotopic PDAC models. Using standardized dissemination scores, local infiltration and metastatic spread were assessed. RNA and microRNA expression was studied in Microarrays and Taqman Low Density Array. Quantitative RT-PCR and western blots were used for expression validation.

RESULTS: According to metastatic potential cell lines were classified into 3 hierarchical groups. In highly-metastatic PDAC, a significant induction of EP300 encoding miR-194 (fold change: 49.34), miR-200b (fold change: 28.36), miR-200c (fold change: 17.39), miR-429 (fold change: 15.23) (p < 0.05) and corresponding, a decreased expression of EP300 mRNA (p < 0.0001) and protein (p < 0.05) for highly-metastatic PDAC with liver metastases were detected compared to non- or marginal metastatic cell lines. These alterations did not correlate with local tumor growth.

CONCLUSION: In PDAC, epigenetic alterations with upregulated EP300 encoding miR-194, miR-200b, miR-200c and miR-429 are related to downregulated EP300 mRNA and protein. These results demonstrate that microRNAs are able to modulate the expression of metastasis specific suppressor genes. In addition, these data suggest diagnostic and therapeutic opportunities for EP300 and its encoding miRNAs in PDAC.

638

The Rate of Post Operative Infections Is Not Reduced by Peroperative Antibiotics in Elective Cholecystectomy: An Analysis of 10927 Operations Registered in the Swedish Register for Gallstone Surgery and ERCP (GallRiks)
Gunnar Persson¹, Patrik Lundstrom³, Johanna Osterberg³, Bodil Svennblad², Gabriel Sandblom⁴
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BACKGROUND: Patients operated on for gallstone disease often receive prophylactic antibiotics especially in acute operations but frequently also in elective surgery even though evidence for the effectiveness of such treatment is lacking. In this study we present data on the use of prophylactic antibiotics and postoperative infections from a national, web based register of gallstone surgery.

METHODS: The Swedish Register for Gallstone Surgery and ERCP (GallRiks) started in May 2005 and soon reached a national coverage with 75% of all procedures being entered in 2007. It comprises open and laparoscopic surgery of the gallbladder as well as all endoscopic interventions of
the bile ducts. GallRiks is an internet application with online registration of procedures and follow up as well as electronic reports on demand. A program for validation of data has started and the results from the first 6 hospitals revised indicate a match between the medical records and the database in 98.6% of the cases. During 2006 and 2007 a total of 16400 operations were registered in GallRiks. Patients from hospitals who had registered less than 25 patients were excluded from this study as were patients who had either a major surgery along with the cholecystectomy or only had a choledochotomy (previous cholecystectomy). Incomplete records and cases with a missing 30-day follow up were also excluded. Altogether 747 patients (4.6%) were excluded for these reasons. In another 4726 patients (30%) the surgery was performed acute. Thus, this is a study of 10927 patients who had an elective cholecystectomy performed in 54 Swedish hospitals during the years 2006 and 2007.

RESULTS: The 54 hospitals used prophylactic antibiotics at very different rates, from 0% to 98% of the operations, which by far exceeds any random variation. A postoperative abscess was found in 93 (.9%) and in 377 patients (3.5%) some kind of septic complication occurred requiring antibiotic treatment. In a multiple logistic regression analysis, adjusting for age, sex, indications for surgery, surgical methods and operative difficulties peroperative antibiotics had no beneficial effect on the risk of postoperative septic complications.

CONCLUSION: There is a huge variation in the use of prophylactic antibiotics in elective cholecystectomy between different hospitals in Sweden reflecting the lack of uniform guidelines. The rate of septic complications from this operation is low and is furthermore unaffected by prophylactic antibiotics.

10:00 AM – 11:15 AM
S503

VIDEO SESSION III:
NOTES APPENDECTOMY—READY, SET... GO?

639
NOTES Transvaginal Appendectomy
Santiago Horgan, Lauren J. Fischer, Kari Thompson, Adam Spivack, Garth R. Jacobsen, Brian Wong, Mark A. Talamini
University of California- San Diego, San Diego, CA

Natural orifice translumenal endoscopic surgery (NOTES) appendectomy is an emerging technique for acute appendicitis. Under IRB protocol, a 21-year-old female is explored through a 5 mm umbilical port. A dual lumen 15 mm transvaginal trocar is placed under direct vision. With cephalad retraction, the mesoappendix is taken with the harmonic scalpel. The appendix is transected with a stapler and removed in a bag through the vaginal port. The colpotomy is closed with absorbable suture. The abdominal incision and colpotomy were well healed one month later. A hybrid laparoscopic-assisted NOTES transvaginal appendectomy is a safe procedure for use in the treatment of acute appendicitis.

640
Transrectal Endoscopic Appendectomy in a Cadaveric Model
Sonia Ramamoorthy, Adam Spivack, Kari Thompson, Lauren J. Fischer, Brian Wong, Mark A. Talamini
UCSD General Surgery, San Diego, CA

Abdominal access was gained with a 5 mm port. A rectotomy was made in the posterior rectum 3 cm above the dentate line. The retrorectal space was dissected using a dilating balloon to open the retrorectal space while visualized through the laparoscope. The flexible endoscope was introduced through dissected space and into the peritoneal cavity under direct vision. The appendix was ligated and transected using endoscopic tools. The appendix was extracted through the rectotomy. The rectotomy was closed under direct vision using interrupted absorbable suture. Tranrectal endoscopic appendectomy is a feasible operation using current instrumentation.

641
Transrectal Simulated Appendectomy in a Porcine Model with Novel Balloon Dilation in Retroperitoneum
Sonia Ramamoorthy, Garth R. Jacobsen, Kari Thompson, Adam Spivack, Lauren J. Fischer, Brian Wong, Mark A. Talamini, Santiago Horgan
Surgery, University of California San Diego, San Diego, CA

Here we present a novel NOTES approach for a transrectal simulated appendectomy in a porcine model. To safely enter the mesorectal space, and eventually the retroperitoneum, we have used endoscopic balloon dilation. This dilation was enhanced using an Apollo endosurgery (Austin, TX) tangentially dilating endoscopic balloon. The retroperitoneum was easily accessed and safely dilated using this balloon. This access allowed the tissue to slowly be displaced in the direction of dissection and created an adequate space for the endoscope to be passed. This novel balloon has simplified and is an important tool for transrectal access in NOTES procedures.
642
Laparo-Endoscopic Single Site (LESS) Appendectomy with the Endoscope
Kevin M. McGill*, Nikalesh Ippagunta, Glenn Forrester, Julio Teixeira, Steven Benenbaum
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OBJECTIVE: To demonstrate with video presentation a laparo-endoscopic single site appendectomy with the flexible endoscope. Video: This video demonstrates an appendectomy performed through a single incision using a flexible endoscope. Dissection is completed using instruments through a two channel gastroscope. Dissection techniques include division of the mesoappendix using tissue graspers with cautery through the endoscope, and ligation of the appendix with endo-loops. The appendix is then divided with a needle knife through the endoscope and removed using an endocatch bag.

643
Rigid and Flexible Trocars for NOTES Access in Human Anatomy
Monika E. Hagen1, Oliver J. Wagner1, Philippe Morel2, Santiago Horgan1, Mark A. Talamini1, Paul Swain1
1Department of Surgery, University of California San Diego, San Diego, CA; 2Division of Digestive Surgery, University Hospital Geneva, Geneva, Switzerland
INTRODUCTION: Trocars are successfully used during conventional laparoscopy and might also be suitable for NOTES. We hypothesized that trocars can be used during NOTES for rapid and safe access through several natural orifices.
MATERIALS AND METHODS: A video about trocars for NOTES access in human anatomy was produced.
RESULTS: The video shows the application of different rigid and flexible trocars for NOTES in human cadavers transgastrically, transrectally and transvaginally.
CONCLUSIONS: Tocars appear very valuable as they may be used through almost any natural orifice in different way. Still, adjustments to standard laparoscopic trocars would make them more suitable for NOTES.

2:15 PM – 3:45 PM
S505a
PLENARY SESSION V

804
Does Neoadjuvant Chemotherapy with FOLFOX- or FOLFIRI Improve the Disease-Free Interval or Survival of Patients with Colorectal Metastases?
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Division of General Surgery, Mayo Clinic – Rochester, Rochester, MN
INTRODUCTION: Adjuvant therapy with FOLFOX/FOLFIRI has improved resectability and consequently survival for selected patients with colorectal metastases (CRM) to the liver. The objective of this study was to determine if neoadjuvant FOLFOX/FOLFIRI was associated with increased disease-free survival (DFS) or improved overall survival (OS) in patients with CRM to the liver.
METHODS: All patients who underwent hepatic resection for metastatic colorectal disease during the period of 1/1/2000 to 6/31/2005 at Mayo Clinic, Rochester, MN, were reviewed (n = 307). Eligible patients were divided into two groups: Group 1 (n = 44) consisted of patients who received neoadjuvant FOLFOX/FOLFIRI, and Group 2 (n = 55) did not receive neoadjuvant therapy. Exclusion criteria included history of hepatic arterial infusion (n = 66) or other chemotherapeutic agents (n = 45), documented presence of extra-hepatic metastases (n = 50), upper abdominal/intraoperative radiation (n = 22) history of hepatitis/cirrhosis (n = 1), concomitant cancers (n = 1) or a mix of the above (n = 23). Kaplan-Meier Survival was used to estimate OS and DFS. Cox proportional hazards models were used to examine the association between treatment group and overall and disease-free survival. Data were adjusted for age and gender. Statistical significance was set at P < .05.
RESULTS: The cohort consisted of 58 men and 41 women. The median age was 63 years (33–90 years). The median age of patients receiving neoadjuvant chemotherapy was 58 while the median age of patients not receiving neoadjuvant therapy was 64 (p = 0.03). Surgical management predominantly consisted of right hepatectomy (49%) and non-anatomic resections (40%). Patient survival for Group 1 at one, three, and five years was 93%, 62%, and 48%, respectively, with a median survival of 4.5 years. In Group 2 survival at one, three, and five years was 90%, 63%, and 45%, respectively, with a median survival of 3.7 years. There was not a significant association of treatment group with overall survival, Group 1 vs. Group 2 (HR 0.94, p = 0.85). The DFS for Group 1 at 1, 3, and 5 years was 52%, 14%, and 14%, with a median DFS of 1.0 year, and the DFS for Group 2 at 1, 3, and 5 years was 52%, 24%, and 21% with a median DFS of 1.0 year. Neoadjuvant therapy is not significantly associated with improved DFS (HR = 1.14, p = 0.58).
CONCLUSIONS: Neoadjuvant FOLFOX/FOLFIRI was employed more frequently in younger than older patients with CRM likely to increase resectability. However, neoadjuvant chemotherapy for CRM was not significantly associated with an increase in OS or DFS, and was applicable in a minority of the patients seen in our referral practice.

805
Pre-Operative Nomogram to Predict Risk of Peri-Operative Mortality Following Pancreatic Resections for Malignancy
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INTRODUCTION: The majority of pancreatic resections for malignancy are performed in older patients with major co-morbidities. The aim of this study was to develop a pre-operative nomogram based on the presence of co-morbidities to predict risk of peri-operative mortality.

MATERIALS AND METHODS: The National Inpatient Sample (NIS) database was queried (2000–2005) to identify adult patients that underwent resection for pancreatic malignancy. The pre-operative co-morbidities, identified as predictors were used and a nomogram was created with multivariate logistic regression using the Taylor expansion method in SAS callable SUDAAN 10.0. (Figure:1) Patient Sample A (2000–2004) was utilized to develop the model and patient Sample B (2005) was utilized to validate this model.

RESULTS: A total of 4482 and 999 patients were included in Samples A and B. The overall peri-operative mortality rate for Samples A and B was 6.3% and 5.2% respectively. The mean total points calculated for Sample A by the nomogram was 131.7 (SE = 1.54, range: 7.7 to 339.8) which translates to a nomogram-predicted mortality rate of 4.9%, which is similar to the actual mortality. The mean total points for Sample B was 128.1 (SE = 1.62, range: 7.7 to 367.9) which translates to a nomogram-predicted mortality rate of 4.6%. The similarity of mortality rates of Samples A and B as predicted by the nomogram and a concordance index of 0.76 shows good agreement between the data and the nomogram.

CONCLUSION: This nomogram consisting of pre-operative co-morbidities has been shown to accurately predict the risk of peri-operative mortality. The nomogram can be used for risk assessment and counseling in the pre-operative setting for patients with pancreatic cancer considering surgical intervention.

Pre-operative nomogram to predict risk of peri-operative mortality following pancreatic resections for malignancy

806
Characteristics and Outcome of Patients Undergoing Debridement of Pancreatic Necrosis
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BACKGROUND: Acute pancreatitis with necrosis associated with high rates of morbidity and mortality, especially in those undergoing operative debridement. The Atlanta Classification developed in 1992, was recently revised in 2007, to better categorize acute pancreatitis improved imaging techniques. Aims: To utilize the 2007 revision of the Atlanta Classification to assess outcomes, morbidity and mortality in patients undergoing debridement of pancreatic necrosis.

METHODS: From 1999–2008, patients with pancreatic necrosis who were treated with surgical debridement were included in the analysis. Computed tomography (CT) images were independently reviewed to classify of pancreatic collections according to the revised Atlanta classification.

RESULTS: Seventy-three patients (54 males, 74%) with fluid collections were categorized as follows: infected walled off extrapancreatic necrosis (38%), sterile walled off extrapancreatic necrosis (26%), infected walled off pancreatic necrosis (16%), sterile walled off pancreatic necrosis (13%) and post-necrotic pancreatic collection (7%). Forty-one (56%) patients underwent endoscopic drainage prior to surgical consultation, 21 (52%) of which had infected necrosis at the time of operation (p = 0.012). In-hospital mortality was 14% (range 5–107 days). Those undergoing open debridement with external drainage (21, 24%) and open packing (5, 40%) had a significantly higher mortality than those undergoing cystgastrostomy with pancreatic debridement (46, 6.7%) (p = 0.03). Type of collection was not associated with operative procedure or mortality rate. Preoperative albumin levels <1.5 mg/dl (p < 0.01), fungal (p < 0.05) and bacterial (p < 0.05) infections were associated with longer length of stay. Thirty-one (35%) patients experiencing post-operative complications had a significantly longer hospital stay (mean 36 days vs. 11 days, p < 0.01).

CONCLUSION: With today’s referral pattern at high volume centers, a high percentage of patients undergo endoscopic drainage prior to surgery. Cystgastrostomy and pancreatic debridement is associated with lower mortality rates than
external drainage or open packing procedures. Collection type according to the revised Atlanta Classification was not associated with type of debridement morbidity rates. Length of stay was increased in patients with poor nutrition, infected necrosis and in those experiencing complications. Acute necrotizing pancreatitis continues to be associated with significant in-hospital morbidity and mortality rates, and should undergo aggressive treatment at tertiary care centers.

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Repeat Curative Intent Liver Surgery Is Safe and Effective for Recurrent Colorectal Liver Metastases: Results from an International Multi-Institutional Analysis

Mechteld C. de Jong1, Carlo Pulitano2, Alessandro Ferrero3, Jennifer Strub4, Michael A. Choti1, Richard D. Schulick1, Gilles Menth3, Lorenzo Capussotti3, Timothy M. Pawlik1

1Department of Surgery, The Johns Hopkins University School of Medicine, Baltimore, MD; 2Vita-Salute San Raffaele University, Milan, Italy; 3Unit of Hepato-Biliary-Pancreatic Surgery, A.O. Ordine Mauriziano, Torino, Italy; 4University Hospitals of Geneva, Geneva, Switzerland

INTRODUCTION: Although 5-yr survival approaches 55% following resection of colorectal liver metastases (CRLM), most patients (pts) develop recurrent disease that is often isolated to the liver. Although repeat curative intent surgery (CIS) is increasingly performed for recurrent CRLM, only small series have been reported. We sought to determine safety and efficacy of repeat CIS for recurrent CRLM, as well as determine factors predictive of survival in a large multi-center cohort of pts.

METHODS: Between 1985–2008, 1512 pts who underwent CIS-defined as curative intent hepatic resection/radiofrequency ablation (RFA)-for CRLM were identified from an international multi-institutional database. 209 (14%) pts underwent 251 repeat CIS. Data on clinicopathologic factors, mortality, morbidity, mortality were collected and analyzed.

RESULTS: Following initial CIS, 594 (64%) pts recurred within the liver. Of these, 209 pts underwent repeat CIS for recurrent disease. The majority had hepatic resection alone as initial therapy (n = 188; 90%). A subset of pts underwent 3rd (n = 35) or 4th (n = 7) repeat CIS. Mean interval between surgeries was similar (1st → 2nd: 20 mon; 2nd → 3rd: 22 mon; 3rd → 4th: 12 mon; P = 0.20). Tumor characteristics changed with each subsequent CIS (Table). Extent of hepatic resection decreased with subsequent CIS (≥hemi-hepatectomy: 1st CIS: 70% vs. 2nd CIS: 37% vs. 3rd/4th CIS: 19%; P < 0.05). RFA was utilized in roughly 1/4 of pts undergoing repeat CIS (2nd CIS: 22% vs. 3rd/4th CIS: 23%). Mortality and morbidity were similar following 2nd, 3rd, 4th CIS, respectively (all P > 0.05) (Table). 5-yr survival was 36%, 40%, and 44% following 2nd, 3rd, 4th CIS, respectively (P > 0.05). Factors predictive of survival included tumor size (HR = 1.8; P = 0.04), tumor number (HR = 4.5; P = 0.03) and presence of extrahepatic disease (HR = 3.1; P = 0.008).

CONCLUSION: Repeat CIS for recurrent CRLM can be performed with low morbidity and near zero mortality. Pts with low tumor burden and no extrahepatic disease are best candidates for repeat CIS. In these pts, repeat CIS can provide long-term survival rates similar to those of 1st CIS.

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Readmission After Pancreatectomy for Pancreatic Cancer in Medicare Patients

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OBJECTIVE: To use a population-based dataset to evaluate length of stay and the number of and reasons for readmission in Medicare patients undergoing pancreatectomy.

METHODS: We used SEER-Medicare linked data to evaluate the initial hospitalization, readmission rates within 30 days of and up to one year after initial discharge, and reasons for readmission in patients 66 years and older undergoing pancreatectomy. After excluding deaths during the initial hospitalization, patients requiring readmission within 30 days were compared to those who did not.

RESULTS: 1,730 Medicare patients underwent pancreatectomy for pancreatic cancer between 1992 and 2003. There were 130 in-hospital deaths (7.5%). Of the 1,600 patients who survived until discharge, 784 patients were readmitted a total of 1,766 times within one year of discharge. The length of stay and readmission rates remained constant over the time period. Within 30 days of discharge, 248 patients (15.5%) were readmitted a total of 320 times. Early readmissions were primarily related to postoperative complications. The most common reasons for readmission were abscess/sepsis in 20%, delayed gastric emptying in 15%, chemotherapy/recurrence related in 10%, dehydration in 9%, pancreatic fistula/bile leak in 8%, cardiovascular complications in 5%, hemorrhage/GI bleed in 3%, and wound infection in 2%. 10% of readmissions were unrelated to surgery. Readmissions after 30 days were increasingly related to progression of disease. Patient age, gender, race, comorbidities and tumor stage did not predict early
readmission within 30 days. The 30-day mortality rate was 15.6% in patients requiring readmission and 14.9% in patients who did not (P = 0.75). However, patients readmitted within 30 days of discharge had worse long-term survival (median = 11.8 months, 5-year survival 18%) than patients not requiring readmission (median = 16.5 months, 5-year survival 18%, P = 0.04). Readmission within one year was associated with a much worse median survival (21.6 months vs. 12.1 months, P < 0.0001) related primarily to progression of disease requiring readmission.

CONCLUSIONS: Our study demonstrates a one year readmission rate of 49% and a 30-day readmission rate of 15% after pancreatectomy. Previous studies do not report 30-day readmission rates, which are most important as these rates reflect surgical complications. These data demonstrate that readmitted patients are not more likely to die within 30 days. However, their survival is decreased in the initial year following surgery. This is likely attributed to the surgical complications which required readmission.

809
Does Size Really Matter in the Resection of Primary Cystic Neoplasms of the Pancreas?
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INTRODUCTION: Proposed criteria for resection of pancreatic cystic lesions have included symptoms, size (>3 cm), and suspicious features by endoscopic ultrasound (EUS). The objective of this study was to evaluate risk factors for malignancy in a large series of patients undergoing resection of suspected pancreatic cystic neoplasms.

METHODS: Medical records of patients selected for resection of pancreatic cystic lesions at DUMC from 2000 to 2008 were reviewed. Lesions with solid components on cross-sectional imaging were excluded. Malignancy was defined as invasive or in situ carcinoma.

RESULTS: After review, 101 patients were confirmed to have undergone resection for suspected cystic neoplasms of the pancreas. Preop EUS was performed in 71 patients. Sixteen patients had malignant lesions (preop size 1.5–5.9 cm).

There was no clear association between size and malignancy (Figure 1). Male gender, biliary ductal dilatation (BDD), pancreatic ductal dilatation (PDD), and suspicious cytology (but not age, symptoms, or size) were associated with increased risk of malignancy (Table 1). When factors available for all patients were incorporated into a multivariate model, only BDD and PDD were independent risk factors for malignancy. Only one patient with malignancy had neither BDD nor PDD but did have solid components by EUS.

### Table 1. Malignancy Rate

<table>
<thead>
<tr>
<th>Factor</th>
<th>Yes</th>
<th>No</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (Male)</td>
<td>(n = 34)</td>
<td>26%</td>
<td>(n = 67)</td>
</tr>
<tr>
<td>Bile Duct Dilatation</td>
<td>(n = 8)</td>
<td>62%</td>
<td>(n = 93)</td>
</tr>
<tr>
<td>Pancreatic Duct Dilatation</td>
<td>(n = 28)</td>
<td>32%</td>
<td>(n = 66)</td>
</tr>
<tr>
<td>Suspicious cytology</td>
<td>(n = 11)</td>
<td>46%</td>
<td>(n = 60)</td>
</tr>
</tbody>
</table>

CONCLUSIONS: In patients selected for resection, size was not an independent risk factor for malignancy. While size might be appropriate for stratification of asymptomatic patients with simple cysts, size should not be used as a selection criterion for patients who have cysts with solid components or with associated BDD or PDD.
INTRODUCTION: Neoadjuvant chemoradiation (NCR) has become the preferred approach for locally advanced rectal cancer (RC). We have evaluated the use of oral topotecan as a radiosensitizing agent in this setting. In this study, by the use of gene expression profiling (GEP), we sought to assess molecular patterns associated with pathologic response to NCR.

METHODS: A phase I study design was used to determine the maximum tolerated dose of oral topotecan in combination with radiation in the neoadjuvant treatment of RC. Topotecan was administered orally for 25 doses with a starting dose of 0.25 mg/m2 (max 1.15 mg/m2) in combination with radiation in the neoadjuvant treatment of RC. Distinct molecular patterns were detectable in pretreatment biopsies that were associated with subsequent pathologic response. As a novel approach, we have also identified specific molecular changes that occur during treatment that may be predictive of a pCR. Our findings encourage further investigation of predictive genetic signatures as well as of biologic mechanisms associated with NCR treatment response.

RESULTS: From 2001 to 2007, 26 patients (Stage II n = 18, III n = 8) participated in the study. The pathologic complete response (pCR) and non-response rate (NR, stable or progressive disease) were 19% (n = 5) and 39% (n = 10), respectively. A partial pathologic response was observed in 42% of patients (n = 11). Comparing pre-treatment GEP between pCR and NR patients revealed 30 upregulated and 37 downregulated genes (p < 0.001). Gene ontology analysis revealed 7 significantly enriched pathways. Of these, 6 were involved in nucleotide or lipid metabolism (e.g. CTP/UTP metabolism, p < 0.001; plasmalogen metabolism, p < 0.001) and 1 in apoptosis and survival (anti-apoptotic TNFs/NF-kB/IAP pathway, p = 0.07). In an attempt to identify mid-treatment markers of subsequent response, we examined gene expression ratios from pre- and intra-treatment tissues. A total of 18 genes demonstrated differential upregulation in pCR cases and included genes associated with angiogenesis, apoptosis and transcriptional regulation (e.g. ANGPT1, NR1D1, LOC10012, EYA4 and PDCD2).

CONCLUSIONS: Neoadjuvant topotecan and radiation yields pCR rates similar to those seen with standard 5-FU/radiation. Distinct molecular patterns were detectable in pretreatment biopsies that were associated with subsequent pathologic response. As a novel approach, we have also identified specific molecular changes that occur during treatment that may be predictive of a pCR. Our findings encourage further investigation of predictive genetic signatures as well as of biologic mechanisms associated with NCR treatment response.

811 Population-Based Analysis and Growth Factor Receptor Expression of GI Carcinoid Tumors
Kanika A. Bowen,1 Scott R. Silva,1 Taylor S. Riall,1 Hung Q. Doan,1 B.M. Evers1, 2
1Department of Surgery, The University of Texas Medical Branch, Galveston, TX; 2Sealy Center for Cancer Cell Biology, The University of Texas Medical Branch, Galveston, TX

Although still considered relatively uncommon, the incidence of carcinoid tumors appears to be increasing at a more rapid rate than other cancers. Surgical treatment of carcinoid tumors of the gastrointestinal (GI) tract can be particularly difficult due to the intense fibrotic response; multiple growth factors and their receptors are suspected to be involved in this process yet this aspect has not been studied in detail. The purpose of our study was twofold: 1) to determine the incidence, patient and tumor characteristics, synchronicity, and outcome of patients with GI carcinoid tumors using the Surveillance, Epidemiology and End Results (SEER) database, and 2) to delineate the expression pattern of growth factor receptors in carcinoid tumors.

METHODS: 1) The SEER database search, which is comprised of cancer incidence and survival data from cancer registries covering approximately 26% of the US population, provided information on patients diagnosed with carcinoid tumors from 1990–2002. 2) Paraffin-embedded blocks of carcinoid tumors (n = 45) from the foregut, midgut, and hindgut were sectioned and stained for the following growth factor receptors (GFRs): epidermal growth factor receptor (EGF-R), insulin-like growth factor receptor (IGF-R), vascular endothelial growth factor receptor (VEGF-R), HER-2/neu, and neural cell adhesion molecule (NCAM).
RESULTS: 1) Over the 12 year analysis period, 18,180 patients were identified with carcinoid tumors of the foregut, midgut, and hindgut; the incidence of carcinoid tumors increased ~2-fold during this time period. The most common site of GI carcinoid was colorectal (28%), followed by the small intestine (20%), and stomach (6%). At the time of diagnosis 49%, 21%, and 23% of patients demonstrated localized disease, regional disease, and distant disease, respectively. A single synchronous lesion was noted in 17% of patients, and 3% had two synchronous lesions. The overall 5-year survival for patients was ~58%. 2) Of the patients with carcinoid tumors resected at our institution, there was a trend of increased expression of VEGF-R and IGF-R, particularly in the foregut and midgut carcinoids.

CONCLUSIONS: Analysis of a large database representative of a comprehensive source of population-based information confirms that the incidence of carcinoid tumors is increasing with an approximate doubling in the number of carcinoid cases from 1990–2002. Furthermore, we demonstrate an increase in VEGF-R and IGF-R expression, particularly of foregut carcinoids, suggesting that GFR inhibitors may be effective adjuvant therapy for carcinoid cancer and the associated fibrotic response.

**812**

Can the Frey Procedure Relieve Biliary Obstruction in Chronic Pancreatitis Without a Separate Drainage Procedure?

H. Ramesh*, George Jacob  
Lakeshore Hospital & Research Center, Cochin, Kerala, India

AIM: To assess the feasibility of the Frey procedure in relieving biliary obstruction without a separate drainage procedure. Patients: The data of 79 patients with chronic pancreatitis and biliary obstruction (bile duct diameter > 7 mm with abnormal liver function tests) who were treated surgically over an 8 year period was analyzed. Patients with cancer were excluded. 59 patients who underwent Frey procedure were included.

PROCEDURE: Initial cystic duct cholangiography was followed by adequate head coring, after which cholangiography was repeated. Further management was dependent on: a) Free flow of contrast into duodenum: no additional procedure: n = 21b) Extensive structuring of and confined to intrapancreatic common bile duct: longitudinal bile ductotomy and incorporation into the Roux-en-Y pancreaticojejunostomy (internal biliary drainage): n = 28c) Free flow of contrast, but deep jaundice, and/or cholangitis: additional short term (6 weeks) T tube drainage: n = 5d) Stricture extending beyond intrapancreatic common bile duct: Healthy duodenum and CBD diameter ≥ 1.5 cm: side-to-side choledochoduodenostomy; n = 4b. Unhealthy, edematous duodenum with thick walled CBD: hepaticojejunostomy onto same loop of jejunum as pancreatic anastomosis: n = 1.

RESULTS: Follow up 36–124 months (see Table).

<table>
<thead>
<tr>
<th>Group</th>
<th>Bilirubin (mean) (mgs%)</th>
<th>Cholangitis</th>
<th>Biliary Obstruction Relief After Surgery</th>
<th>Postoperative Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.6</td>
<td>4</td>
<td>19/21</td>
<td>2: temporary endoscopic stenting</td>
</tr>
<tr>
<td>B</td>
<td>4.2</td>
<td>7</td>
<td>24/28</td>
<td>2: temporary endoscopic stenting, 2: choldochoduodenostomy</td>
</tr>
<tr>
<td>C</td>
<td>9.8</td>
<td>3</td>
<td>5/5</td>
<td>5: endoscopy stenting</td>
</tr>
<tr>
<td>D</td>
<td>7.2</td>
<td>1</td>
<td>5/5</td>
<td>-</td>
</tr>
</tbody>
</table>

CONCLUSION: Frey procedure relieved biliary obstruction without an additional biliary drainage procedure. When stricture was unrelieved by head coring, internal drainage of the bile duct into the pancreaticojejunostomy could be achieved without deleterious effects.

**813**

Immediate Versus Tailored Immunophrophylaxis After Surgery for Crohn’s Disease (CD)

Liliana Bordeianou*, Sharon L. Stein³, Vanessa P. Ho³, Bruce E. Sands², Joshua R. Korzenik², Vinita E. Jacob⁴, Brian P. Bosworth⁴, Richard A. Hodin¹

¹Surgery, Massachusetts General Hospital, Boston, MA; ²Gastroenterology, Massachusetts General Hospital, Boston, MA; ³Surgery, New York Presbyterian Hospital Weill Cornell Medical Center, New York, NY; ⁴Gastroenterology, New York Presbyterian Hospital Weill Cornell Medical Center, New York, NY

INTRODUCTION: Studies have not established timing of immunophrophylaxis (Rx) with 6-MP, azathioprine, or mesalamine after surgery for CD. Some suggest Rx should be initiated ≤1 month, others advocate targeted Rx at time...
of endoscopic recurrence. We compare efficacy of these competing approaches.

**METHODS:** 199 CD patients who underwent ileocecectomy 9/93–4/08 were retrospectively divided into 3 groups based on Rx timing: immediate (I-rx), tailored (T-rx), none (N-rx). Groups were compared for differences in demographics, pathology, surgical technique (chi square, ANOVA). Rate of symptomatic recurrence (chi-square), and time to symptomatic recurrence was analyzed (log rank, multivariate Cox proportional hazards).

**RESULTS:** 69 (34.7%) received I-rx, 32 (16.1%) received T-rx and 98 (49.3%) were N-rx. The groups were similar, though I-rx were younger and N-rx more likely to be lost to follow-up (table). At 5-years, 62 (53.9%) patients had endoscopic, 46 (51.9%) had symptomatic and 22 (24.3%) had surgical recurrences. On chi square, T-rx appeared more likely than I-rx to have symptomatic recurrence (43.7% vs. 28.9%, p = 0.02), but when censored for length of follow up, the only predictors of symptomatic recurrence was CCI (p = 0.048). Timing of Rx (p = 0.44), age (p = 0.07), history of prior resection (p = 0.22), presence of active disease (p = 0.32) and type of anastomosis (p = 0.29) were not.

<table>
<thead>
<tr>
<th></th>
<th>I-Rx (%)</th>
<th>T-Rx (%)</th>
<th>N-RX (%)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>52</td>
<td>50</td>
<td>51</td>
<td>0.97</td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>30.7</td>
<td>33.4</td>
<td>40.7</td>
<td>0.01*</td>
</tr>
<tr>
<td>CCI</td>
<td>2.4</td>
<td>3.8</td>
<td>2.2</td>
<td>0.09</td>
</tr>
<tr>
<td>Prior Resection</td>
<td>31.8</td>
<td>21.8</td>
<td>26.5</td>
<td>0.54</td>
</tr>
<tr>
<td>Disease: Active</td>
<td>75.4</td>
<td>87.5</td>
<td>88.6</td>
<td>0.05*</td>
</tr>
<tr>
<td>Penetrating</td>
<td>68.1</td>
<td>50.0</td>
<td>66.7</td>
<td>0.17</td>
</tr>
<tr>
<td>Positive Margins</td>
<td>15.9</td>
<td>18.8</td>
<td>22.9</td>
<td>0.50</td>
</tr>
<tr>
<td>Stapled Anastomosis</td>
<td>63.7</td>
<td>59.4</td>
<td>73.5</td>
<td>0.03*</td>
</tr>
<tr>
<td>Length Follow-Up (yrs)</td>
<td>2.7</td>
<td>3.4</td>
<td>2.2</td>
<td>0.09</td>
</tr>
<tr>
<td>Lost to Follow-Up</td>
<td>11.6</td>
<td>9.4</td>
<td>3.7</td>
<td>0.01*</td>
</tr>
</tbody>
</table>

**CONCLUSION:** Patients offered immunophrophylaxis tailored to endoscopic recurrence have a similar time to symptomatic recurrence as those offered immunophrophylaxis immediately.

Management Algorithm for Pneumatosis Intestinalis and Portal Venous Gas

Erik Wayne1, Matthew Ough2, Andrew Wu3, Junlin Liao3, Kelli Andresen4, David M. Kuehn4, Neal Wilkinson3

1Surgery, University of Louisville, Louisville, KY; 2Surgery, Rush University, Chicago, IL; 3Surgery, University of Iowa, Iowa City, IA; 4Radiology, University of Iowa, Iowa City, IA

**BACKGROUND:** Pneumatosis intestinalis (PI) and portal venous gas (PVG) are radiographic signs of underlying intra-abdominal pathology often associated with mesenteric ischemia (MI). Historically, PI and PVG mandated exploratory laparotomy due to the high mortality rate of untreated MI. The sensitivity and increased utilization of modern computed tomography (CT) frequently identifies PI and PVG from benign causes in patients who may be subjected to non-therapeutic laparotomies to rule out MI.

**METHODS:** Consecutive adult patients presenting with either PI or PVG identified by CT were examined during the 5 year study. The clinical presentation, radiographic findings, treatment and outcome were reviewed. During the initial exploratory series (4 years), 74 cases were identified and utilized to generate a clinical algorithm capable of identifying MI from benign PI/PVG. The algorithm was then applied to 15 additional cases to confirm its clinical utility (1 year).

**RESULTS:** PI and PVG were associated with three major clinical subgroups: mechanical gastrointestinal (GI) disease or injury (n = 29); acute mesenteric ischemia (n = 30); and benign idiopathic (n = 26); (four were unable to be classified). In the exploratory series, patients with acute mesenteric ischemia were associated with abdominal pain (p = 0.01), elevated lactate (>3.0) (p = 0.006), small bowel PI (p = 0.04) and Vascular Disease Score (calculated) (p < 0.0005). We were able to distinguish the three clinical subgroups using a practical clinical algorithm with a sensitivity of 89%, specificity of 100%, positive predictive value of 100% and negative predictive value of 96%. The algorithm was 100% accurate when applied to the 15 additional cases.

**Table 1. Clinical Subgroups of Patients with PI or PVG**

<table>
<thead>
<tr>
<th></th>
<th>Mechanical Causes</th>
<th>Mesenteric Ischemia</th>
<th>Benign Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (%)</td>
<td>29 (34%)</td>
<td>30 (35%)</td>
<td>26 (30%)</td>
</tr>
<tr>
<td>Vascular Disease Score (range)</td>
<td>3.29 (0–9.5)</td>
<td>6.9 (4–12)</td>
<td>2.0 (0–6)</td>
</tr>
<tr>
<td>VDS Greater or equal to 4.0</td>
<td>39%</td>
<td>100%</td>
<td>7%</td>
</tr>
<tr>
<td>Treatment</td>
<td>Surgery 65%</td>
<td>Surgery 69%</td>
<td>Surgery 38%</td>
</tr>
<tr>
<td>Medical 35%</td>
<td>Futility 31%</td>
<td>(all non-therapeutic)</td>
<td>Observation 62%</td>
</tr>
<tr>
<td>Outcome</td>
<td>Recovery 93%</td>
<td>Recovered 24%</td>
<td>Recovered 96%</td>
</tr>
<tr>
<td>Mortality 7%</td>
<td>Mortality 76%</td>
<td>Mortality 76%</td>
<td>Relapse 8%</td>
</tr>
<tr>
<td>Mortality 7%</td>
<td>Mortality 76%</td>
<td>Mortality 76%</td>
<td>Mortality 4%</td>
</tr>
</tbody>
</table>

**VDS = Vascular Disease Score (Range 0 to 15)**

**CONCLUSIONS:** With greater sensitivity of modern CT scans, PI and PVG are being detected in patients with a wide range of surgical and non-surgical conditions. Using a clinical algorithm, we can identify important subgroups of patients with PI/PVG: mechanical diseases, acute mesenteric ischemia and benign idiopathic. Using this algorithm when treating patients with CT identified PI or PVG will improve treatment and can prevent non-therapeutic laparotomy in those with benign idiopathic findings.
Success and Complication Rates from 4997 ERCP Examinations in Sweden 2007: Data from the Swedish Register for Gallstone Surgery and ERCP (GallRiks)

Lars Enochsson1,2, Fredrik Swahn1,2, Urban Arnelo1,2, Magnus Nilsson1,2, Matthias Löhr1,2, Gunnar Persson3
1Department of Surgery, Karolinska University Hospital, Stockholm, Sweden; 2Department of Clinical Science Intervention and Technology (CLINTEC), Karolinska Institutet, Stockholm, Sweden; 3Department of Surgery, Ryhov County Hospital, Jönköping, Sweden

CONCLUSION: Propofol sedation seems to improve the cannulation success rate. Deep cannulation of the bile duct was achieved in 88%. The technique to cannulate with a guidewire seems to have been generally adopted in Sweden and was used in 84% of the examinations. In 2% of the cases a complication was detected during the procedure and at 30 day follow-up the overall complication rate was 11%. Pancreatitis was found in 2.4%, bleeding in 0.80% and perforation in 0.28% of the examinations. The procedures were performed with the patient sedated with midazolam (47%), propofol (37%) or in general anaesthesia with intubation (16%). Cannulation of the bile duct was significantly less successful using sedation with midazolam (87.4%) compared to propofol (93.5%).

OBJECTIVE: This study was conducted to determine whether the administration of prophylactic octreotide decreases the incidence of pancreatic fistula and its complications.

METHODS: Based on previous reports from our service the occurrence of pancreatic fistula after PD is significantly higher when the amylase level in the abdominal drain fluid on postoperative day 1 is > 1000UI/dL. Between January 2004 and July 2007, 97 patients were recruited into this study on the basis of preoperative indication of PD resection. Patients who had amylase level content > 1000UI/dL in the abdominal drain on postoperative day 1 were randomized to control versus octreotide 100 mcg subcutaneously three times a day for 10 days. The primary postoperative endpoints were pancreatic fistula occurrence, clinical classification of pancreatic fistula, and length of hospital stay. The definition of pancreatic fistula was a drain output of any measurable volume of fluid on or after postoperative day 3 with an amylase content greater than 3 times the serum amylase.

RESULTS: Thirty five patients submitted to PD with pancreatic-enteric anastomosis had amylase level > 1000UI/dL in the abdominal drain on postoperative day 1 and were randomized to control versus octreotide 100 mcg subcutaneously three times a day for 10 days. The primary postoperative endpoints were pancreatic fistula occurrence, clinical classification of pancreatic fistula, and length of hospital stay. The definition of pancreatic fistula was a drain output of any measurable volume of fluid on or after postoperative day 3 with an amylase content greater than 3 times the serum amylase.

SUCCESS AND COMPLICATION RATES FROM 4997 ERCP EXAMINATIONS IN SWEDEN 2007: DATA FROM THE SWEDISH REGISTER FOR GALLSTONE SURGERY AND ERCP (GALLRIKS)

Lars Enochsson1,2, Fredrik Swahn1,2, Urban Arnelo1,2, Magnus Nilsson1,2, Matthias Löhr1,2, Gunnar Persson3
1Department of Surgery, Karolinska University Hospital, Stockholm, Sweden; 2Department of Clinical Science Intervention and Technology (CLINTEC), Karolinska Institutet, Stockholm, Sweden; 3Department of Surgery, Ryhov County Hospital, Jönköping, Sweden

BACKGROUND: Endoscopic Retrograde Cholangio Pancreatography (ERCP) is an established method in the treatment of complicated gallstone and other hepatobiliary diseases. This invasive method is, however, not without complications, mainly pancreatitis, bleeding and perforation. In this study we present data from, to our knowledge, the first web based national register of ERCP in the world.

METHODS: The Swedish Register for Gallstone Surgery and ERCP (GallRiks) started in May 2005. It comprises open and laparoscopic surgery of the gallbladder as well as all endoscopic interventions of the bile ducts. GallRiks is an internet application with on line registration of procedures and follow up as well as electronic reports on demand. Since the start an increasing number of Swedish hospitals have joined the register and the material now constitutes approximately 75% of all ERCPs in Sweden. During 2007 a total of 5040 ERCP examinations were registered. The 30 day follow up was incomplete in 43 patients and thus 4997 web-based ERCP registrations were available for evaluation.

RESULTS: Deep cannulation of the bile duct was achieved in 88%. The technique to cannulate with a guidewire seems to have been generally adopted in Sweden and was used in 84% of the examinations. In 2% of the cases a complication was detected during the procedure and at 30 day follow-up the overall complication rate was 11%. Pancreatitis was found in 2.4%, bleeding in 0.80% and perforation in 0.28% of the examinations. The procedures were performed with the patient sedated with midazolam (47%), propofol (37%) or in general anaesthesia with intubation (16%). Cannulation of the bile duct was significantly less successful using sedation with midazolam (87.4%) compared to propofol (93.5%).

CONCLUSION: GallRiks is a new national register for cholecystectomy and ERCP in Sweden with a current registration frequency of 75% of all ERCP performed in Sweden in 2007. This is the first publication of data from GallRiks. The complication rate of ERCP is in accordance with international standards and the technique of using a guide wire for cannulation is widespread in Sweden. An adequate sedation seems to improve the cannulation success rate.
A–54%, type B–31% and type C–15% in the octreotide group. The median postoperative length of hospital stay was 11 days in both groups.

CONCLUSIONS: These data demonstrate that the occurrence of pancreatic fistula, fistula related complications, and hospital stay after pancreaticoduodenectomy are not reduced by prophylactic use of octreotide in a high-risk group to develop postoperative pancreatic fistula.

818
A Broad Assessment of Clinical Outcomes After Laparoscopic Antireflux Surgery
Brant K. Oelschlager, Kevin C. Ma, Renato V. Soares*, Martin I. Montenovo, Juan E. Munoz Oca, Carlos A. Pellegrini
Surgery, University of Washington, Seattle, WA

OBJECTIVES: There is considerable discussion regarding “success” rates for laparoscopic anti-reflux surgery (LARS). We hypothesized that, in part, this was a reflection of the outcome variables used. We, therefore, categorized several such variables and assessed outcomes for each in a large cohort of patients.

METHODS: Four hundred patients (208 females; median age 52y/o) who underwent LARS at the University of Washington from 1993 to 2008 were given a comprehensive questionnaire to assess various aspects of their outcomes from LARS.

RESULTS: The median follow-up was 107 (6–175) months.

SYMPTOM IMPROVEMENT: Heartburn (N = 376) in 326 (87%), regurgitation (N = 365) in 331 (91%), and chest pain (N = 265) in 207 (79%), measured by patient’s perception.

MEDICATION USE: 236 (59%) patients remain completely off medications for GERD, 164 are using anti-reflux medications (41%). Of these, 73 patients are taking less medication than before LARS. The most common reasons for continuing GERD medication after LARS were: heartburn (n = 100) 60%, regurgitation (n = 13) 8%, Barrett’s Esophagus (n = 13) 8%.

PH MONITORING: The average pre-op DeMeester score was 56.8 ± 5.1 (n = 321), which decreased to 16.5 ± 10.9 in patients who underwent post-op testing (n = 174). One Hundred thirty-two (76%) had normalization of this score.

SIDE-EFFECTS: The following side-effects developed or worsened: dysphagia in 72 (18%) patients; bloating in 96 (24%) patients; diarrhea in 61 (15%) patients. The severity (0–10 scale) of these was: dysphagia 5.1 ± 2.6, bloating 6.5 ± 2.2, diarrhea 6.5 ± 2.9.

PATIENT PERCEPTION OF SUCCESS: Currently, 279 (70%) patients rate their operation as a complete success and 111 (22%) as partially successful. Those with partial or no success cited recurrent reflux (n = 70), a side-effect (n = 37), or both (n = 14) as the reason.

REOPERATIONS: Fifteen (3.7%) patients required reoperations, 9 for recurrent reflux and 6 for side-effects.

PROGRESSION OF BARRETT’S: Of the 58 patients with Barrett’s before LARS, 2 developed HGD/cancer (or 1 per 258 patient years).

DURABILITY: The percentage of patients with successful control of GERD symptoms: 88% at 1 year, 83% at 2 years, 77% at 5 years, and 74% after 10 years.

CONCLUSION: LARS is an effective and durable treatment option for GERD. Success or failure cannot be defined in a single domain. A comprehensive analysis of outcomes requires categorization that includes symptom response, side-effects, patient’s perception and objective measurement of acid exposure, mucosal integrity, and the need for additional medical or surgical treatment. Only then can patients and physicians better understand the role of LARS and make informed decisions.

819
Is Laparoscopic Heller Myotomy Still Indicated in Stage IV Sigmoid Megaesophagus?
Department of Surgical and Gastroenterological Sciences, Clinica Chirurgica III, University of Padua, Padua, Italy

BACKGROUND: Laparoscopic Heller-Dor (LapHD) is an effective treatment for esophageal achalasia, with good results in about 90% of patients. It may be argued whether such an operation is appropriate in case of dilated, sigmoid-shaped megaesophagus. The aim of our study was therefore to evaluate if the esophageal diameter and the presence of a sigmoid-shaped megaesophagus could affect the outcome of LapHD procedure in patients with achalasia.

PATIENTS AND METHODS: From 1992 to October 2008, among 447 patients treated with LapHD for esophageal achalasia, 18 had a straight, larger than 6 cm in diameter esophagus (Group A, median age 47, range 19–80) and 15 had a sigmoid-shaped, larger than 6 cm in diameter esophagus (Group B, median age 43, range 18–78). These two groups formed the basis of this report. The findings of the remaining 414 patients, with the esophagus smaller than 6 cm in diameter, served as control group (Group C, median age 44, range 19–85). The percentage of patients who underwent a previous endoscopic treatment before the operation did non differ in the 3 groups (28%, 13% and 21% respectively for Group A, B and C, p = ns). Also other demographic and clinical parameters, such as symptom score or duration of symptoms, did not differ in the 3 groups. The operation was performed by 4 staff surgeons in a well standardized way, with the only addition of a wider isolation of the cardia in order to straighten the distal esophagus in the Group B patients. One patient in group A and 16 in group C experienced accidental mucosal perforation during surgery.
RESULTS: At a median follow-up of 30 months (IRQ 10.8–78.2) we obtained an excellent outcome in all but one of the Group A patients (94%). These results were similar to those obtained in Group C patients (382/414 good results, 92%), whereas in Group B only 9 patients out of 15 (60%) were relieved of their dysphagia (p < .01, Chi-square test). Two redo-myotomies and 2 esophagectomies were eventually required in 4 patients; other 2 patients are still undergoing periodical endoscopic dilations. Only 1 patient in group A required complementary dilations.

CONCLUSIONS: In patients with a dilated (> 6 cm) but non-sigmoid in shape esophagus, LapHD allows results similar to those obtained in patients with earlier disease. In patients with late disease and a sigmoid-shaped esophagus, LapHD may still achieve good results by relieving dysphagia in more than half of the patients (60%). Therefore, laparoscopic myotomy may still be the first surgical option to be offered to these patients before esophagectomy.

Wednesday, June 3, 2009
8:30 AM – 10:00 AM
S505a
TRANSLATIONAL SCIENCE PLENARY
(PLenary SESSION VI)

1010
Infection Rates in a Large Investigational Trial of Sacral Nerve Stimulation for Fecal Incontinence
Steven Wexner1, Richard McCallum9, Anders Mellgren11, John A. Coller4, Ghislain Devroede5, Tracy L. Hull13, Jennifer Ayscue2, Michael J. England6, David A. Margolin8, S. Abbas Shobeiri12, Howard S. Kaufman7, William J. Snape13, Ece Mutlu10, Paul Pettit3, Joe Tjandra14
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INTRODUCTION: Treatment options for patients with fecal incontinence (FI) are limited, and irreversible surgical treatments can be associated with high rates of infection and other complications. One treatment, sacral nerve stimulation (SNS), is approved for FI in Europe and was recently submitted to the FDA for approval of this indication in the US. In that trial, 83% of subjects showed ≥50% reduction in the number of incontinent episodes per week at 12 months compared to baseline. The objective of this analysis is to present infection rates in the recently completed clinical trial assessing the safety and efficacy of SNS for FI in a large population.

METHODS: Adult patients with greater than two FI episodes per week received implantation of an SNS device following a successful test of the therapy. During test stimulation, test leads and a temporary external stimulator are used to evaluate the patient’s response to the therapy prior to implantation of the neurostimulator. Adverse events were reported by investigators at each study site and were coded. Terms such as infection, redness, or seroma were coded as infection regardless of whether the event was related to the therapy. These rates were compared to the rates of infection after the other FDA approved treatment for end stage fecal incontinence – the artificial bowel sphincter (ABS).

RESULTS: One hundred twenty subjects (92% female, 60.5 ± 12.5 years old) received a chronically implanted InterStim® Therapy (Minneapolis, MN) device. Subjects were followed for an average of 23 (range 2.2–61) months. Of the 120 implanted subjects, 13 (10.8%) reported infection during the implant phase. One infection resolved on its own and five were successfully treated with medication. Seven infections (5.8%) required surgical intervention, with infections in five patients requiring full system explant. Test stimulation surgical duration was similar between the infected group (74 min) and the non-infected group (68 min). Reported rates of infection after ABS ranged from 20–25%.

DISCUSSION: Reported infection rates from a clinical trial of a currently marketed artificial sphincter were 20–25%. Ultimately, post-operative complications required the complete explant of that artificial sphincter device in 30% of subjects. In contrast, only 4% of the subjects in the current study underwent infection-related device explant.
CONCLUSION: SNS for FI, resulted in a relatively low infection rate compared to the only other FDA approved treatment for end stage for FI. Combined with the high therapeutic success rate shown in this study, these data present a positive risk/benefit profile. Sponsor: Medtronic

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[18F]-Fluorodeoxyglucose-Positron Emission Tomography for the Assessment of Histopathologic Response and Prognosis After Completion of Neoadjuvant Chemotherapy in Gastric Cancer

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BACKGROUND: Neoadjuvant chemotherapy is frequently applied to improve the prognosis of patients with locally advanced gastric cancer. However, only a major histopathological response will provide a survival benefit in these patients. Recent studies suggest that [18F]-fluorodeoxyglucose-positron emission tomography (FDG-PET) significantly correlates with histopathological response and survival in patients with gastroesophageal adenocarcinomas undergoing neoadjuvant chemotherapy followed by surgical resection. Therefore, we evaluated the potential of FDG-PET for the assessment of histopathologic response and prognosis in the multimodality treatment of patients with gastric cancer.

METHODS: Study patients were recruited from a prospective clinical observation trial on neoadjuvant chemotherapy for gastric cancer between 1997 and 2007. Forty-two patients with locally advanced gastric cancer (cT3–4, Nx, MO) were included (33 men, 9 women; median age 57 years). All patients received neoadjuvant chemotherapy according to the PLF-protocol (cisplatin, leucovorin, 5-FU; 2 cycles over 6 weeks) and subsequently 40 patients underwent standardized total gastrectomy while 2 patients received definitive chemotherapy because of tumor progression. Histomorphologic regression was defined as major histopathological response when resected specimens contained less than 10% vital residual tumor cells. FDG-PET was performed before and 2 weeks after the end of neoadjuvant chemotherapy with assessment of the intratumoral FDG-uptake [pre-treatment standardized uptake value (SUV1); post-treatment standardized uptake value (SUV2); percentage change (SUV%)] These variables were correlated with histopathological response and survival.

RESULTS: Neoadjuvant chemoradiation led to a significant reduction of intratumoral FDG-uptake (p = 0.0006). However, no significant correlations between SUV1, SUV2 or SUV% and histopathological response or prognosis were found. Histomorphological tumor regression was confirmed as an important prognostic factor (p = 0.04; log-rank test).

CONCLUSION: Our study does not support recent reports that the metabolic response by FDG-PET is associated with histomorphological response or survival in patients with gastric cancer following neoadjuvant therapy and gastrectomy.

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Transvaginal Cholecystectomy Without Laparoscopic Support Using Prototype Flexible Endoscopic Instruments

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PURPOSE: Transvaginal cholecystectomy with laparoscopic assistance has been performed safely in humans. Cholecystectomy with Natural Orifice Translumenal Endoscopic Surgery (NOTES) without laparoscopic support will require new techniques and instruments for access, gallbladder retraction, dissection, and sealing of the cystic duct and artery. The aim was to develop a NOTES technique to perform transvaginal cholecystectomy without laparoscopic instruments using prototype flexible endoscopic devices.

METHODS: Cholecystectomies were performed in 88–97 lbs pigs with a planned two week survival. Prototype flexible instruments (NOTES Toolbox 1 provided by Ethicon Endo-Surgery Inc.) included a steerable overtube, bipolar hemostatic forceps, Maryland dissector, clip applier, grasper, rotating hook knife, scissor, and a tissue approximating system (TAS). A dual channel endoscope was passed transvaginally and pneumoperitoneum was established. Endoscope stabilization was achieved with the steerable trocar or a suture through a working channel of the endoscope and the abdominal wall. Sutures, endo-loops, or the TAS were attached to the gallbladder and externalized through the abdominal wall with a 1 mm suture passer for retraction. Dissection in the triangle of Calot to achieve the critical view was performed with endoscopic scissor, hook knife, or Maryland. The cystic duct was sealed with prototype clips and the artery was clipped or cauterized. The gallbladder was dissected off the liver with scissor and hook knife. The gallbladder was removed from the vagina under direct vision. The colpotomy was closed with 3-0 absorbable sutures.

RESULTS: Three out of the five pigs survived two weeks; two died early from liver bed hemorrhage. Operative times ranged from 115–275 minutes and the operative times decreased with experience. The critical view was established in all cases. Perforation of the gallbladder occurred in four pigs. At necropsy, all clips placed on the cystic duct were secure. The artery was secure when clipped in two or coagulated in three pigs. There was no evidence of bile leak or infection.

CONCLUSIONS: NOTES cholecystectomy without laparoscopic support is feasible using prototype flexible endoscopic devices. The transvaginal steerable trocar gives consistent access to the gallbladder. Complete gallbladder dissection is possible and the clip applier is effective in controlling the cystic duct. The cystic artery can be controlled with clip or coagulation. The primary remaining difficulty is lack of precision during dissection. Techniques and instrumentation for pure NOTES cholecystectomy have improved, but further refinement is warranted.
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Immunonutrition with Long Chain Fatty Acids Prevents Activation of Macrophages in the Gut Wall

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BACKGROUND: Gut derived mediators and immune cells released into the mesenteric lymph during abdominal sepsis cause severe pulmonary dysfunction including activation of macrophages (Glatzle JOGS 2007). Long chain fatty acids absorbed in the gut activate a vago-vagal reflex pathway, the so called “cholinergic anti-inflammatory pathway”, which controls the activity of macrophages in the gut wall (Wang Nat. Med. 2004).

AIM: To investigate whether an enteral immunonutrition with long chain fatty acids prevents the activation of macrophages in the gut wall.

METHODS: Mesenteric lymph was obtained from lymph fistula rats, receiving an enteral infusion of either 5%glucose (glucose lymph) or long chain fatty acids in form of 2% olive oil (lipid lymph) before and after LPS (e-coli 5 mg/kg i.p.) injection. Lymph was used for isolation of immune cells (analysed with FACS) and for measurement of TNFα. The immune cells (≈10^6) were stimulated invitro with LPS (10 ng, 100 ng, 1 µg, 10 µg). TNFα was measured in all lymph samples and in the supernatant of the invitro experiments.

RESULTS: Sepsis induced by LPS increased TNFα release into the mesenteric lymph about 240 fold in glucose-treated rats, which was significantly reduced in lipid treated rats (TNFα pg/ml, before vs. after LPS, glucose lymph: 44 ± 12 vs. 10680 ± 1400*, lipid lymph: 33 ± 15 vs. 2330 ± 1297*, * p < 0.005 glucose vs. lipid). Sepsis induced a significant 2 fold increase in the release of CD11c/ED2 positive macrophages in both glucose and lipid treated animals; there was no difference between glucose or lipid treated rats. LPS induced a significantly greater increase in release of TNFα in macrophages harvested from mesenteric lymph during enteral glucose vs. lipid infusion (TNFα pg/ml, glucose vs. lipid, 100 ng LPS: 87 ± 23 vs. 28 ± 20*, 1µg LPS: 60 ± 9 vs. 4 ± 2*, p < 0.01 vs. glucose).

CONCLUSIONS: During sepsis, macrophages in the gut wall are activated releasing inflammatory mediators such as TNFα. However, an enteral immune modulating diet with long chain fatty acids in form of olive oil was able to suppress TNFα release from macrophages in the gut. This is possibly mediated through the cholinergic anti-inflammatory pathway, thereby preventing the release of disease-inducing cytokines into the circulation. (Supported by the German Sepsis Foundation)

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Plectin-1 as a Biomarker in Malignant Pancreatic Intraductal Papillary Mucinous Neoplasms

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BACKGROUND: Intraductal papillary mucinous neoplasms (IPMN) are now being identified with increasing frequency. IPMN of the main pancreatic duct (MD-IPMN) carries a significant risk of malignancy and surgery is usually recommended. Side branch IPMN (BD-IPMN) has a much lower risk of malignancy and can often be observed. However, BD-IPMN with the presence of symptoms, mural nodules, positive cytology or a cyst size larger than 3 cm is considered to have a high risk of malignancy and surgery is usually recommended. Carcinomas arising in IPMN are either the clinically more benign colloid carcinoma or the aggressive ductal adenocarcinoma. The diagnosis of carcinoma arising in IPMN using cytology or non-invasive imaging is challenging, often resulting in pre-emptive resection of benign lesions. Improved detection of malignancy using novel biomarkers may therefore improve diagnostic accuracy. One such novel promising biomarker is Plectin-1 (Plec-1). Plec-1 was identified in a phage display screen looking for unique markers of PDAC. We validated its use by immunohistochemistry (IHC) and in vivo imaging and found that Plec-1 directed imaging markers identify PDAC and distinguish it from benign pancreatic changes. The aim of this study was to determine whether Plec-1 can also be used to differentiate carcinoma arising in IPMN from benign IPMN.

METHODS: To assess the utility of Plec-1 as a biomarker in human IPMN, we assayed Plec-1 expression in normal pancreas (n = 4), PDAC (n = 19), benign (n = 15) IPMN as well as carcinoma arising in IPMN (n = 11) using IHC. Nerves, which were present in all slides and strongly stain for Plec-1, were used as a reference and to compare staining across slides. We evaluated benign IPMNs of all three epithelial phenotypes: gastric type (n = 9), intestinal type (n = 4) and oncocytic type (n = 2). 11 carcinomas arising in IPMN were tested for Plec-1 expression: 6 colloid carcinomas and 5 ductal adenocarcinomas.

RESULTS: Plec-1 was not detected in normal pancreatic tissue (n = 4) but was strongly expressed in all of the PDAC (n = 19). Regardless of their epithelial type, none of the 15 benign IPMNs did stain for Plec-1. However, 5 of 5 ductal adenocarcinomas arising in IPMN stained for Plec-1. Interestingly, only 1 of 6 colloid carcinomas expressed Plec-1.

CONCLUSION: The presence of Plec-1 in IPMN accurately identifies carcinoma arising in IMPN and is a good biomarker for the more aggressive ductal adenocarcinoma. However, the absence of Plec-1 cannot be used to exclude cancer as colloid carcinomas rarely stain.
1015
Enhancing Detection of Free Peritoneal Cancer Cells in Gastric Cancer Using Newcastle Disease Virus
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INTRODUCTION: Cytological detection of free peritoneal cancer cells detected in gastric cancer patients offers important prognostic information and may affect staging and treatment. However, conventional cytology by Papanicolaou staining clearly does not detect all cases of peritoneal disease. We evaluated a novel technique for detecting free peritoneal gastric cancer cells using Newcastle Disease Virus (NDV-GFP), a non-pathogenic virus containing the enhanced green fluorescent protein (GFP) gene.

METHODS: NDV-GFP was tested upon MKN-1 human gastric adenocarcinoma cells plated against a background of normal rat hepatocytes to determine tumor-specific viral infection and GFP expression. A clinical sample of malignant ascites was then processed, incubated with increasing doses of virus, and evaluated with fluorescence microscopy for optimal NDV-GFP dose determination. Peritoneal lavage samples from 22 patients with biopsy-proven gastric adenocarcinoma undergoing staging laparoscopy were then evaluated with NDV-GFP. Green fluorescent cells were further molecularly characterized.

RESULTS: NDV-GFP at a dose of 5E6 PFU specifically infects MKN-1 gastric adenocarcinoma cells and can detect 1 cancer cell against 1 million benign rat hepatocytes. GFP expression was seen at 6 hours from infection and was detectable for over 24 hours. NDV-GFP at a dose of 5E4 plaque forming units (PFU) produced detectable GFP expression in a clinical sample of malignant ascites, which was enhanced with higher viral doses. For practicality, further samples were infected with 5E6 PFU. Non-cancerous cells, such as red blood cells, were found to be non-GFP expressing. GFP-expressing cells counterstained positive for CEA expression, confirming their cancerous origin. GFP expression was seen in lavage samples from all 22 patients, while cytology was positive in only 5 of these patients. While 9/22 (40.9%) patients were stage IV with M1 disease, only 5/9 (55.6%) were positive by cytology. In contrast, all 9 samples were positive by NDV-GFP detection. Furthermore, when evaluating tumor size, GFP expression was markedly enhanced in T3 disease, detecting 16 patients with T3 tumors versus 2 patients detected by cytology. When considering nodal status, NDV-GFP detected 10 N1 patients compared to no N1 patients detected by cytology.

CONCLUSIONS: NDV-GFP specifically targets and infects gastric cancer cells. NDV-GFP enhances detection of free peritoneal cancer cells in gastric cancer patients and offers a more rapid and sensitive diagnostic tool compared to conventional cytology. This novel diagnostic modality may offer important prognostic information.

9:45 AM – 11:45 AM
S504
VIDEO SESSION IV:
NOTES—SINGLE PORT ACCESS SURGERY

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Transoral Gastroplasty: A Novel Technique for Incisionless Weight Loss Surgery
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We present a video of an incisionless weight loss procedure. A novel device is inserted per orum to create a stapled vertical gastroplasty. Following creation of the gastric pouch, a second device is used to generate a restricted outlet. This results in a restrictive operation that results in early satiety and weight loss. This procedure is currently being performed under FDA protocol in a multicenter randomized and blinded trial.

1017
Single Incision Laparoscopic Surgery (SILS): Cholecystectomy
Parag Butala, Brian Jacob*, Neil Cambronero, George D. Xipoleas, Mark A. Reiner
Mount Sinai NY, New York, NY

Single incision laparoscopic surgery (SILS) is a novel approach to laparoscopic surgery using a single small skin incision with either multiple low-profile trocars or a single access port. SILS is rapidly growing in popularity for use in a variety of elective general surgical applications, and the introduction of safe and reproducible techniques is imperative. This video demonstrates our method for a SILS cholecystectomy for symptomatic cholelithiasis. The video stresses the initial technique for entry into the abdominal cavity and highlights the importance of maintaining standard operative techniques intraabdominally. This video will demonstrate the feasibility of SILS cholecystectomy.
Natural Orifice Surgery for Early Stage Esophageal Malignancy: Proof of Concept
Bart P. Witteman, Andres Gelrud, George M. Eid, Alejandro Nieponice, Stephen F. Badylak, Blair A. Jobe
The Heart, Lung and Esophageal Surgery Institute, University of Pittsburgh Medical Center, Pittsburgh, PA; Division of Gastroenterology, Hepatology & Nutrition, University of Pittsburgh Medical Center, Pittsburgh, PA; Division of General Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA; McGowan Institute for Regenerative Medicine, University of Pittsburgh Medical Center, Pittsburgh, PA

BACKGROUND: Endoscopic therapies were introduced for treatment of superficial cancer with the goal of esophageal preservation. These techniques have limitations based in sampling errors and histologic accuracy.

OBJECTIVE: To determine feasibility of transoral endoscopic resection of the esophageal mucosal-submucosal complex (MSC) in an animal model.

METHODS: Using flexible endoscopic surgery, a sleeve of MSC is resected over the entire esophageal length.

CONCLUSION: This video demonstrates proof of concept for transoral endoscopic esophagectomy. When stricture formation is controlled with extra cellular matrix substitution, this technique may be an alternative to traditional esophagectomy.

Optical Coherence Tomography of the Colon and Its Mesentery (Including Virtual Sentinel Node Biopsy) by Natural Orifice Transluminal Endoscopic Surgery (N.O.T.E.S.)
Ronan A. Cahill, Mitsuhiro Asakuma, Joseph A. Trunzo, Steve J. Schomisch, Joel Leroy, Bernard Dallemagne, Jacques Marescaux
Surgery, IRCAD/EITS, Strasbourg, France; Departments of General Surgery and Surgical Endoscopy, University Hospitals, Case Medical Center, Cleveland, OH

Natural Orifice Transluminal Endoscopic Surgery (NOTES) may supplement the oncological providience of intraluminal resectional techniques (eg Endoscopic Submucosal Dissection) for early stage colonic neoplasia by providing nodal staging information in a truly minimally invasive fashion. Catheter-based Optical Coherence Tomography deployed via NOTES peritoneoscopy may advance this by providing high resolution (x400) optical analysis of both the colon wall from outwith the intestine as well as mesenteric lymph node architecture. This facility to provide ‘virtual biopsy’ of salient tissues (including sentinel nodes) by NOTES is demonstrated in this technical video utilizing a porcine model.

Dissection Techniques for NOTES Cholecystectomy with the Flexible Endoscope
Kevin M. McGill, Nikalesh Ippagunta, Glenn Forrester, Julio Teixeira
Surgery, St. Luke's-Roosevelt Hospital Center, New York, NY
Video: This video demonstrates a cholecystectomy performed using a two channel flexible endoscope. Different techniques demonstrated are hydrodissection, dome-down technique, camera assisted dissection, coaxial dissection, and different retraction techniques. The different techniques demonstrated make NOTES cholecystectomy feasible and safe.

Endoscopic Assisted Transgastric Removal of an Eroded Vertical Gastric Band
Steven Hodgett, J. Christopher Eagon
Minimally Invasive Surgery, Washington University in St. Louis, St. Louis, MO
Our patient is a 54 year old female s/p vertical banded gastroplasty for morbid obesity, followed by revision for breakdown of her gastric staple line. She came to clinic with a one month history of abdominal pain, nausea, vomiting and hematemesis. EDG demonstrated an erosion of her gastric band into her stomach. Considering her previous gastric procedures as well as a previous open incisional hernia repair we elected to remove her band by endoscopic assisted transgastric approach. This Video demonstrates our technique using an endoscope and two 5 mm ports placed through the anterior gastric wall.

Laparoscopic Assisted TransAnal Sigmoidectomy (LATAS): A Bridge to NOTES?
Joep Knol, Eric J. Dozois
Digestive Surgery, MZNL Hospital Overpelt, Overpelt, Belgium; Division of Colon and Rectal Surgery, Mayo Clinic, Rochester, MN
The combination of standard laparoscopy and specimen extraction through a natural orifice has the potential to decrease wound related complications. We describe a new technical approach to laparoscopic sigmoidectomy in which the specimen is extracted transanally using a TEM-like proctoscope. Laparoscopic assisted transanal sigmoidectomy (LATAS) could be considered an alternative minimally invasive approach in patients with benign disease of the sigmoid colon. A 44-year-old male with recurrent diverticular disease of the sigmoid colon was consented to undergo the LATAS procedure. Operating time was 92 minutes, no perioperative or postoperative complications occurred.
HIGH RESOLUTION MANOMETRY HAS LESS INTEROBSERVER VARIABILITY THAN CONVENTIONAL MANOMETRY

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BACKGROUND: Previous reports have questioned the validity of conventional solid state manometry, citing low interobserver agreement. The development of high-resolution manometry (HRM) catheters and graphic visualization software may offer advantages over conventional methods including less interobserver variability. The aim of this study was to compare interobserver variability between High Resolution (HRM) and Conventional Manometry (CM).

METHODS: 50 healthy volunteers underwent duplicate high resolution and conventional manometry studies performed on the same day in each subject. Studies were interpreted by 2 groups of three esophageal motility fellows (Group I: 2005–6 vs. Group II: 2007–8), Group I during the introduction of HRM into the diagnostic laboratory. All 6 individuals separately analyzed each of the 50 HRM and CM studies. Eleven outcome variables were measured for each technique: including: lower esophageal sphincter (LES) resting pressure, residual pressure, abdominal length, total length, esophageal body contraction amplitudes in each of three segments and the percent simultaneous, failed and peristaltic contractions. Intraclass Correlation Coefficients (ICC) were calculated for the two groups of three and all six fellows separately. ICC > 0.75 was taken as good/excellent reproducibility.

RESULTS: Interobserver variability in CM was poor (ICC = 0.07951–0.58124) in every measured parameter with the exception of measurements of esophageal body pressures. Interobserver variability in HRM was excellent for measurements of LES resting and residual pressures, percent of failed contractions and esophageal body pressures at 5 and 10 cm but remained poor for measurement of LES lengths and % simultaneous waves (ICC = 0.94406, 0.83196, 0.79124, 0.89381, 0.90312, and 0.21608, 0.2486, 0.18469 respectively). When values for the groups were averaged, interobserver agreement was superior in all measurements for HRM compared to CM and for Group II compared to Group I.

CONCLUSION: Interobserver variability in the interpretation of high resolution manometry data is less than that of conventional manometry and improves with time suggesting an institutional learning curve. Further standardization of HRM analysis is needed.


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PURPOSE: To determine the mortality rate, and significant associated factors, related to laparoscopic (LC) and open cholecystectomies (OC) over a 10-year period in the United States.

METHODS: Using the Nationwide Inpatient Sample (NIS) of approximately seven million inpatient records per year, we extracted and analyzed data for both LC and OC between 1997 and 2006. Cholecystectomies performed as part of another primary procedure were excluded. Using procedure-specific codes, we calculated annual national volumes for both open and laparoscopic cholecystectomies for the time period under review and the associated in-hospital mortality rate following both of these procedures. Using logistic regression modeling, we then analyzed selected patient (age, gender, admission type, diagnosis) and institutional (hospital location and teaching status) characteristics to determine if a significant association existed between these factors and in-hospital mortality.

RESULTS: There was an 8.9% increase in the volume of LC and a corresponding decrease in open procedures over the 10 years under review. In 2006, 19% of cholecystectomies were still performed using an open approach and the associated factors, related to laparoscopic (LC) and open cholecystectomies for the time period under review and the associated in-hospital mortality rate following both of these procedures. Using logistic regression modeling, we then analyzed selected patient (age, gender, admission type, diagnosis) and institutional (hospital location and teaching status) characteristics to determine if a significant association existed between these factors and in-hospital mortality.

CONCLUSIONS: These data indicate an increase in the proportion LCs performed over the years under study with a decrease in the proportion of OCs. However, OCs remains associated with a significant mortality burden when compared with the laparoscopic approach.
RESULTS:  

Liver mass is regulated in precise proportion to body mass in healthy animals, and this ratio (liver:body weight) is specifically restored by regeneration following acute injury. Despite extensive analysis of the molecular mechanisms that regulate hepatic regeneration, the specific signals that initiate and terminate the regenerative response and those that determine the ideal liver:body mass ratio have not been elucidated. Previous analyses have suggested the mechanisms involved in such regulation are likely to include signals derived from the bowel via the portal circulation. Therefore, in the studies reported here we investigated the effect of partial small bowel resection on regulation of liver mass in a murine surgical model.  

METHODS:  Two month old, male C57BL/6J wildtype mice were subjected to partial small bowel resection or sham surgery (transsection without resection) followed by primary reanastamosis, as we have previously described. These animals were allowed to recover, after which they were sacrificed at serial time points for determination of liver:body weight ratio and analysis of liver tissue. These animals were subjected to partial small bowel resection or sham surgery (transsection without resection) followed by primary reanastamosis, as we have previously described. 

RESULTS:  In mice subjected to partial small bowel resection, total and functional liver mass is reduced following partial small bowel resection, and this reduction is associated with induction of pro-autophagic and pro-apoptotic signaling events. These data have important implications with respect to the pathogenesis and management of liver disease seen in the setting of partial small bowel resection, for example in neonates who undergo substantial small bowel resection for necrotizing enterocolitis.

SUMMARY AND CONCLUSIONS:  The studies reported here show that total and functional liver mass is reduced following partial small bowel resection, and this reduction is associated with induction of pro-autophagic and pro-apoptotic signaling events. These data have important implications with respect to the pathogenesis and management of liver disease seen in the setting of partial small bowel resection, for example in neonates who undergo substantial small bowel resection for necrotizing enterocolitis.

### Table 1. National Volumes for Cholecystectomy and Associated Mortality From 1997–2006  

<table>
<thead>
<tr>
<th>Year</th>
<th>All</th>
<th>Open</th>
<th>Laparoscopic</th>
<th>All</th>
<th>Open</th>
<th>Laparoscopic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>413,624</td>
<td>115,779 (28.0)</td>
<td>297,845 (72.0)</td>
<td>6001 (1.5)</td>
<td>4,673 (4.0)</td>
<td>1,328 (0.4)</td>
</tr>
<tr>
<td>1998</td>
<td>406,795</td>
<td>87,305 (21.5)</td>
<td>319,490 (78.6)</td>
<td>6,318 (1.6)</td>
<td>4,457 (5.1)</td>
<td>1,861 (0.6)</td>
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<td>1999</td>
<td>405,434</td>
<td>73,947 (18.2)</td>
<td>331,387 (81.8)</td>
<td>5,680 (1.4)</td>
<td>3,962 (5.2)</td>
<td>1,818 (0.5)</td>
</tr>
<tr>
<td>2000</td>
<td>431,591</td>
<td>72,259 (16.7)</td>
<td>359,332 (83.3)</td>
<td>5,480 (1.3)</td>
<td>3,646 (5.0)</td>
<td>1,834 (0.5)</td>
</tr>
<tr>
<td>2001</td>
<td>435,538</td>
<td>73,426 (16.9)</td>
<td>362,111 (83.1)</td>
<td>5,796 (1.3)</td>
<td>3,697 (5.0)</td>
<td>2,100 (0.6)</td>
</tr>
<tr>
<td>2002</td>
<td>455,571</td>
<td>73,283 (16.4)</td>
<td>372,288 (83.6)</td>
<td>5,650 (1.3)</td>
<td>3,763 (5.1)</td>
<td>1,887 (0.5)</td>
</tr>
<tr>
<td>2003</td>
<td>434,165</td>
<td>74,203 (17.1)</td>
<td>359,962 (82.9)</td>
<td>5,165 (1.2)</td>
<td>3,193 (4.3)</td>
<td>1,972 (0.5)</td>
</tr>
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<td>2004</td>
<td>425,734</td>
<td>94,804 (22.3)</td>
<td>330,930 (77.7)</td>
<td>4,798 (1.1)</td>
<td>3,299 (3.5)</td>
<td>1,498 (0.5)</td>
</tr>
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<td>2005</td>
<td>417,488</td>
<td>82,967 (19.9)</td>
<td>334,521 (80.1)</td>
<td>4,796 (1.1)</td>
<td>2,910 (3.5)</td>
<td>1,886 (0.6)</td>
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<tr>
<td>2006</td>
<td>416,470</td>
<td>79,666 (19.1)</td>
<td>336,804 (80.9)</td>
<td>4,537 (1.1)</td>
<td>2,958 (3.7)</td>
<td>1,579 (0.5)</td>
</tr>
</tbody>
</table>

1025  

Murine Functional Liver Mass Is Reduced Following Partial Small Bowel Resection  
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Liver mass is regulated in precise proportion to body mass in healthy animals, and this ratio (liver:body weight) is specifically restored by regeneration following acute injury. Despite extensive analysis of the molecular mechanisms that regulate hepatic regeneration, the specific signals that initiate and terminate the regenerative response and those that determine the ideal liver:body mass ratio have not been elucidated. Previous analyses have suggested the mechanisms involved in such regulation are likely to include signals derived from the bowel via the portal circulation. Therefore, in the studies reported here we investigated the effect of partial small bowel resection on regulation of liver mass in a murine surgical model.  

METHODS:  Two month old, male C57BL/6J wildtype mice were subjected to partial small bowel resection or sham surgery (transsection without resection) followed by primary reanastamosis, as we have previously described. These animals were allowed to recover, after which they were sacrificed at serial time points for determination of liver:body mass ratio and analysis of liver tissue.  

RESULTS:  In mice subjected to removal of ~50% of proximal small intestine, liver:body weight ratio was decreased 10% at 48 hrs and 20% at 72 hrs after surgery compared to sham operated animals (p < 0.01). Similar results were seen in animals in which a comparable amount of distal small bowel was resected. Functional liver mass was also reduced based on analyses of total hepatic protein (reduced 30% versus sham, p < 0.01) and total hepatic alanine transaminase (ALT) activity (reduced 50% versus sham, p < 0.001) in the remnant organ 72 hours after small bowel resection. Morphometric analysis also showed reduction in hepatocellular size in animals subjected to small bowel resection (reduced 15% versus sham, p < 0.02). Protein immunoblot analysis demonstrated increased expression of LC3-II, a marker of autophagic induction, and an increase in the ratio of Bax:Bcl-2 protein expression, an indicator of activation of pro-apoptotic signaling, in the livers of bowel-resected animals (p < 0.01 versus sham).  

SUMMARY AND CONCLUSIONS:  The studies reported here show that total and functional liver mass is reduced following partial small bowel resection, and this reduction is associated with induction of pro-autophagic and pro-apoptotic signaling events. These data have important implications with respect to the pathogenesis and management of liver disease seen in the setting of partial small bowel resection, for example in neonates who undergo substantial small bowel resection for necrotizing enterocolitis.
Impact of KIT and PDGFRA Gene Mutations on Prognosis of Patients with Gastrointestinal Stromal Tumors After Complete Primary Tumor Resection
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University Hospital Essen, Essen, Germany

BACKGROUND: Although the importance of KIT and PDGFRA mutations in the oncogenesis of gastrointestinal stromal tumors (GIST) is well established, their prognostic role remains controversial. The aim of our study was to investigate the impact of KIT and PDGFRA gene mutations on the prognosis of patients with GIST after complete primary tumor resection.

METHODS: Genomic DNA from tumor tissue from 184 patients with primary GIST was submitted to mutational analysis. Exons 9, 11, 13, and 17 of the KIT gene and exons 12, 18 of the PDGFRA gene were sequenced. In addition to the mutational status, several clinical and pathological parameters were analyzed and correlated to the risk of recurrence and long-term disease-free survival (DFS).

RESULTS: Somatic mutations were detected in 162 tumors (88.0%). Age (p = 0.019), clinical stage (p < 0.001), mitotic count (p < 0.001), and tumor size (p = 0.009) were of prognostic relevance on both univariate and multivariate analysis. Five-year DFS was 41.9%. While the presence of a KIT or PDGFRA mutation per se was not associated with tumor recurrence and/or disease-free survival, exon 11 deletion and hemizygous mutation status were highly predictive for poor survival (p = 0.014 and p = 0.0004, respectively).

CONCLUSIONS: KIT exon 11 deletions and somatic loss of the wild-type KIT identified patients with poor prognosis. Age, clinical stage, tumor size, and mitotic count were standard clinicopathologic features that significantly influenced the prognosis. Mutation type of the mitogen receptor c-kit has a potential for predicting the course of the disease and might contribute to management individualization of GIST patients.

Management of Symptomatic Intraabdominal Collections After 672 Hepatic Resections
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INTRODUCTION: Before 1980 patients with symptomatic intraabdominal collections (SIAC) after hepatectomy required surgical drainage. Image guided percutaneous drainage has improved in the last two decades allowing nonsurgical management. We sought to determine the utility of percutaneous drainage in the management of patients with SIAC and analyze factors potentially associated with SIAC and biliary fistula.

PATIENTS AND METHODS: From a prospective database 672 patients who underwent hepatic resection between 2004 to 2006 were identified. Patients requiring drainage for SIAC were recorded and outcome after drainage was analyzed. Patient demographics, laboratory reports, intraoperative data and their association with SIAC and biliary fistula were investigated using chi-square and t-tests as well as multiple logistic regression.

RESULTS: Six hundred seventy-two underwent hepatic resection from 2004–2006; 48(7.1%) developed SIAC; 16 (33%) seroma/hematoma, 22 (46%) biliary fistulas and 10 (21%) abscesses. All patients underwent percutaneous drainage only. A small subhepatic collection was not possible to drain in one patient; however the patient’s symptoms resolved without drainage. The clinical manifestations of SIAC were: fever (77%), abdominal pain (27%), nausea/vomiting (12%). 11(22%) patients required two drainage procedures to manage the same collection. No perioperative deaths could be directly attributed to SIAC or percutaneous drainage. On multivariate analysis, a concomitant bilioenteric anastomosis, HAIP placement and right or extended right hepatic hepatectomy were independently associated with SIAC (p < 0.05).

CONCLUSIONS: KIT exon 11 deletions and somatic loss of the wild-type KIT identified patients with poor prognosis. Age, clinical stage, tumor size, and mitotic count were standard clinicopathologic features that significantly influenced the prognosis. Mutation type of the mitogen receptor c-kit has a potential for predicting the course of the disease and might contribute to management individualization of GIST patients.

Nomogram predictor of OrgSSI
operative time were similar between patients with infected SIAC compared to those with non infected SIAC.

CONCLUSION: SIAC are uncommon after hepatectomy and effectively managed with percutaneous drainage. One third of patients with SIAC have non-infected/non-bilious collections and these are not easily discerned from infected SIAC based on standard clinical factors. SIAC are most likely to develop after right or extended right hepatic lobectomy, bilioenteric anastomosis and with HAIP placement.

Mortality After Nonhepatic General Surgery in Patients with Concomitant Liver Cirrhosis: An Analysis of 138 Operations in the 2000S Using CHILD- and MELD Scores

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Despite of advances in modern surgical and intensive care treatment mortality seems to remain high in patients with liver cirrhosis undergoing nonhepatic general surgery. In the few existing articles mortality was reported as high as 70% in patients with poor liver function (high CHILD- or MELD-score). Since data are scarce we analyzed our recent experience with cirrhotic patients undergoing emergent or elective nonhepatic general surgery since 2001 in a German University hospital.

METHODS: Since 2001 138 nonhepatic general surgical procedures (99 intraabdominal, 39 abdominal wall) were performed in patients with proved liver cirrhosis. Liver cirrhosis was preoperatively classified according to the CHILD- (41 CHILD A; 59 B, 38 C) and the MELD-score (MELD median 13). Sixty-nine (50%) of the patients underwent emergent operations. Most abdominal wall operations were for hernias. Intraabdominal operations consisted of GI-tract procedures (n = 51), cholecystectomies (n = 15) and various others (n = 33). Perioperative data were gained by retrospective analysis. The electronic hospital charts included all data for classification of cirrhosis (CHILD, MELD).

RESULTS: Overall mortality of all 138 patients was 28% (10% elective surgery, 45% emergent surgery; p < 0.001). Mortality was higher after intraabdominal than after abdominal wall operations (35% vs. 8%; p = 0.001) or in patients requiring transfusions (47% vs. 6% without transfusions; p < 0.001). Mortality increased with the CHILD-score: 10% (Child A), 17% (B), 63% (C; p < 0.001) and the MELD-score (12% MELD 6–11; 18% MELD 12–17; 69% MELD > 17; p < 0.001). Patients requiring surgery for bleeding or for perforation/peritonitis (n = 34) showed a higher mortality than patients without these indications (56% vs. 18; p < 0.01). In multivariate risk factor analysis the CHILD-/MELD-scores and transfusions (all p < 0.01) but not the indication for surgery or location (intraabdominal vs. abdominal wall) were independent risk factors for a lethal outcome.

CONCLUSIONS: Our results demonstrate that perioperative mortality remains high in patients with liver cirrhosis undergoing general surgery. Patients with poor liver function and/or need for blood transfusions even had a very high mortality. In our experience both the CHILD- and the MELD-score significantly predicted postoperative mortality. Both scores may, therefore, be applied to preoperatively predict outcome and modify management in patients with liver cirrhosis.

Major Complications After Laparoscopic Cholecystectomy: A Simple Risk Score

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Laparoscopic cholecystectomy (LC) has become extensively used in the US; however, reported morbidity varies widely. A reliable method to determine complication risk might be useful to optimize care. In this study, we developed an integer-based risk score to determine the likelihood of major complications following LC.

METHODS: Using the Nationwide Inpatient Sample 1998–2006, patient-discharges for LC were identified. Previously validated major complications including acute MI, aspiration pneumonia, procedure-related laceration, postoperative infection, DVT, PE, hemorrhage, and reoperation were assessed. Using preoperative covariates including patient demographics, comorbidities, surgical indication, and hospital characteristics, we used logistic regression and bootstrap methods to generate an integer score for predicting in-hospital complication rates. A randomly-selected 80% of cohort was used to create the risk score, with testing in the remaining 20% validation-set.
RESULTS: 561,923 patient-discharges were identified with an overall complication rate of 6.5%. Predictive characteristics incorporated in the model included: age, sex, Charlson comorbidity score, surgical indication, hospital type, and admission type. Integer values were assigned, and used to calculate an additive score. 3 groups were assembled to stratify risk, with a 4-fold gradient for in-hospital complications ranging from 3.2 to 13.5%. In both derivation and validation sets, the score discriminated well, with respective c-statistics of .657 and .656.

CONCLUSION: An integer-based risk score can be used to predict complications following LC, and may assist in preoperative risk stratification and patient counseling. These findings may be useful to determine which patients should be referred to specialized centers and/or providers for treatment of gallbladder disease.

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Survival After Proximal, Local and Distal Resection of Extrahepatic Cholangiocarcinoma: Analysis of Prognostic Factors
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BACKGROUND/AIM: Differentiation between proximal, mid and distal extrahepatic cholangiocarcinoma (CCA) is primarily based on surgical approach, rather than differences in tumor biology. The aim of the current study was to compare disease specific survival (DSS) between proximal, mid and distal CCA after resection and to identify prognostic factors.

METHODS: Clinicalpathological data of 175 patients with extrahepatic CCA who had undergone resection with curative intent between 1992 and 2007 were reviewed. Treatment consisted of proximal bile duct resection with concomitant hepatectomy, local bile duct resection (mid CCA, and radiologically defined Bismuth type I and II lesions), and distal resection as part of pancreatoduodenectomy (PD). Follow-up data was analyzed for DSS.

RESULTS: 51 (57%) in proximal and distal CCA, respectively (P .001). Forward-entry multiple regression analysis demonstrated that lymph node status (Hazard Ratio [HR] 1.75; 95%CI 1.19–2.58), tumor differentiation (HR 2.14; 95% CI 1.32–3.47), and status of resection margin (HR 1.60; 95% CI 1.08–2.37) were independent prognosticators for worse DSS in the entire group.

CONCLUSIONS: Patients with distal CCA were associated with the worst DSS after resection, however, location was not an independent prognostic factor for survival. A margin negative resection was the only prognostic factor determined by the surgical procedure. In order to improve survival of local lesions the surgical procedure should be extended either with liver resection or with pancreatoduodenectomy, depending on site of the lesion.

1032
Fine Needle Aspiration Cytology from Pancreatic Cysts: Limited Utility in Surgical Decision Making
Craig P. Fischer 1,2, Bridget N. Fahy 1,2, Thomas A. Aloi 1,2, Isaac Rajjman 1, Alberto O. Barroso 1,2, Peter J. Schwarz 1,2, Barbara L. Bass 1,2
1Surgery, The Methodist Hospital, Houston, TX; 2Surgery, Weill Cornell Medical College, Houston, TX

INTRODUCTION: Endoscopic Ultrasound (EUS) plays an important role in the diagnosis of cystic and solid pancreatic lesions. Fine needle aspiration cytology(FNAC) aids physicians in determining which patients require surgical resection. We report the utility of EUS/FNAC in the diagnosis of cystic and solid pancreatic lesions.

METHODS: Fifty-eight patients underwent EUS/FNAC of pancreatic lesions between 7/2006–7/2008. Fifty-two patients had evaluable cytology, and 33 patients underwent surgical resection. FNAC results were categorized into suspicious/ positive for malignancy, negative and indeterminate, based on routine hematoxylin and eosin staining performed by a single cytopathologist. The sensitivity (S), specificity (SP), positive predictive value (PPV), and negative predictive value (NPV) of FNAC were determined based upon comparison to final surgical pathology.

RESULTS: Of the 33 total pancreatic lesions reviewed, 17 were solid and 16 were cystic. Twenty-four total lesions (12 solid, 12 cystic) were malignant or premalignant (73%). FNAC of solid lesions had a S of 92% and NPV of 100%. FNAC for cystic lesions had a S of 100%, SP of 80% PPV of 92% and NPV of 100%. FNAC for cystic lesions had a S of 58%, SP of 100%, PPV of 100%, and NPV of 44% (Table). While none of the malignant solid lesions had negative FNAC, 5/12 (42%) of malignant or premalignant cystic lesions were negative for malignancy on FNAC.

CONCLUSIONS: FNAC demonstrated excellent accuracy in the diagnosis of solid pancreatic lesions. FNAC of cystic pancreatic lesions was appreciably less accurate and alone does not appear to be an adequate means of assessing the malignant potential of cystic pancreatic lesions.
Inhibition of IKK Kinase Attenuates Lipopolysaccharide Induced Hepatic Injury
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Department of Surgery, University of Texas Medical School at Houston, Houston, TX

BACKGROUND: Lipopolysaccharide (LPS) causes hepatic injury that may involve enhanced activity of nuclear factor kappa B (NF-κB) and subsequent changes in expression of oxidative stress proteins such as inducible nitric oxide synthase (iNOS) and cyclo-oxygenase-2 (COX2). Translocation of inactive NF-κB from the cytosol to the nucleus is prevented by the inhibitory protein IB. NF-κB activation usually involves IKK phosphorylation of IkBα on two serine residues with resultant dissociation of IkBα from NF-κB. We hypothesized that inhibition of serine phosphorylation of IkBα would diminish hepatic injury and modulate changes in oxidative stress protein caused by LPS.

MATERIALS AND METHODS: Male Sprague-Dawley rats received Bay 11–7085 (10 mg/kg IP), an inhibitor of IKK kinase, or vehicle (DMSO) 1 hour before receiving saline or LPS (20 mg/kg IP). Rats were sacrificed 5 hours after LPS. Serum was collected to measure ALT as an index of hepatic injury. Liver was assessed for iNOS and COX2 (Western blot) protein immunoreactivity (n > 5/group; ANOVA).

RESULTS: LPS significantly increased ALT levels and upregulated iNOS and COX2 when compared to controls. Inhibition of IKK with Bay 11–7085 attenuated LPS induced hepatic injury and blunted upregulation of iNOS and COX2 when compared to LPS treated controls.

CONCLUSIONS: These data indicate that LPS induced hepatic injury is mediated, at least in part, through serine phosphorylation of IkBα which also modulates LPS induced changes in hepatic iNOS and COX2 expression.
and 153 days in Group 2. The frequency of CASH in Group 1, 2 and 3 was 9%, 11% and 6%, respectively (p = 0.89). The frequency of steatosis was not different among Groups 1, 2 and 3 (p = 0.99). Both operative duration (p = 0.007) and blood loss (p = 0.003) were greater for patients receiving any chemotherapy compared to benign controls. However, there was no difference in operative duration or blood loss between chemotherapy groups. There was a trend towards greater (>Grade 4) post-operative complications (Clavien grading scheme) in Group 1 compared to Group 2 (p = 0.08). Overall 30 day mortality was 2.2% and there was no difference in 30 day or 60 day mortality. The one and five year survival was 96.9% and 26.3%, respectively in Group 1. The one and five year survival was 96.4% and 43.7%, respectively in Group 2. The HR was 1.6 (0.9–2.86) for patients treated with FOLFOX when compared to 5FU.

CONCLUSION: Folfox neoadjuvant chemotherapy was not associated with an increased frequency of CASH or steatosis compared to patients receiving 5FU or patients with benign disease. Folfox therapy was not associated with increased EBL or operative time when compared to those receiving 5FU but there was a trend to higher grades of complications when compared to patients receiving 5FU. OS was significantly less in patients undergoing neoadjuvant FOLFOX therapy.

10:30 AM – 12:00 PM
S505a
PLENARY SESSION VII

1080
The Effects of Sympathetic and Parasympathetic Denervation on Distal Colon Motility in Conscious Rats
Timothy J. Ridolfi1, Toku Takahashi2, Lauren Kosinski3, Kirk A. Ludwig1
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BACKGROUND: It is known that extrinsic autonomic denervation of the colon causes changes in colonic motility and defecation. The extrinsic nervous system is subject to injury during low anterior resection. After low anterior resection, patients are likely to experience defecatory disorders, such as urgency, soiling and diarrhea. However, it is not fully understood how sympathetic and parasympathetic nerves regulate the motility of the distal colon. It is also not known how injury to the sympathetic or parasympathetic nerves affects distal colonic motility. We studied colonic motility in response to the stimulation of sympathetic, hypogastric nerves or the parasympathetic, pelvic nerves in anesthetized rats. We also studied the effects of extrinsic denervation of hypogastric nerves or pelvic nerves on distal colonic motility in conscious rats.

METHODS: Under isoflurane anesthesia, a strain gauge transducer was implanted on the serosal surface of the distal colon to record the circular muscle contractions in SD rats. Using a dissecting microscope, the right hypogastric nerve or pelvic nerve was isolated and electrical nerve stimulation (S V, 0.5 msec, 1–10 Hz) was performed. Another group underwent transection of bilateral hypogastric nerves or pelvic nerves. Sham operated rats served as controls. After surgery colonic motility was continuously recorded for three days in a conscious state. Changes in colonic motility were evaluated by calculating the motility index (MI) of 30 min recordings.

RESULTS: Electrical stimulation of the pelvic nerve caused colonic contractions, while hypogastric nerve stimulation caused colonic relaxation in a frequency dependent manner. The stimulatory effect of the pelvic nerve stimulation and inhibitory effect of the hypogastric nerve stimulation were antagonized by atropine and propranolol, respectively. At 6 hours postoperatively animals with pelvic nerve transections were found to have a significantly reduced MI (518 ± 1954 gram seconds, n = 3), compared to that of sham operated rats (975 ± 243 gram seconds, n = 3, p = 0.04). In contrast, MI of colonic motility was significantly increased to 5029 ± 1954 gram seconds (n = 3, p = 0.02) in rats who underwent hypogastric nerve transection.

CONCLUSION: It is suggested that the pelvic nerve regulates colonic contractions via muscarinic receptors, while the hypogastric nerve regulates colonic relaxations via beta adrenoceptors in rats. Injury of pelvic nerves results in impaired contractions, while injury of hypogastric nerve results in augmented contractions. Our study may help to further understand the pathophysiology of low anterior resection syndrome.

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Comparison of the Prognostic Value of Inflammation Based Pathological and Biochemical Criteria in Colorectal Cancer
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INTRODUCTION: Both localised tumour inflammatory cell infiltrate and a host systemic inflammatory response (SIR) confer prognostic value in colorectal cancer (1, 2, 3). The inter-relationships between components of the SIR
and the local inflammatory response are poorly understood. The aim of the present study is to compare the prognostic value of the local inflammatory response (Jass and Klintrup scores) and the SIR (Glasgow Prognostic Score (GPS)), and to examine potential inter-relationships in patients undergoing curative resection for colorectal cancer.

METHODS: 287 patients underwent curative surgery between 1997–2004. Routine pathology specimens were scored according to Jass and Klintrup criteria for peritumoural infiltrate. Data was collected from routine pre-operative blood tests. To construct the GPS, C-reactive protein >10 mg/L and albumin <35 g/dl were given a score of 1 and the GPS scared 0, 1, or 2. Hypoalbuminaemia in the absence of CRP > 10 mg/L was scored 0.

RESULTS: Median follow-up was 71 months (minimum 34 months), during this time 116 patients died; 69 of their cancer. On univariate analysis of colon and rectal cancers, the presence of a low grade inflammatory cell infiltrate (Klintrup’s criteria) and a GPS >1 were independently associated with poorer cancer specific survival. In node negative disease (Stage I and II), age (P < 0.01), GPS (P < 0.01), neutrophil count (p < 0.05) and Klintrup criteria (P < 0.05) were related to cancer survival. On multivariate survival analysis in node negative disease, the GPS (HR 2.60, P < 0.01) and Klintrup criteria (HR 6.35, P < 0.05) were independently associated with cancer specific survival. Increasing tumour stage was associated with less peritumoural infiltrate (Jass criteria P < 0.001, Klintrup criteria P < 0.01). Increased GPS was associated with increased white cell (P < 0.01) and neutrophil (P < 0.01) counts and low lymphocyte counts (P < 0.01). Increased white cell count was associated with increased neutrophil count (P < .001) and low grade peritumoural infiltrate (P < 0.05, Klintrup criteria). Jass and Klintrup criteria for peritumoural infiltrate were directly associated (P < 0.001).

CONCLUSION: Both pathological (Klintrup) and biochemical (GPS) measures of the inflammatory response are independent predictors of survival following colorectal cancer surgery. Furthermore, the present study’s results suggest low peritumoural infiltrate (Klintrup criteria) and increased systemic inflammation (GPS criteria) are linked by the cell mediated immune system. (1) Jass Jr, et al. Lancet 1987;1(8545):1303–6(2) Klintrup K, et al. EJC 2005;41:2645–54.(3) Leitch EF, et al. Br J Cancer. 2007;97:1266–70.

National Trends in Esophageal Surgery—Are Outcomes as Good as We Believe?
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INTRODUCTION: Positive volume-outcomes relationships in esophagectomy have prompted support for regionalization of care; however broad US outcomes have not recently been analyzed. This study was designed to examine national trends in provision of esophagectomy and to reassess the volume-outcome relationship in light of changing practice patterns and training paradigms.

METHODS: Data were obtained from the Nationwide Inpatient Sample, the largest all-payer discharge database in the US, from 1998–2006. A search for total esophagectomy, partial esophagectomy and esophagogastric resection was performed. Quantification of patients’ comorbidities was made using the Charlson Index. Using logistic regression modeling, annual case volumes were correlated with institutions’ outcomes. Arbitrarily-assigned case volume categories were avoided. Risk-adjusted outcome measures were calculated for mortality and various complications.

RESULTS: A total of 57,676 esophagectomies were recorded. Though patient demographics remained similar across the study period, in-hospital unadjusted mortality fell from 12% to 7%. Regionalization increased; hospitals performing > 20 esophagectomies per year increased from 22% to 28%, and hospitals with a case volume <12 decreased from 57% to 52%. Adjusting for comorbidities, greater case volume was associated with significant improvements of in-hospital mortality (p < .0001), post-operative shock (p = .0018), splenic injury (p = .0026), respiratory failure (p = .0027), pneumonia (p = .0035) and renal failure (p < .0001). Adjusting for comorbidities, greater case volume was associated with significant improvements of in-hospital mortality (p < .0001), post-operative shock (p = .0018), splenic injury (p = .0026), respiratory failure (p = .0027), pneumonia (p = .0035) and renal failure (p < .0001). Increasing benefit was seen with increasing volumes.

CONCLUSIONS: The current mortality rate of 7% following esophagectomy is higher than that reported in most contemporary case series. Using national population-based data, the hypothesized positive volume-outcome relationship of esophageal surgery has been validated without the use of arbitrarily-assigned case volume categories. This relationship exists for all volumes of esophagectomy. The current paradigm of assuming improved outcomes as a result of the above parameters is justified.
Preoperative Gastric Acid Secretion Defines a Subgroup of Patients with High-Risk to Develop Barrett’s Esophagus in the Esophageal Stump After Esophagectomy for End Stage Chagasic Achalasia

Julio R. da Rocha 1, Ulysses Ribeiro 1, Sérgio Szachnowicz 1, Eliza R. Baba 1,2, Adriana V. Safatle-Ribeiro 1, Kiyoshi Iriya 2, Ary Nasi 1, Rubens Sallum 1, Ivan Cecconello 1

Subtotal esophagectomy and gastric pull-up with cervical anastomosis is the main treatment for end stage achalasia. This surgical technique has been associated with esophagitis and also Barrett’s epithelium in the esophageal stump following esophagectomy. The contributing factors to Barrett’s esophagus development in this situation are not completely known.

AIM: To determine the involvement of preoperative conditions, regarding gastric secretary and hormonal response, in the appearance of Barrett’s esophagus in the esophageal stump, in patients who underwent subtotal esophagectomy for end stage chagasic achalasia.

METHODS: 101 patients submitted to esophagectomy and cervical gastric pull-up were followed-up prospectively for a mean of 10.5 ± 8.8 years. All patients underwent clinical, endoscopic and histopathologic evaluation every two years. Thirty-six patients (35.6%) had developed columnar metaplasia during follow-up. Gastric acid secretion in basal condition and after pentagastrin stimulation, serum pepsinogen levels in basal condition and after betazole stimulation, and basal gastric serum levels were measured preoperatively in 15 patients with end stage chagasic achalasia who have developed Barrett’s esophagus, and the results were compared to 25 chagasic achalasia patients who did not have Barrett’s esophagus.

RESULTS: In the Barrett’s group, the mean basal and pentagastrin stimulated gastric acid secretion was significantly higher than in the non Barrett’s group (basal: 1.52 vs. 1.04, p = 0.04, stimulated: 19.40 vs. 13.78, p = 0.03). Basal and stimulated pepsinogen were increased at the Barrett’s group compared to non Barrett’s group (Basal = 94.1 vs., 66.1, p = 0.03; stimulated = 139.3 vs. 101.4, p = 0.04). There was no difference in serum gastrin between the two groups. Moreover, gastritis was present during endoscopic examination in 60% of the Barrett’s group, while it was detected only in 16% of the non Barrett’s group, p = 0.006.

CONCLUSIONS: 1. Barrett’s esophagus in the esophageal stump was associated to the preoperative levels of gastric acid secretion and serum pepsinogen; 2. The presence of gastritis in the transposed stomach, probably due to exposure to duodenogastric reflux, may indicate higher risk for developing Barrett in the esophageal stump.

Lack of Association Between a Self-Administered Questionnaire, GERDQ, and Objective GERD Findings Diagnosed by 24-Hour Esophageal pH Monitoring

Kevin Chan 2, Geoffrey Liu 2, Linda Miller 3, Clement Ma 3, Wei Xu 1, Gail Darling 1

We hypothesized that specific component questions of GERDQ were clinically associated with two key summary measures of the 24-hour esophageal pH monitoring: distal time (DT; % total time pH <4 in the esophagus) and Demeester score (DS; a formal weighting scale based on the esophageal pH measurements).

METHODS: 315 consecutive, unrelated individuals with GERD-like symptoms from the community were referred for the 24-hour esophageal pH monitoring. Participants completed a baseline GERDQ. Univariate analyses identified subset questions of GERDQ most associated with DT/DS. Multivariate analysis of this subset identified questions that independently predicted for GERD.

RESULT: 280 (89%) individuals had complete questionnaire and covariate data: 62% were female and the median (range) age of the candidate pool was 47.3 (18–84) years. 48% had onset of heartburn > 5 years; 51% reported heartburn to be severe or very severe. 51% were found to have true GERD on the basis of having either DT > 4% or DS > 14.7. Males were more likely to have true GERD (Chi-squared p = 0.04); age was not associated with GERD (p = 0.11). Univariate logistic regression identified 10/22 key GERD questions that were significantly associated with DT/DS. In multivariate analyses, only two questions (“Has acid regurgitation awakened you at night?” and “Have you ever had esophageal or gastric disease?”) remained significant; the c-statistic was 0.60 for DT/DS. An expanded analysis incorporated three additional clinically important GERD questions to the model (“How many years since your first onset of symptoms?”, “Has heartburn awakened you at night?”, and “What gender are you?”), and a scoring system was developed. 100% of individuals scoring ≥7 on an 8-point scale had true GERD; specificity and sensitivity for DT/DS were 100% and 14.0%, respectively. Sensitivity for any of these combinations of questions never reached above 70%.
CONCLUSION: No single or combination of components of GERDQ was sensitive enough to rule out patients for esophageal pH monitoring. Though a five-question short questionnaire may be useful for predicting a small subset of patients who have a very high chance of having true GERD, subjective questionnaire information was not useful in predicting which patients did not have GERD.

1085
Surgical Resection for Locoregional Esophageal Cancer Is Underutilized in the United States
Attila Dubecz1,2, Boris Sepesi1, Renato Salvador1, Marek Polomsky1, Carolyn E. Jones1, Virginia R. Little1, Daniel Raymond1, Thomas J. Watson1, Juan P. Wisnivesky3, Jeffrey H. Peters1
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BACKGROUND: While it is commonly reported that over half of patients with esophageal cancer (EC) initially present with systemic metastases, data from the American Cancer Society indicate that at least 55%, and as many as 70%, present with locoregional disease alone. While esophagectomy provides the highest probability of long-term cure, the perception of poor overall survival and high perioperative mortality results in many candidates never being referred for surgical evaluation. We hypothesized that esophagectomy for EC is underutilized and assessed the prevalence of resection in national, state and local cancer data registries.

PATIENTS AND METHODS: Clinical stage, surgical and non-surgical treatments, age, and race of patients with EC were identified from the Surveillance, Epidemiology and End Results (SEER) registry (1988–2004), the Hospital Association of NY State registry (HANYS 2007) and a single referral center (2000–2007). SEER identified a total of 25,306 patients with EC (average age: 65.0 years, male-to-female ratio: 3:1); treatment modality was identifiable in 22,617. HANYS identified 1519 admissions for cancer of the esophagus and cardia (average age: 67 years, M:F ratio 3:1); treatment modality was identifiable in all patients, though stage was not available from NY state registry data. A single referral center identified 420 patients (52/year; average age: 67 years, M:F, 3:1); treatment modality and stage were available in all. For SEER data, logistic regression was used to examine determinants of esophageal resection; variables tested included age, race and gender.

RESULTS: Sixty-three percent of the SEER population (14,240) was classified as having locoregional disease. Surgical resection was performed in 25% (5,644/22,617) of the total and only 39.6% of potentially resectable patients (5,644/14,240). Similarly, resection was performed in 28.6% (443/1519) of the total admissions from NY State. By comparison, 65% (272/420) of patients at a specialized referral center underwent surgical resection. Fifty seven percent (8,133) of patients in the SEER registry received no operative therapy. Resection rates for EC did not change between 1988 and 2004. Males were more likely to receive operative treatment (OR: 1.1, p < 0.05). Whites and blacks were less likely to undergo surgery than Asians (OR: 1.47, p < 0.01).

CONCLUSION: Surgical resection for locoregional EC is likely underutilized. Racial variations in esophagectomy are significant. While the pattern of utilization is poorly documented and largely unexplained, we believe that referral to specialized centers may result in an increase in patients considered for surgical therapy.
**Increase in the Tight Junction (TJ) Protein Claudin-1 in Intestinal Inflammation**

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**INTRODUCTION:** Alterations in TJ structure and function have been seen in both IBD and experimental models of inflammation. Studies have shown a decrease in key TJ proteins such as ZO-1 and occludin. Our group has also shown an increase in claudin-1, a transmembrane TJ protein, in DSS induced colitis. We hypothesize that claudin-1 is upregulated in intestinal inflammation.

**METHODS:** IEC-18 cells (ileal cell line) were treated with 0, 5, 50, or 100 ng/ml of TNFα for 48 hours (n = 4 all doses). Operative intestinal samples from patients with UC (colon), CD (terminal ileum (TI)), or a non-inflammatory condition (normal, both colon and TI) were collected and mucosa isolated. Western blots were performed on IEC-18 cells and tissue samples for claudin-1. Blots were stripped for actin as a loading control. UC and CD mucosal samples were compared to their respective controls with an unpaired t-test, IEC-18 samples were compared with ANOVA.

**RESULTS:** There was a significant increase in claudin-1 expression with 50 and 100 ng/ml of TNFα (see fig). There was significantly more claudin-1 expression in UC compared to normal, p < 0.0007 (see fig). Claudin-1 was increased in the TI of CD patients and approached statistical significance, p = 0.05.

**CONCLUSIONS:** 1) Treatment with TNFα, a key inflammatory cytokine in IBD, led to a significant increase in claudin-1 in IEC-18 cells. 2) There was a significant increase in claudin-1 in diseased colon in UC and an increase approaching statistical significance in diseased TI in CD. The increase in claudin-1 seen in inflammation may be a compensatory mechanism to maintain structural integrity of the TJ despite the loss of key proteins, ZO-1 and occludin.
M1749

Influence of Granulocyte-Colony Stimulating Factor (G-CSF) on the Tumorigenicity of Colorectal Carcinoma

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INTRODUCTION: Colony stimulating factors such as G-CSF modulate proliferation and differentiation of cells in the bone marrow and influence the activation and survival of peripheral leukocytes. However, the effects of G-CSF are not restricted to hematopoietic cells. Several solid tumors like bladder and ovarian carcinoma are known to be stimulated by G-CSF, gallbladder cancer expresses G-CSF receptors. Clinically, recombinant G-CSF is used more and more to overcome neutropenic periods during chemotherapy for cancer. Also, it has been shown to support liver regeneration after partial hepatectomy in mice: Whilst survival with liver regeneration was observed in mice treated with G-CSF after partial hepatectomy extending the critical remnant liver mass of >0.8% of their body weight, untreated mice died of liver failure. Approximately 50% of patients with colorectal cancer (CRC) develop liver metastases, but only 10% of those patients qualify for a curative liver resection for reasons including pattern and anatomic distribution of those metastases. Hence, understanding of G-CSF effects on liver CRC metastasis is mandatory as a first step towards a future clinical application of the observed G-CSF stimulus on liver regeneration.

METHODS AND RESULTS: In 5 CRC cell lines, murine CT26 and human Caco2, SW480, SW620 and DLD1, effects of recombinant G-CSF were determined. Proliferation assays comparing G-CSF challenged cells using AlamarBlue showed a diminished growth compared to placebo. LDH assays were performed to rule out direct toxicity of G-CSF. Immunohistochemistry was used to localize the G-CSF-receptor. Unlike in hematopoietic cells, the receptor in CRC cells was found to be cytoplasmic and not membrane standing. In RT-PCR and Western Blot analysis, a 6-fold upregulation of the G-CSF receptor was detected in G-CSF-treated cells compared to placebo challenged cells. Transwell migration and Matrigel invasion assays simulating conditions in basal membranes showed no difference between G-CSF- and placebo-treated cells (1, 2, 3, 4 and 5 days) permeating the membrane. Similarly, FACS analysis performed to determine cell cycle arrest and apoptosis after stimulation with G-CSF and placebo also showed no difference.

CONCLUSION: In contrast to other malignancies, growth and tumorigenicity of colorectal carcinoma does not seem to be stimulated by G-CSF in vitro. Effects of G-CSF on these cells differ from hematopoietic cells in receptor expression and localization. Further studies are necessary to determine in vivo effects of G-CSF on colorectal cells.

M1750

Plasma Levels of Placenta Growth Factor, a Proangiogenic VEGF Family Protein, Are Elevated in Colorectal Cancer Patients

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INTRODUCTION: Placenta growth factor (PIGF), a member of the VEGF family of proangiogenic proteins, plays a role in pathological angiogenesis; tissue expression levels are elevated in numerous malignancies and, in colorectal cancer (CRC), correlate with tumor stage, vascularity, and survival. Plasma PIGF levels in cancer patients have not been well studied. The purpose of this study was to evaluate plasma PIGF levels in patients with CRC or benign colonic conditions and to determine if there is a relationship between blood levels of tumor (T), nodal (N), or final tumor stage.

METHODS: Preoperative blood samples as well as demographic, clinical, and pathology data were obtained from patients undergoing colorectal resection for benign and malignant conditions. PIGF plasma levels were determined via ELISA in duplicate and are reported as mean ± standard deviation. The t test was used to compare PIGF levels between groups while the ANOVA test was used to assess the relationship between PIGF levels and T, N, or tumor stage in the cancer group. Significance was defined as p < 0.05.

RESULTS: A total of 124 CRC (80% colon, 20% rectal) and 111 patients with benign conditions (46% adenomas, 47% diverticulitis) were studied. The mean preoperative plasma PIGF level was significantly higher in the cancer group (15.7 pg/ml ± 5.3) than in the control group (13.5 pg/ml ± 5.3); (P = 0.001). There was no significant difference in levels noted between the rectal and colon cancer subgroups. Of note, no significant correlation between plasma PIGF levels and T or N stage was found although plasma levels were higher in node positive patients.

CONCLUSION: There is a modest (16%) but significant increase in mean plasma PIGF levels in CRC patients when compared to levels in patients with benign colonic disease. It is assumed that the tumor is the source of the additional PIGF found in the blood. Unfortunately, no relationship was found between plasma PIGF levels and either the T, N, or final tumor stage. It is not likely that blood levels of PIGF alone will be useful in staging or evaluating CRC patients.
Spatial Colonic Expression of Adiponectin in Normal, Inflamed and Hirschsprung’s Disease Models in Mice

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Adiponectin (ApN) is an adipocytokine predominantly secreted by adipocytes. Normal serum adiponectin levels have been shown to be important for anti-inflammation, but the role of local adiponectin expression in colon and in conditions of colonic inflammation such as Hirschsprung’s associated enterocolitis is not well described. Previous data from our lab using pooled microarray analysis of human colonic samples of normal and Hirschsprung’s disease patients revealed a 12 fold lower expression in adiponectin expression between aganglionic and ganglionic colon. Currently, we have found a differential spatial expression across normal colon, inflamed colon and colon of Hirschsprung’s disease (HD) models in mice.

METHODS: Immunohistochemistry for ApN, E-cadherin, and fibroblast marker was performed across the length of the colon of wildtype mice, mice with HD (Lethal spotting mutant) and mice treated with DSS to cause colitis. Real-time PCR for adiponectin, adiponectin receptors R1 and R2, and GFAP (a glial cell marker) was performed across the length of colon with the proximal colon having consistently the greatest expression and the more distal colon having significantly less expression. Mutant mice and mice treated with DSS have similarly lower levels of adiponectin compared to controls. Adiponectin receptor expression did not vary along the length of colon nor were there significant differences between colonic epithelium and muscularis layers.

RESULTS: Adiponectin expression was localized to the muscularis and submucosal layers of colon with minimal to no colonic epithelial expression. This expression colocalized to the myofibroblasts and smooth muscle cells of the colonic wall. Adiponectin expression varied along the length of the colon with the proximal colon having consistently the greatest expression and the more distal colon having significantly less expression. Mutant mice and mice treated with DSS have similarly lower levels of adiponectin compared to controls. Adiponectin receptor expression did not vary along the length of colon nor were there significant differences between colonic epithelium and muscularis layers.

CONCLUSIONS: Adiponectin but not adiponectin receptor expression varies along the length of the colon and is greatest within the colonic muscularis. The significance of this differential compartmental expression is unknown, however, the expression pattern of adiponectin in normal mice is similar to the compartment specific presence of colonic bacteria. This differential colonic adiponectin expression may be helpful to protect regions of the colon from bacterial invasion and inflammation. Adiponectin expression is also lower in murine models of inflammation and abnormal enteric nervous system development and did not reach normal levels in the ganglionic sections of colon of the mice with HD. Whether low adiponectin expression correlates with Hirschsprung’s associated enterocolitis has yet to be determined.
M1753
Survivin Gene Expression in Blood as a Prognostic Marker in the Surgical Therapy of Patients with Esophageal Cancer
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BACKGROUND: Although circulating tumor DNA has been detected in patients with different types of cancer, less is known about free RNA in cancer patients. Therefore, we evaluated if mRNA expression of survivin, an inhibitor of apoptosis, can be used to detect circulating tumor cells in peripheral blood of patients with esophageal cancer. Furthermore, we assessed the influence of complete surgical resection and the association of survivin levels in peripheral blood with prognosis.

METHODS: Sixty-two patients (53 men, 9 women; median age 60 years) with esophageal cancer (adenocarcinoma: n = 37; squamous cell cancer: n = 25) scheduled for surgical resection were included. A neoadjuvant radiochemotherapy was performed in 24 (39%) patients. Whole blood was drawn one day pre- and 10 days postoperatively from all study patients. After extraction of cellular tumor-RNA from blood samples, quantitative expression analysis of survivin was done by real-time reverse transcription polymerase chain reaction.

RESULTS: Survivin expression in blood was detectable in 81% of the study patients. The pre- and postoperative mRNA amount of survivin did not differ between patients with adenocarcinoma and squamous cell cancer (p = 0.26). Postoperative survivin expression levels were significantly lower than preoperative levels (p = 0.02). With a median overall survival of 29.4 months, patients with a preoperative survivin expression above the 60th percentile had a significantly shorter overall survival than patients with a reduced expression profile (p = 0.03; 23 vs. 38 months).

CONCLUSIONS: Direct quantification of survivin mRNA expression in peripheral blood of patients with esophageal cancer is technically feasible and is significantly reduced by complete surgical resection. Moreover, survivin gene expression in blood might become a non-invasive prognostic molecular marker in patients with esophageal cancer.

M1754
SPRR3, MELK, MAGE-4, and EGFR Gene Expressions in Esophageal Squamous Cell Carcinoma
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SPRR3 constitutes the largest member of the small proline-rich gene family and is associated with differentiation and the benign phenotype of the human esophageal epithelial cell. MELK is a cell cycle-regulated protein kinase involved in cell cycle progression, proliferation, tumor growth and messenger RNA (mRNA) splicing. MAGE-4 is a cancer-germline gene that is expressed in many tumors. Epidermal growth factor (EGFR) is overexpressed in esophageal tumors and might represent a gene target therapy. However, the clinical significance of these molecular markers has not been well established.

AIM: To verify SPRR3, MELK, MAGE-4, and EGFR gene expression in esophageal squamous cell carcinoma (SCC) in selected patients who had undergone potentially curative surgical treatment.

METHODS: Tissue specimens from 30 esophageal SCC and normal esophageal epithelium within the surgically resected specimens were frozen in liquid nitrogen immediately after their removal (up to 15 minutes). The samples were immediately immersed in liquid nitrogen and sent to the laboratory at −80°C freezer. After histopathological verification, the frozen specimens of each case were microdissected. Frozen specimens were cut in cryostat and were histopathologically analyzed, selecting the samples with maximum degree of viable tissue representation, from primary neoplasia and normal esophagus. The levels of mRNA were quantified by Real Time-RT-PCR using SybrGreen method (µL of diluted cDNA), SybrGreen Master Mix (concentrate 1X, 200µM primer sense e 200µM primer antisense in 20µL of reaction volume), compared to the constitutive gene β-actin.

RESULTS: SPRR3 expression was remarkable decreased in all esophageal SCC compared to the normal mucosa. EGFR was overexpressed in 61.5% of the tumors, and it was associated to the patients outcome (patients alive in the overexpressed group = 36.4% vs. 75% in the low expressed group, p=0.002). MELK was overexpressed in 84.7% of the patients, and MAGE-4 was overexpressed in all tumors. There was no association between downregulation of SPRR3 expression, overexpression of MELK, MAGE-4, and EGFR and clinicopathologic characteristics, including gender, age, T.N.M. stage, or grade of differentiation.

CONCLUSIONS: 1) SPRR3 is frequently downregulated in esophageal squamous cell carcinoma, and may play a role in the maintenance of normal esophageal epithelium; 2) MELK and MAGE-4 are upregulated and these genes may contribute to the tumorigenesis of esophageal squamous cell carcinoma; 3) These data support the role of targeted therapies against MELK, MAGE-4, and EGFR in the treatment of squamous cell carcinoma of esophagus.
Basic: Hepatic

M1755
Mediators of Immune System and Their Possible Role in Pathogenesis of Chronic HBV & HCV Infections
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INTRODUCTION: Chronic infection with hepatitis often results in cirrhosis and enhances the probability of developing HCC. Moreover the host response to hepatitis involves various components of the immune system, which have distinct role in outcome of the disease. Identification of the factors leading to severe liver damage and development of HCC might provide crucial clinical implications in the management of patients with such chronic infections.

OBJECTIVE: The aim of present study was to evaluate the levels of circulating biomarkers in the patients with chronic hepatitis virus infection of different etiology and their possible role in the pathogenesis of the disease.

MATERIALS & METHODS: The study was divided into 3 groups i.e. group 1 consist of patients with chronic HBV infections (n = 60), group 2 consist of patients with chronic HCV infections (n = 60) and group 3 consist of healthy controls (n = 60). Out of the total cases undertaken for the study equal no. of cases were of cirrhosis and healthy controls. Total viral load was quantified from the EDTA plasma using COBAS Amplicor Analyzer (minimum detection limit 300 copies/ml in HBV & 1620 copies/ml in HCV). The levels of circulating Th1/Th2 cytokines (IL-2, TNF-α, IFN-γ IL-4, IL-6, IL-10) through FACS; levels of C reactive protein; enzymes of antioxidant defense system, Glutathione reductase and Super oxide dismutase and levels of circulating nucleosomes were analyzed by ELISA. All the above parameters were then individually correlated with the viral load of HBV and HCV.

RESULTS: Viral load ranging from 7.4 × 10^1 to 5.3 × 10^7 copies/mL in HBV and from 1620 to 6.1 × 106 copies/mL in HCV was observed. There was a significant increase in the levels of IL-4, IL-6 and IL-10 in hepatitis patients in comparison to their respective controls. Further a strong positive correlation of viral load with IL-4 (r=0.5898, P < 0.001) and IL-6 (r = 0.725, P < 0.001) in HBV and IL-10 (r = 0.673, P < 0.001), IL-6 (r = 0.799, P < 0.001) in HCV was observed. Increase in the levels of circulating apoptotic nucleosomes, Glutathione reductase and C reactive protein were also observed in patients as compared to controls. The enzyme Glutathione reductase (r = 0.83 P < 0.001 in HBV and 0.451 in HCV P < 0.001) correlated positively, however there was no significant correlation with other circulating biomarkers was found.

CONCLUSION: Such studies can be helpful in designing interventionalal strategies like anti-viral therapeutic and/or immunotherapeutic strategies to prevent the progression and long-term consequences, for effective prevention of chronic infections and thereby contributing towards developing personalized medi-care.

Basic: Pancreas

M1756
Role of Metastasis Suppressor Genes and Their Epigenetic Regulation by Promoter Methylation in Pancreatic Carcinoma
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INTRODUCTION: The pancreatic ductal adenocarcinoma (PDAC) belongs to the most aggressive malignancies with an overall 5-year survival rate of less than 5%. A characteristic of this particular tumor entity is the early development of distant metastases, the mechanisms of which remain poorly understood. The aim of this study was to identify genes relevant to the process of metastasis in PDAC and analyze them for genetic and epigenetic alterations.

METHODS: We evaluated the metastatic and invasive potential of 16 PDAC cell lines of varying origin in a series of newly established orthotopic mouse models for PDAC. The resulting data was compiled into scores for metastatic and invasive potential. Methylation Specific PCR (MSP) and Bisulfite Sequencing PCR (BSP) were performed for all cell lines for the promoter region of 12 of the 15 described metastasis suppressor genes. The respective mRNA expression levels were determined by TaqMan Assay based qRT PCR for each gene and cell line as well as for a healthy control sample. Invasion- and metastasis-scores from the mouse models were compared to the data obtained from the epigenetic and mRNA analyses.

RESULTS: 5 of the 12 investigated metastasis suppressor genes showed promoter methylation in both BSP and MSP while the remaining ones did not show methylation. Results from both techniques were highly correlated (p < 0.01–0.001) with correlation coefficients r > 0.7 (except TIMP3). Promoter methylation correlated significantly with loss of mRNA expression in 2 of 5 methylated metastasis suppressor genes (p < 0.05). Metastasis suppressor gene mRNA expression did not correspond with a less aggressive phenotype of PDAC: AKAP12, BRMS1, CD44, KAI1 and MASPIN were significantly overexpressed in PDAC cell lines compared to normal pancreatic tissue, whereas only GPR54, MAP2K4, TIMP3 and TXNIP showed expected reduced mRNA expression. Furthermore, a significant correlation between the mRNA expression levels and metastasis scores was detected for AKAP12 and MASPIN (p < 0.05) and CD44 mRNA expression levels correlated significantly with invasion scores (p < 0.05). Discussion: Metastasis suppressor genes have mostly been identified by analyzing their impact on a distinct and often single tumor entity, such as mammary carcinoma. Our data suggests that not all of these genes may play an according role in PDAC and that in fact some of them may even promote tumor invasion and metastasis. We suggest their function for PDAC be reinvestigated. Furthermore, epigenetic regulation by promoter hypermethylation appears not to be a key regulator for most metastasis suppressor genes in PDAC.
CD4+ T cells play a central role in immune protection. Tumors might impair CD4+ T cell immune function, and this might contribute to tumor escape, a relevant finding in pancreatic cancer (PC). Aims were to: 1) compare the effects of PC and other gastrointestinal cancer (GIC) cells on human CD4+ T cells proliferation, migration and Th1 differentiation; 2) analyse whether cancer cells modify the expansion of CD4+ cell memory (CD45RO), naive (CD45RA), activated (CD69) and regulatory (CD25) subsets.

**METHODS:** CD4+ T lymphocytes were purified from blood donors' buffy coats (n = 29) (RosetteSep kit, Stem-Cell Technologies). CD4+ T cells were cultured for 4 days in control medium or in pancreatic (BxPC3, Capan1, MiaPaCa2), colorectal (HT29), gastric (AGS) or hepatocellular (HepG2) cancer cell conditioned media (CM). Migration was assessed using a transwell system in the presence or absence of hSDFα; the number of migrating cells was estimated by a luminescent cell viability assay (CellTiter-Glo®, Invitrogen). Cell proliferation, in the presence or absence of allogenic PBMC, was evaluated before and after 4 culture days. CD45RA, CD69 and CD25 membrane expression was FACS analysed in control and conditioned CD4+ T cells after 4 culture days. CD45RA, CD69 positive cells were significantly expanded by PC cell CM (χ² = 26.4, p < 0.001) but not by other GIC cell CM (χ² = 0.4, p:ns).

**RESULTS:** Both in the presence (χ² = 110, p < 0.001) and absence (χ² = 26.4, p < 0.001) of PBMC, only PC cell CM significantly lowered CD4+ T cell proliferation with respect to control or other GIC. In the absence of hSDF, a higher number of PC and other GIC conditioned CD4+ T cells transmigrate with respect to control (p < 0.001). In the presence of hSDFα only PC cell CM significantly reduced CD4+ T cell migration with respect to control (χ² = 40.3, p < 0.001). All PC CM significantly induced CD4+ T cell production of IFNγ (p < 0.01 for BxPc3, p < 0.05 for Capan1 and MiaPaCa2). Control or other GIC CM did not affect IFNγ production (p:ns). Control or tumor CM did not modify CD45RA, CD45RO or CD25 subsets. CD69 positive cells were significantly expanded by PC cell CM (χ² = 15, p < 0.001 for BxPc3, χ² = 16, p < 0.001 for Capan1, χ² = 10, p < 0.01 for MiaPaCa2) but not by other GIC cell CM (χ² = 0.4, p:ns).
M1759
Does Adiponectin Upregulation Attenuate the Severity of Acute Pancreatitis in Obesity?
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INTRODUCTION: Obesity is an independent risk factor for severe acute pancreatitis, though the mechanisms underlying this association are unknown. The powerful anti-inflammatory adipokine adiponectin is decreased in obesity. We recently showed that the severity of pancreatitis in obese mice is inversely related to circulating adiponectin levels, and therefore hypothesized that adiponectin upregulation would attenuate the severity of pancreatitis in obese mice.

METHODS: Forty congenitally obese (Lep db) mice were studied. Seven days prior to study, 20 mice received a single tail vein injection of adenovirus expressing recombinant murine adiponectin (APN; 2*10^8 pfu), the remainder received a control adenoviral vector expressing β-galactosidase (β-gal; 2*10^8 pfu). Half of the mice in each group had pancreatitis induced by cerulein injection (50 mcg/kg IP hourly for six hours). The other half received saline on the same schedule. Serum APN concentration and pancreatic tissue levels of interleukin-6 (IL-6), interleukin-1β (IL-1β), and monocyte chemoattractant protein-1 (MCP-1) were measured by ELISA. Histologic pancreatitis score was determined by 2 experienced observers based on the degree of inflammation (0–4), edema (0–4) and vacuolization (0–4). Data were analyzed by ANOVA and Tukey tests; p < 0.05 was considered significant.

RESULTS: No difference in body weight was observed among groups. Serum APN (mg/ml), pancreatic tissue concentration of IL-6, IL-1β and MCP-1(pg/ml), and pancreatitis score are shown in the Table.

<table>
<thead>
<tr>
<th>Group</th>
<th>Adiponectin</th>
<th>IL-6</th>
<th>IL-1β</th>
<th>MCP-1</th>
<th>Pancreatitis Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>gal-saline</td>
<td>5 ± 1</td>
<td>6 ± 1</td>
<td>10 ± 1</td>
<td>16 ± 2</td>
<td>0.3 ± 0.0</td>
</tr>
<tr>
<td>APN-saline</td>
<td>60 ± 5 §</td>
<td>6 ± 1</td>
<td>15 ± 4</td>
<td>23 ± 4</td>
<td>0.3 ± 0.0</td>
</tr>
<tr>
<td>gal-caerulein</td>
<td>5 ± 1</td>
<td>262 ± 41*</td>
<td>267 ± 46*</td>
<td>854 ± 126*</td>
<td>7.9 ± 0.7*</td>
</tr>
<tr>
<td>APN-caerulein</td>
<td>78 ± 10 §± 1</td>
<td>127 ± 40*</td>
<td>202 ± 27*</td>
<td>659 ± 137*</td>
<td>7.4 ± 0.9*</td>
</tr>
</tbody>
</table>

CONCLUSIONS: These data show that: 1) adenovirus administration significantly upregulates serum adiponectin concentration; 2) adiponectin upregulation significantly decreases pancreatic tissue IL-6 level, however, 3) does not change pancreatic IL-β1, MCP-1, or histologic pancreatitis severity. Adiponectin upregulation modulates the pancreatic cytokine milieu, but does not attenuate pancreatitis in this model of mild acute pancreatitis.

M1760
Sphingosine-1-Phosphate Promotes Paracellular Functional Protein Expression and Intestinal Epithelial Cell Barrier Function
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INTRODUCTION: Intestinal epithelial barrier dysfunction results from a wide variety of pathologic conditions such as infection, trauma, inflammation and malignancy. Disruption of intercellular junctional proteins appears to be a key pathway to loss of barrier integrity. Preliminary evidence from our lab has shown that Sphingosine-1-phosphate (S1P) S1P promotes intestinal epithelial barrier function through a mechanism involving the S1P-1 receptor, leading to increased E-cadherin protein and decreased paracellular permeability. We hypothesized that S1P would increase expression of the tight junction protein occludin in both physiologic and pathological conditions.

METHODS: Studies were performed upon cultured differentiated IECs (IEC-Cdx2L1 line). Western blotting and immunohistochemical staining were performed under standard protocols. Paracellular permeability was assessed using 14C-labelled mannitol, and transepithelial electrical resistance was measured by Voltohmeter.

RESULTS: Intestinal epithelial cells treated with LPS (50 mcM) showed increased paracellular permeability versus control (TEER dropped by ~34%), whereas S1P treatment (0.5 mcM) increased TEER by ~25% versus control. Pre-treating IECs with S1P before LPS exposure prevented the LPS-induced drop in TEER in a time-dependent fashion. Treatment of IECs with S1P (0.5–5.0 mcM) increased E-cadherin protein by Western blot, however did not significantly increase levels of occludin. However, S1P (0.5–1.0 mcM) did increase phosphorylated occludin (P-occludin) levels versus control. LPS application (50 mcM, 4h) to IECs decreased occludin protein levels by Western blotting that was completely prevented by S1P (0.5 mcM, 1h) pretreatment. Finally, in immunofluorescence studies, LPS (50 mcM, 3h) disrupts cortical staining by occludin versus control, however pretreatment with S1P (1 mcM, 2h) preserves the occludin cortical staining.

CONCLUSIONS: These results indicate that S1P promotes intestinal epithelial barrier function during LPS exposure. S1P increases expression of the tight junction protein P-occludin, prevents decreases in occludin levels seen during LPS exposure, and maintains paracellular permeability during LPS exposure.
Duodenal-Jejunal Exclusion Increases Mid-Jejunal GIP Content in Wistar Rats

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INTRODUCTION. Enteroendocrine K cells secrete the incretin hormone glucose-dependent insulinotropic peptide (GIP) and are predominately located in the duodenum. Theoretically, GIP levels should decrease after gastric bypass surgery due to the duodenal exclusion of K cell stimulation. However, studies have found conflicting data regarding the changes in intestinal GIP secretion after gastric bypass. We utilized lymphatic sampling as a more sensitive medium than plasma to measure gastrointestinal GIP concentrations in rodents. We hypothesized that a marginal change in GIP concentration after duodenal jejunal exclusion (DJE) is due to a compensatory increase in GIP production and secretion from distal small bowel enteroendocrine cells.

METHODOLOGY: We performed a DJE (n = 10), which bypasses the duodenum and first 10 cm of the jejunum with a 15 cm jejunal limb, or sham surgery (n = 9) in 12 week-old, male, Wistar rats. An oral glucose tolerance test (OGTT) was performed at approximately 10 days after surgery. Superior mesenteric lymphatic cannulation was performed 2 weeks after DJE or sham surgery. An intragastric mixed meal was administered and lymph and plasma samples were collected for one hour and analyzed for total GIP concentration. 4 intestinal segments were obtained for GIP quantification: (1) duodenum (2) 10 cm distal to the ligament of Treitz (LOT) (distal to the duodenojejunos-tomy in DJE rats), (3) 25 cm distal to the LOT (distal to the roux-en-y anastomosis in DJE rats) and (4) ileum.

RESULTS: There was no difference in body weight at any time point between the surgical groups. There was no difference in glucose concentration area under the curve (AUC). DJE rats tended to have an increased insulin concentration AUC compared to sham rats (4.11% ± 0.37 vs. 2.52% ± 0.30 respectively, p = 0.01). There was no difference in plasma or lymphatic GIP concentration AUC between DJE and sham rats (lymph: 15240 (pg/ml) min ± 2651 vs. 16939 (pg/ml) min ± 3417 respectively, p = 0.70). GIP intestinal content (% GIP/total protein) was increased in the mid-jejunum (distal to the roux-en-y anastomosis) in DJE rats compared to sham rats (4.11% ± 0.37 vs. 2.52% ± 0.30 respectively, p = 0.01).

CONCLUSIONS: Plasma and lymphatic GIP concentrations did not significantly change after DJE in Wistar rats. Bypassing duodenal K cells after duodenal exclusion is countered by an increase in mid-jejunal GIP intestinal content and secretion at the new site of primary nutrient absorption. This increase in intestinal GIP content likely explains the marginal and conflicting changes in plasma GIP concentrations after gastric bypass.

Intestinal Preconditioning Causes Early Barrier Dysfunction Without Interfering with Ion Transport in Porcine Ileal Mucosa

Fernando Huete-Toral, Elena Molina-Roldan, Iris Sanchez-Egido, Rocio Anula, Jesus A. Fernandez-Represa, Julio M. Mayol

INTRODUCTION. Intestinal PC does not alter either baseline electrical barrier properties (TER: 78 ± 5.1 vs. 72.9 ± 8.2; n = 13, NS) or baseline currents (Isc: 30.9 ± 2.9 vs. 39.5 ± 7.5; n = 13, NS). Cyclic nucleotide-activated currents (peak Isc: 47.7 ± 3.4 vs. 41.9 ± 2.5 ) or calcium-stimulated secretion (peak Isc: 5.5 ± 2.6 vs. 6.2 ± 2.7) were not affected either. However, paracellular permeability assessed by FITC as a probe. H&E staining was used to assess microscopic morphology. Student’s t test was used for statistical analysis.

RESULTS: Preconditioning did not alter either baseline electrical barrier properties (TER: 78 ± 5.1 vs. 72.9 ± 8.2; n = 13, NS) or baseline currents (Isc: 30.9 ± 2.9 vs. 39.5 ± 7.5; n = 13, NS). Cyclic nucleotide-activated currents (peak Isc: 47.7 ± 3.4 vs. 41.9 ± 2.5 ) or calcium-stimulated secretion (peak Isc: 5.5 ± 2.6 vs. 6.2 ± 2.7) were not affected either. However, paracellular permeability assessed by FITC (Fluorescence at 30 min: 222 ± 61.7 counts vs. 65.3 ± 23.0 counts; n = 6 p = 0.038), was transiently increased. No morphological difference between preconditioned and control mucosa was observed.

CONCLUSIONS: Intestinal PC does not alter either baseline or stimulated secretion but causes an early increase in permeability in porcine ileal mucosa.
EGF-Receptor Targeting in Combination with Chemotherapy: Not Effective in Experimental Gastric Cancer

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BACKGROUND: Overexpression of epidermal growth factor receptor 1 (EGFR1) plays a central role in malignant transformation and tumor progression. EGFR1 inhibition by specific antibodies or tyrosine-kinase inhibitors yielded therapeutic effects in colon and lung cancer. Aim of this study was to evaluate the effect of EGFR1 inhibition alone or in combination with chemotherapy on human gastric cancer cell lines in vitro and in an orthotopic nude mouse model.

METHODS: In vitro: 3 human gastric cancer cell lines (poorly differentiated MKN-45 and AGS; well differentiated NCI-N87) were exposed to increasing concentrations of the chemotherapeutics Carboplatin (0–3000 µg/ml), Irinotecan (0–1000 µg/ml), Docetaxel (0–300 µg/ml), or to the EGFR1-antibody Cetuximab (0–100 µg/ml) and the EGFR-tyrosine-kinase inhibitor Erlotinib (0–10 µM). Cell proliferation was assessed after 24 hours by MTT-assay. In vivo: 1 cm³ fragments from subcutaneous MKN-45 donor tumors were orthotopically implanted into the gastric corpus of 48 nude mice. Animals were randomized in control and 3 treatment groups: the application of Carboplatin (20 mg/kg, weekly ip.), Cetuximab (1 mg, weekly ip.) or the combination of both substances started 4 weeks after tumor induction and was continued for 14 weeks or until death. Primary tumor volume, local infiltration and metastatic spread (dissemination score) were determined at autopsy. H&E stained sections of all organs were analyzed to assess micrometastasis.

RESULTS: In vitro: Carboplatin was most effective among the evaluated chemotherapeutics and significantly reduced proliferation of gastric cancer cells in a dose dependent manner (MKN-45: –81%; AGS: –57%; NCI-N87: –67%). High concentrations of the EGFR1 inhibitors Cetuximab and Erlotinib only reduced proliferation of MKN-45 cells (–16% and –17%, respectively). In vivo: table.

CONCLUSION: The evaluated chemotherapeutics reduce proliferation of human gastric cancer cell lines in vitro, but not in vivo: Carboplatin as the most potent drug did not exert an effect, at least in a therapeutic setting, which started 4 weeks after tumor induction. Activating K-Ras mutations downstream of the EGFR may be a possible explanation for lacking effects of the EGFR-inhibitors.

Clinical: Biliary

Prognosis After Surgery of Cholangiocarcinoma: Peripheral Intra-Hepatic Cholangiocarcinoma Versus Peri-Hilar Cholangiocarcinoma

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BACKGROUND: Cholangiocarcinoma is the second most frequent primary liver cancer, despite improvement of diagnosis only few patients can be submitted to resective surgery with curative intent. According to its location and characteristics cholangiocarcinoma can be classified into two different categories: peripheral intrahepatic cholangiocarcinoma (ICC) and perihepatic cholangiocarcinoma (PCC). The aim of this study is to compare the results of resective surgery of ICC and PCC.

METHODS: Ninety-five out of 152 patients observed between January 1990 and December 2007 in a single division of surgery of University of Verona Medical School underwent to surgical resection of a ICC (33 patients) or PCC (62 patients); the resectability rate was 62.5%. R0 resection was achieved in 73 patients (77%). The surgical resections included 65 (66.9%) major liver resections and 60 patients (62%) underwent combined extra-hepatic bile duct resection.

RESULTS: The median survival of the entire group was 24 months; actuarial 3- and 5-year survival was respectively 44% and 23%. Univariate analysis showed that the factors associated with survival were tumor type (ICC or PCC), an R0 resection, lymph node metastasis and macroscopic vascular invasion. Multivariate analysis identified that R0 resection and macroscopic vascular invasion were the most important prognostic factors associated with survival, with hazard ratios of respectively 2.14 and 1.95. Further analysis identify that survival was significantly longer in ICC compared to PCC with a 5 years survival of 26 and 13%, respectively. The analysis of the different clinicopathological factors identified a significant higher rate of R+ resection, perineural infiltration, regional lymph node metastases and macro-vascular invasion in PCC compared to ICC.

CONCLUSION: Our results confirm that only R0 resection can provide good long term survival. The macroscopic type of the tumor (ICC or PCC) is an important prognostic factor and the higher frequency of negative clinic-pathological factors can explain the worse prognosis of PCC.
Unilateral Versus Bilateral Plastic Stenting for Malignant Hilar Stricture: A Meta-Analysis and Systematic Review of Risks


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BACKGROUND: Plastic stents are used for palliating inoperable malignant hilar strictures. It is unclear if bilateral plastic stenting provides any advantage over unilateral stenting.

AIM: To compare bilateral and unilateral plastic stenting in malignant hilar strictures.

METHOD: Study Selection Criteria: Studies using plastic stents for palliation in patients with malignant hilar stricture. Data collection & extraction: Articles searched in Medline, Pubmed, Japanese language literature, Ovid journals, CINAHL, International pharmaceutical abstracts, old Medline, Medline nonindexed citations, and Cochrane Central Register of Controlled Trials & Database of Systematic Reviews. Two reviewers independently searched and extracted data.

STATISTICAL METHOD: Pooled proportions were calculated using Mantel-Haenszel method (fixed effects model) and by the DerSimonian Laird method (random effects model). The heterogeneity among studies was tested using Cochran’s Q test based upon inverse variance weights.

RESULTS: 1540 reference articles were identified, of which 129 were selected and reviewed. 8 studies (N = 367) for bilateral plastic stenting and 8 studies (N = 850) for unilateral plastic stenting which met the inclusion criteria were included in this analysis. Pooled data are shown in table 1. The pooled estimated by fixed and random effect models were similar. The p for chi-squared heterogeneity for all the pooled accuracy estimates was > 0.10.

Table 1. Comparison of Bilateral Plastic Versus Unilateral Plastic Stenting for Malignant Hilar Obstruction

<table>
<thead>
<tr>
<th>Odds Ratio with 95% CI</th>
<th>P (Tests If Odds Ratio Different From 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success of Placement</td>
<td>0.94 (0.64 to 1.38)</td>
</tr>
<tr>
<td>Decrease in Bilirubin</td>
<td>2.29 (0.67 to 7.81)</td>
</tr>
<tr>
<td>Overall Complications</td>
<td>1.42 (0.21 to 9.33)</td>
</tr>
<tr>
<td>Early Complications</td>
<td>1.54 (0.92 to 2.59)</td>
</tr>
<tr>
<td>Overall Cholangitis</td>
<td>1.46 (0.68 to 3.16)</td>
</tr>
<tr>
<td>Early Cholangitis</td>
<td>2.19 (0.64 to 7.57)</td>
</tr>
<tr>
<td>Late Cholangitis</td>
<td>1.26 (0.06 to 24.74)</td>
</tr>
<tr>
<td>30 Day Mortality</td>
<td>0.78 (0.38 to 1.61)</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Unilateral plastic stenting seems to have similar odds of overall complications, cholangitis, and 30 day mortality when compared to bilateral plastic stenting for malignant hilar strictures. In patients with malignant hilar stricture, unilateral plastic stenting is comparable to bilateral plastic stenting for adverse events.

Can Pre-Operative Clinical and Imaging Findings Predict the Laparoscopic or Open Approach for Cholecystectomy? A One-Year Study from a Community Based Teaching Hospital

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INTRODUCTION: Laparoscopic cholecystectomy is the gold standard for the treatment of cholelithiasis; however the conversion rate varies from 1–20%. In spite of the recent advances both in terms of surgeon’s experience/technique and the availability of newer sophisticated instruments the incidence of conversion is actually true. This conversion is neither a failure nor a complication, but an attempt to avoid complications. Our aim was to evaluate the various preoperative risk factors that could accurately predict the conversion from laparoscopic to open cholecystectomy.

METHODS: All patients who had undergone cholecystectomy over the 12-month period from July 2007 to June 2008 at our hospital were included in the study. Retrospective analysis of the charts of these patients was done. Clinical, hematological, biochemical, imaging parameters and operative findings were recorded. Patients with additional procedures planned or who had a provisional diagnosis of gall bladder cancer were excluded from the study.

RESULTS: Four hundred and seventy one patients successfully underwent cholecystectomy over a 12-month period from July 2007 to June 2008. 1.91% (9/471) patients were directly planned for open cholecystectomy. Overall conversion rate in our study was 4.67% (22/471). The most frequent reason for conversion was severe inflammation and unclear anatomy at calot’s triangle (n = 12) followed by adhesions (n = 6) and gangrenous cholecystitis (n = 3). One patient had to be converted to open approach because of severe obesity and failure to create pneumoperitoneum. Multivariate analysis identified elderly patients (>60 years), elevated white cell count (>11,000/cu mm), elevated bilirubin (>1.5 mg/dL), CBD stones, evidence of gall bladder wall thickness (>3 mm) and/or pericholecytic fluid (either on Ultrasound/CT scan) and a positive HIDA scan as independent predictors of conversion. The post graduate year of resident assisting in the case had no significant effect on conversion rate.

CONCLUSION: Pre-operative clinical and imaging findings can successfully predict in selecting the laparoscopic or open approach or on the least can alert the surgeon for a possible difficult surgery. Apart from choosing the approach, it also improves patient counseling, helps in better perioperative planning and decreases post operative morbidity and hospital costs.
Tissue Cytokines Reveal Gender Difference in Acute Cholecystitis
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BACKGROUND: Male sex is a predictor for poor outcomes in patients with cholecystitis. Socioeconomic factors or gender-dependent inflammatory modulation may contribute to negative clinical outcomes.

PATIENTS AND METHODS: Patients presenting with acute or chronic cholecystitis for laparoscopic cholecystectomy were prospectively enrolled in the study. Acute cholecystitis was defined as a patient with unrelenting right upper quadrant pain, tenderness, and/or elevated WBC count, temperature, or ultrasonographic signs of acute cholecystitis. Demographic and socioeconomic data were obtained with a detailed survey. Interstitial fluid from gallbladder fundus and infundibulum biopsies were analyzed for inflammatory cytokines and estradiol using a multiplex cytometric bead assay and estradiol enzyme immunoassay. ANOVA and logistic regression was used for statistical analysis. The study was IRB approved.

RESULTS: Clinical data for 89 patients (27 men, 62 women; mean age 37 yrs, mean BMI 32) were analyzed; tissue cytokine results were available for 64 patients. A WBC > 11,000 (OR 2.7, CI 1.02–7.2, p = 0.045) and a temperature >100°F correlated with acute cholecystitis. No difference in WBC count, temperature, BMI, insurance status, or level of education was encountered between genders. Patients with acute cholecystitis had higher interleukin and lower tissue estradiol levels than patients with chronic cholecystitis. Men with acute cholecystitis had significantly higher tissue levels of IL-1β, IL-8, and IL-10 but not IL-6 or Estradiol than women (table).

CONCLUSION: Significant differences in tissue level cytokines by disease state and gender were encountered although clinical presentation and socioeconomic status for men or women was not significantly different.

Table 1. Tissue Cytokine Levels by Disease State and Gender

<table>
<thead>
<tr>
<th>Cytokine</th>
<th>Acute Male n = 30</th>
<th>Acute Female n = 18</th>
<th>P Value</th>
<th>Chronic Male n = 34</th>
<th>Chronic Female n = 34</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estradiol (ng/mL)</td>
<td>7.9 ± 2.6</td>
<td>17.5 ± 3.3</td>
<td>0.01</td>
<td>9.7 ± 4.1</td>
<td>n.s.</td>
<td>17.5 ± 3.3</td>
</tr>
<tr>
<td>IL-6 (ng/mL)</td>
<td>10.8 ± 2.0</td>
<td>3.5 ± 1.1</td>
<td>0.0004</td>
<td>14.0 ± 3.2</td>
<td>8.7 ± 2.4</td>
<td>n.s.</td>
</tr>
<tr>
<td>IL-8 (ng/mL)</td>
<td>16.5 ± 2.7</td>
<td>4.0 ± 1.0</td>
<td>0.0001</td>
<td>25.5 ± 4.3</td>
<td>10.4 ± 3.0</td>
<td>0.002</td>
</tr>
<tr>
<td>IL-10 (pg/mL)</td>
<td>24.6 ± 4.0</td>
<td>12.2 ± 1.6</td>
<td>0.002</td>
<td>38.8 ± 8.5</td>
<td>15.2 ± 2.5</td>
<td>0.002</td>
</tr>
<tr>
<td>IL-1β (pg/mL)</td>
<td>1145 ± 291</td>
<td>452 ± 116</td>
<td>0.01</td>
<td>1971 ± 605</td>
<td>595 ± 236</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Bile Duct Injuries Associated with Open and Laparoscopic Cholecystectomy
Orlando J. Torres, Aline M. Farias, Maria Helena D. Costa, Lara C. Lucena, Mauricio M. Matias, Vanessa S. Costa, Ricardo A. Araujo, Aline Q. Castanho, Candida N. Lima
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INTRODUCTION: Major bile duct injury following cholecystectomy is a serious complication having a considerable long-term morbidity and occasional mortality. This is aggravated by delayed recognition of injury or a failed initial repair. Major bile duct injury can occur due to open or laparoscopic cholecystectomy. The aim of this analysis was to identify the possible differences between major bile duct injury associated with open and laparoscopic cholecystectomy.

METHOD: This retrospective review includes 16 consecutive major bile duct injuries following cholecystectomy, undergoing management in a single unit at our hospital, which is a tertiary care referral centre between March 2004 and April 2008. Major bile duct injury was defined as occlusion of the common bile duct either by transection or development of a stricture or major segmental ducts injured at the porta hepatic. The patient profile, time of presentation, and primary management were recorded.

RESULTS: There were 14 female (87.5%) and two male (12.5%) with a mean age of 44.1 ± 16.4 years. Thirteen patients (81.2%) were referred from outside our institute and one patient with history of prior repair. Nine patients (56.3%) underwent open cholecystectomy and seven patients (43.7%) underwent laparoscopic cholecystectomy. In one patient the laparoscopic cholecystectomy was performed due to acute cholecystitis in an emergency surgery. Four of the injuries (25.0%) were recognized intra-operatively. This intra-operative diagnosis led to immediate conversion of the procedure to a standard laparotomy. The other twelve injuries (75.0%) were diagnosed post-operatively and manifested as biliary peritonitis and emergency surgery (two patients –16.7%), bile leakage (three patients –25.0%), or jaundice (seven patients –58.3%). The diagnosis was confirmed by abdominal ultrasound, computed tomography, magnetic resonance cholangiography or endoscopic retrograde cholangiograms. The Bismuth's classification was Type I in 3 patients, Type II in 9 patients, Type III in 3 patients and Type IV in 1 patient. Surgical management in all patients consisted of Roux-en-Y hepaticojunostomy. The anastomosis was carried out to the confluence, which was extended to the left duct. The mean postoperative length of stay was 11 days (range 5–42 days). There was one death (6.25%).

CONCLUSIONS: Major bile duct injuries remain a significant problem in biliary surgery. When the first repair is performed by surgeon experienced in hepatobiliary surgery, the success rate is high. There was no difference between laparoscopic and open cholecystectomy in terms of outcome and complications.
M1527

**Complete Laparoscopic Cholecystectomy Through the Umbilicus**

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**BACKGROUND:** Natural orifice transumbilical surgery (NOTUS) is a new surgical method whereby a laparoscopic operation is performed with all incisions placed within the umbilicus leaving no visible abdominal scars. We present our initial experience with nine patients who underwent NOTUS cholecystectomy utilizing three transumbilical laparoscopic ports.

**METHODS:** Eight patients had chronic cholecystitis and two patients had symptomatic cholelithiasis. Four of ten patients had previous open abdominal surgery. All procedures were performed utilizing a flexible-tip camera, rigid grasper, scissor, and automated clips as well as articulating dissector and hook. Transabdominal subcostal suture retraction of the gallbladder was not utilized.

**RESULTS:** The mean operative time was 79 minutes. There were no intraoperative or postoperative complications. There was one conversion to standard four-port laparoscopic cholecystectomy due to severe chronic inflammation. Four were discharged on the same operative day and six were discharged after a 23 hour stay. There were no postoperative complications.

**CONCLUSION:** Cholecystectomy performed through transumbilical laparoscopic trochars is technically feasible and safe in well selected patients. The primary advantage is the lack of visible abdominal scars. Further clinical trials comparing NOTUS cholecystectomy to conventional laparoscopic cholecystectomy are needed.

M1528

**Mirizzi Syndrome Type IV: An Atypical Presentation That Is Difficult to Diagnose Preoperatively**

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Mirizzi syndrome is an atypical presentation of gallstone disease in which the impaction of a gallstone in either the cystic duct or the gallbladder causes stenosis of the extrahepatic bile duct by extrinsic compression and/or fibrosis. In some cases, the associated inflammation progresses to cholecystocholedochal fistula formation. The Mirizzi syndrome incidence is 0.7–2.5% of all patients undergoing cholecystectomy. It is important to surgeons because the diagnosis may not be made preoperatively and it is associated with an increased risk of bile duct injury. Accurate definition of the biliary anatomy preoperatively is essential for optimal surgical planning. The present case describes Mirizzi syndrome classified as type IV in a 77 year-old man with abdominal pain without clinical jaundice, normal bilirubin level and an alkaline phosphatase slightly elevated. Abdominal ultrasound suggested dilated intrahepatic bile ducts and gallstones. Patient underwent endoscopic retrograde cholangiopancreatography (ERCP) which demonstrated a dilated extra and intrahepatic biliary tree compatible with a Klatskin tumor. Magnetic Resonance cholangiopancreatography (MRCP) also suggested a Cholangiocarcinoma at the common hepatic duct junction. Patient underwent an exploratory laparotomy with Mirizzi syndrome type IV being confirmed during cholecystectomy, with extraction of a 2.3 cm stone from the common bile duct. Roux-Y- Hepaticojejunostomy reconstruction was performed as a final treatment for Mirizzi syndrome type IV. Mirizzi syndrome is rarely diagnosed preoperatively and it remains a diagnostic and therapeutic challenge for endoscopists and biliary surgeons.

M1529

**Outcomes of Ileal Pouch-Anal Anastomosis in Women Above 50 Years Old**

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**OBJECTIVE:** Longterm functional outcomes after IPAA in female patients over 50 years have not been reported. Surgeons may thus hesitate to offer IPAA to these patients. We evaluate outcomes after IPAA in this group of patients.
METHODS: Between 1983 and 2007, data of all female patients >50 years old undergoing IPAA (Group A) were evaluated from a prospectively maintained institutional review board approved pelvic pouch database and patients’ records. Data included demographics, operative details, complications, functional outcomes and QOL. Functional outcomes were determined by bowel function, FIQL and FISI. The QOL was assessed using the Cleveland Global Quality of Life scale. Group A patients were compared with women younger than 50 years of age after matching for BMI, primary indication, year of surgery and final pathology (Group B).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A (&gt;50 Yrs) (n = 239)</th>
<th>Group B (&lt;50 yrs) (n = 239)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowel Movements</td>
<td>Day 6 (Iqr 4, 8)</td>
<td>5 (Iqr 4, 7)</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Night 2 (Iqr 1, 3)</td>
<td>2 (Iqr 1, 3)</td>
<td>0.3</td>
</tr>
<tr>
<td>Pad Usage (No)</td>
<td>Day 92/189 (48.7%)</td>
<td>47/192 (24.5%)</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Night 109/190 (57.4%)</td>
<td>58/190 (30.5%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Seepage (No)</td>
<td>Day 67/184 (38.4%)</td>
<td>50/183 (27.3%)</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Night 100/185 (54.1%)</td>
<td>72/190 (37.9%)</td>
<td>0.002</td>
</tr>
<tr>
<td>Urgency never/rarely</td>
<td>106/201 (52.7 %)</td>
<td>122/193 (63.2%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Incontinence never/rarely</td>
<td>129/198 (65.2%)</td>
<td>144/193 (74.6%)</td>
<td>0.05</td>
</tr>
<tr>
<td>FIQL-total</td>
<td>12.9 ± 3.6</td>
<td>12.4 ± 4.4</td>
<td>0.3</td>
</tr>
<tr>
<td>FSI</td>
<td>26.9 ± 15.2</td>
<td>19.4 ± 16.7</td>
<td>0.001</td>
</tr>
<tr>
<td>Cleveland Global Quality</td>
<td>0.8 ± 0.2</td>
<td>0.8 ± 0.2</td>
<td>0.25</td>
</tr>
<tr>
<td>Of Life Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FIQL = Fecal incontinence quality of life
FISI = Fecal incontinence severity index

RESULTS: Of 3382 patients with IPAA, 239 female patients > 50 years old in Group A. The mean age was 57.7 ± 5.7 years and median follow-up 5 years (Iqr 2.2–10.1). Final pathological diagnosis was ulcerative colitis (66%), indeterminate colitis (15%), Crohn’s disease (5%), familial adenomatous polyposis (4%), and others (10%). Majority of patients had total proctocolectomy (68%), J-pouch (94%), stapled anastomosis (89.4%), and proximal diversion (88.7%). The two groups were comparable for the matched characteristics. Follow up duration (p = 0.9), postoperative complications (p = 0.95) and parity (p = 0.6) were similar while comorbidities (p = 0.004) and previous use of medications (p = 0.02) were higher in Group A. Group A patients had worse function as manifest by incontinence (p > 0.05), urgency (p = 0.04), and pad usage (p = 0.001). QOL was however similar (p = 0.3).

CONCLUSION: Although longterm pouch function in female patients over 50 years age is worse than their younger counterparts, QOL is comparable. This maybe related to the effect of age and should be considered when counseling before IPAA.

M1530
Neoadjuvant Radiochemotherapy for Rectal Cancer—Is Histopathological Response Dependent on Histological Subtype?
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Department of Surgery, Charité Universitätsmedizin Berlin, Berlin, Germany

INTRODUCTION: Neoadjuvant radiochemotherapy (RCT) is the current standard for treatment of locally advanced rectal cancer aiming at downstaging the tumor and improvement of local recurrence rate. About one third of rectal cancer treated by this means, however, shows no regression. Current surgical research engages in the identification of this groups in advance. A mucinous component in rectal cancer represents a potential risk factor possibly associated with a decreased response. The aim of the study was to compare the response of mucinous and non-mucinous rectal cancer to neoadjuvant RCT.

PATIENTS & METHODS: Patients with locally advanced rectal cancer (uT3/4N+) of the lower and middle third were treated with neoadjuvant RCT (54 Gy + 5 FU). Local staging was standardized by means of rigid rectoscopy, rectal ultrasound and MRI. 6–8 weeks after completion of RCT standardized resection was performed (TME, AMI ligature and optional protective ileostomy). Patients were divided in mucinous (Group M+) and non-mucinous cancer (Group M–) by histology. Both groups were compared with regard to the grade of regression (Dworak), the post-operative pathological staging (pTN) and downstaging. Downstaging was defined as a reduction of T and N category in resection specimen vs. pretherapeutic staging (score: 1 point per change of T- and N-category).

RESULTS: 80 patients with rectal cancer treated with neoadjuvant RCT before surgery were included between 1999 and 2008. 15 patients had mucinous carcinoma (M+), 65 patients had no mucinous component (M–). There was no significant difference in age, sex, pretherapeutic staging (uTN) and pathological grading between the two groups. Tumor regression was significantly pronounced in group M+ compared to the group of mucinous rectal cancer patients (M–), whereas nodal status did not differ significantly (Table). A complete regression was found in 25% (Group M–) and in 10% (Group M+) (p = 0.003).

<table>
<thead>
<tr>
<th>Subtype?</th>
<th>T (Pre-/Post RCT)</th>
<th>N (Pre-/Post RCT)</th>
<th>Score TN (Pre-/Post RCT)</th>
<th>Regression Grade</th>
<th>Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group M–</td>
<td>0,95</td>
<td>0,95</td>
<td>1,50</td>
<td>3,00</td>
<td>2,31</td>
</tr>
<tr>
<td>Group M+</td>
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<td>0,53</td>
<td>0,93</td>
<td>1,80</td>
<td>2,44</td>
</tr>
<tr>
<td>p-value</td>
<td>0,037</td>
<td>0,834</td>
<td>0,069</td>
<td>0,003</td>
<td>0,689</td>
</tr>
</tbody>
</table>

Differences in the scores of T and N categories between pre- and post-RCT staging (Delta T, Delta N und Delta TN), the post-RCT grading and the grade of regression (Dworak).

CONCLUSION: The histologic subtype has an influence on the response of neoadjuvant RCT. Rectal cancer patients with a mucinous component have a worse response, as well as a lower degree of regression. If this should result in a less favorable prognosis, in future modified neoadjuvant therapeutic strategies might be considered for these easily identifiable patient group.
M1531

Caspase-Cleaved Cytokeratin 18 Fragment (M30) and Circulating Cytokeratin 18 Fragment (M65) as Marker of Postoperative Residual Tumor Load in Colorectal Cancer Patients

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BACKGROUND: Despite radical surgery 30–50% of colorectal cancer patients subsequently develop distant metastases. In these patients, neoplastic cells were disseminated either before or during surgery of the primary cancer. Appropriate detection systems for the routine clinical use to determine the extend of pre- and intraoperative hematogenic tumor cell dissemination are still missing. Soluble cytokeratin 18 (CK18; M65) and a caspase-cleaved fragment of CK18 (M30) have been used as biomarkers, corresponding to tumor cell death and apoptosis respectively. Aim of this study was to evaluate the significance of pre- and postoperative cell death measurements in serum of colorectal cancer patients.

PATIENTS AND METHODS: M30 and M65 were quantified in serum samples pre- and postoperatively and during chemotherapy. Minimal residual disease (MRD) as negative prognostic factor was assessed by detection of cytokeratin-positive tumor cells in bone marrow aspirates and assessed by staining with the pan-cytokeratin antibody A45–B/B3 in bone marrow aspirates. A total of 73 colorectal cancer patients and 27 people without cancer were included into the study.

RESULTS: Patients with colon tumors of stages UICC I and IV had significantly elevated M30 serum concentrations compared to controls. M65 measurements showed elevated levels in UICC I and II, compared to normal controls (p < 0.05). In 31 colon cancer patients, M30 and M65 determinations were performed prior to and seven days after tumor surgery. A group of 24 patients exhibited a significant decrease of M30 in response to tumor removal, in contrast to seven patients with either persistent or higher M30 levels postoperatively. M30 correlated significantly with the increased number of recurrences within 36 months in the group with persisting levels of M30 (4/7 versus 2/24, p = 0.032). Tumor surgery led to decreased M65 serum measurements postoperatively in a subgroup of patients (19/31), in contrast to 12 patients who revealed higher M65 levels postoperatively. MRD was proven in 10% (2/19) of the first group and 50% (6/12) of the second group (p = 0.028). In a small group of patients (n = 10) receiving capecitabine/oxaliplatin chemotherapy, M30 and M65 serum measurements did not correlate with responses, however a transient increase (+24 hours) in M30 measurements was observed.

CONCLUSIONS: This proof of principle study provided evidence that determinations of peri-operative changes of serum M30 and M65 levels seem to constitute a rapid marker of postoperative systemic residual tumor load in colorectal cancer patients.

M1532

Benefits of Laparoscopy: Does the Disease Condition That Indicated Colectomy Matter?

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PURPOSE: The benefits of laparoscopic colectomy (LC) over open colectomy (OC) for a variety of conditions have been well characterized. Whether the relative benefits of the minimally invasive approach differ for different conditions has not been previously investigated. The aim of this study is to identify whether there are differences in benefits with LC for colon cancer (CC), Crohn’s Disease (CD) and diverticular disease (DD).

METHODS: Data of patients with DD, CC, and CD undergoing elective colectomy from 2000 and 2007 were identified from a prospectively maintained IRB database. Patients with CC, CD and DD were matched 1LAP:1OC for gender, BMI, surgical procedure, ASA class and date of surgery. TNM stage was also a match criterion for CC patients. Fisher’s exact, Chi squared and Wilcoxon rank sum tests were used for analysis and interaction p value used to compare the relative benefit of LC over OC for the different diagnoses.

RESULTS: 289 LC patients were matched to 289 OC patients. Median age was 49 (14–91) years in LC and 52 (15–90) years in OC (p = 0.35). All other matched variables were also similar in both groups. 34(13%) LC patients underwent conversion to OC. LC had significantly shorter length of stay (LOS) (3(1–70) vs. 6 (1–37) days) (p < 0.001) and lower estimated blood loss (EBL) (100(10–1750) vs. 200 (10–1700) cc) (p < 0.001) when compared with OC. Mean operative time was similar (LC: 153 ± 78 min vs. OC: 146 ± 71 min (p = 0.54). For LC patients, the conversion rate was significantly lower for DD (1(2%) patients) when compared to CC (17(19%) patients) and DD (16(14%) (Interaction p = 0.008). Improvement in EBL with LC was least pronounced in CD and most pronounced in DD (Interaction p < 0.001). The incidence of post-operative complications was also reduced in LC patients, among those with DD (p = 0.09). See table.

CONCLUSION: LC results in reduced length of stay and estimated blood loss with similar complications rates when compared to OC. The benefits of LC are more pronounced in DD when compared with CD and CC.
Table 1. LC Versus OC by Diagnosis

<table>
<thead>
<tr>
<th>Variable</th>
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<th>Diverticular Disease N = 112</th>
<th>Crohn’s Disease N = 280</th>
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<tr>
<td>Age (years)†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males†</td>
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</tr>
<tr>
<td>EBL cc†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intraop. Complication*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postop Complication*</td>
<td></td>
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</tr>
<tr>
<td>30 days mortality*</td>
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</tr>
</tbody>
</table>

M1533
Predictive Factors for Conversion from Laparoscopic to Open Appendectomy in Acute Appendicitis: An Analysis of 748 Patients
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BACKGROUND: Laparoscopic appendectomy is the commonest emergency abdominal surgery performed worldwide. Despite the benefits associated with its minimally invasive nature, conversion to open appendectomy is sometimes inevitable. Understanding the risk factors for conversion is invaluable in optimising patient counselling and intra-operative decision making.

METHOD: Medical records of 1117 consecutive adult patients undergoing appendectomy for suspected acute appendicitis between January 2002 and December 2007 were retrieved for the study. Some 369 patients receiving open, interval, and incidental appendectomy were excluded, while the peri-operative variables of the remaining 748 patients were evaluated for prediction of conversion.

RESULT: Laparoscopic appendectomy was successful in 594 patients (79.4%), but conversion was required in 154 patients (20.6%). Reasons for conversion included technical difficulty (46.9%), significant peritoneal contamination (23.4%), uncertain pathology (15.5%), unhealthy appendiceal stump (11.7%), and technical complications (2.5%). In multivariate analysis, conversion was independent of gender, body weight, ASA class, previous abdominal surgery, atypical site of pain, presence of peritonism, hypotension, tachycardia, leukocytosis, timing of operation, delay in operation, and experience of surgeon. Only [1] age ≥60 years (p < 0.0001, OR = 3.10, 95% C.I. = 1.99–4.82), [2] duration of pain ≥4 days (p < 0.0001, OR = 3.38, 95% C.I. = 2.05–5.56), and [3] fever >38 degrees Celsius (p = 0.033, OR = 1.55, 95% C.I. = 1.03–2.32) were independent factors predicting conversion. In addition, patients requiring conversion had significantly worse clinical outcomes when compared to those with successful laparoscopic appendectomy. These included increased operative time (100 mins vs. 70 mins, P < 0.0001), prolonged hospital stay (8d vs. 5d, P < 0.0001), higher wound infection rate (8.4% vs. 4.0%, P = 0.025), and more intra-abdominal collections (9.7% vs. 3.9%, P = 0.003).

CONCLUSION: Elderly age, prolonged presentation and high fever were independent factors predicting conversion from laparoscopic to open appendectomy for acute appendicitis.

M1534
Surgery for Fistula-in-Ano in a Specialist Colorectal Unit: A Critical Appraisal
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1Surgery, University of Rome Tor Vergata, Rome, Italy; 2Gastroenterology, University of Rome Tor Vergata, Rome, Italy; 3Pathology, University of Rome Tor Vergata, Rome, Italy; 4Radiology, University of Rome Tor Vergata, Rome, Italy

BACKGROUND: The balance of the occasional conflicting outcomes of cure and continence after fistula-in-ano management is challenging. We reviewed the outcome of surgical management of fistula related or not to Inflammatory Bowel Disease (IBD) in a specialist colorectal unit.

METHODS: From 02/02 to 10/08, 113 consecutive patients underwent 140 procedures. Data on fistula morphology, underlying disease, surgical procedure, healing period, morbidity of surgery and fistula recurrence were prospectively collected and analyzed according to aetiology: Cryptoglandular (C) and associated to IBD (IBD).

RESULTS: Demographics, fistula type and treatment results are shown in Table 1. As expected, single tract fistulae were more common in C compared to IBD (86% vs. 28%, p = 0.001). Primary fistulotomy (52%) was the most common procedure. Staged fistulotomy was performed in 35% of cases, more commonly in IBD group. Advancement flap was performed in 5% of patients. Additional procedures were fistulectomy (4%) and fibrin glue injection (5%).
Three patients required fecal diversion. Median number of procedures/patient was higher in IBD compared to C (2 vs. 1; p = 0.04). Inpatient length of stay was longer for IBD (3.7 days vs. 1.3, p = 0.002). Imaging accuracy for fistula was 93% for MRI and 94% for ultrasound. Of the IBD patients, 33% were also treated with anti-TNFα. One patient was found to have squamous carcinoma along the fistula tract.

CONCLUSIONS: The majority of idiopatic fistulae were treated by primary fistulotomy or staged fistulotomy with low recurrence rate and no permanent incontinence. Conversely, IBD fistulae required additional imaging, complex and further procedures as well as multidisciplinary approach.

M1535
Laparoscopic Total Proctocolectomy: An Incisionless Alternative to Open Surgery and a Safe Approach in Inflammatory Bowel Disease
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PURPOSE: Inflammatory Bowel Disease (IBD) patients have a high incidence of wound and overall postoperative complications related to malnutrition, steroid use and disease characteristics. A decreased incidence of wound complications has been reported after laparoscopic surgery. A totally laparoscopic approach should virtually eliminate this risk as well as provide the expected benefits of a minimally invasive approach. Very few studies are available looking at the potential benefits of a totally laparoscopic total proctocolectomy (TL-TPC), using the perineal wound for extraction. We compare our prospectively collected experience with TL-TPC to open TPC during the same study period.

METHODS: Between August 2002 and September 2008, 30 consecutive IBD patients underwent TL-TPC. These were compared with 29 consecutive IBD patients that underwent open TPC. Patient and disease specific characteristics, perioperative and short-term postoperative outcomes were prospectively collected and analyzed.

RESULTS: In the TL-TPC group there were 8 males and 22 females (mean age = 52; mean BMI = 26.2) while the open TPC patients included 15 males and 14 females (mean age = 50; mean BMI = 26.5). There was no difference in comorbidities, disease duration, disease activity, previous abdominal surgery, nutritional status and steroids use between groups. Mean operative time was similar between groups (347 ± 71 minutes for TL-TPC and 322 ± 85 minutes for open TPC; p = 0.29). A significant difference in favor of TL-TPC was noted for blood loss (276 ± 252 ml for TL-TPC and 510 ± 348 ml for open TPC; p = 0.006) and intraoperative transfusion requirement (0.2 units/case for TL-TPC and 0.4 units/case for open TPC; p = 0.42). Return of bowel function measured as an ileostomy output >100 ml/8hr occurred at a mean of 2.8 ± 3.4 days for TL-TPC versus 3.2 ± 1.6 days for open TPC (p = 0.59). The mean length of stay was 8.5 ± 5.8 days for TL-TPC versus 9.2 ± 3 days for open TPC (p = 0.58). The overall complication rate was 33% for TL-TPC versus 52% for open TPC (p = 0.15). Postoperative abdominal wound infections occurred in 21% of open TPC patients versus no TL-TPC patients (p = 0.007), and a parastomal hernia was diagnosed in 3.3% of TL-TPC patients versus 6.7% of the open TPC patients (p = 0.54). Median follow-up was 2 years (TL-TPC) versus 4.8 years (open TPC).

CONCLUSIONS: The largest yet recorded experience of TL-TPC shows: 1) similar operative time; 2) decreased blood loss and intraoperative transfusion requirements; 3) decreased abdominal wound and parastomal complications. TL-TPC is therefore considered a safe alternative to open surgery for selected IBD patients.

M1536
Laparoscopic Colectomy: Does the Location of the Specimen Extraction Site Matter?
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Cleveland Clinic, Cleveland, OH

INTRODUCTION: There is a death of evidence whether there is a difference in wound complication rate depending upon the extraction site for patients undergoing laparoscopic colectomy. We evaluate differences in wound related complications including infection and hernia depending upon the site used for specimen extraction after laparoscopic colectomy.

METHODS: Retrospective analysis of data of all consecutive patients undergoing laparoscopic colectomy from January 2004 to December 2007. Patients with previous incisional hernias, cases converted to open and requiring reoperation within 30 days were excluded. Conversion to open was defined as an incision length greater than 8 cm. A likelihood ratio regression model was used to assess the independent association of variables with wound infection and hernia postoperative complications.
incisional hernia. Preoperative variables included demographics, comorbidity, body mass index, diagnosis, steroid use and prior abdominal incision. Perioperative factors included specimen extraction-site (transverse, Pfannenstiel, and midline), incision length, operation type and duration, estimated blood loss, stoma formation, wound classification and use of wound protector or hand-access laparoscopy (HAL) port. P value <0.05 was considered statistically significant.

RESULTS: 598 patients undergoing laparoscopic colectomy were evaluated, 326 (54%) female and median age 54 (10–93) years. Extraction site location was midline in 339 (57%), Pfannenstiel in 185 (31%) and transverse in 74 (12%) patients. The median incision length was 5 (3–8) cm. Overall wound infection and incisional hernia rates were 11.2% and 5.5%, respectively, with a median follow-up of 12.1 (1.2–58.4) months. There was no significant differences in wound infection rates among the extraction sites, however incisional hernia rates for midline, transverse and Pfannenstiel incisions were 8.2% (28/339), 2.7% (2/74) and 1.6% (3/185), respectively (P < 0.01). Obesity (P = 0.02) was the only independent risk factor associated with wound infection. The extraction-site location (P = 0.3), use of wound protector (P = 0.4) or HAL port (P = 0.7) were not associated with wound infection. Risk factors independently associated with incisional hernia were obesity (P < 0.01), midline extraction site (P = 0.04), and post-operative wound infection (P = 0.01).

CONCLUSION: During laparoscopic colectomy, different extraction sites may be associated with differing complications. While different extraction site locations have similar rates of wound infection, midline incisions are associated with an increased rate of incisional hernia.

M1537

Laparoscopic Surgery Decreases Anastomotic Leak Rate in Sigmoid Colectomy for Diverticulitis
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Surgery, Massachusetts General Hospital, Boston, MA

INTRODUCTION: Early studies comparing laparoscopic surgery for diverticulitis to open failed to show any advantages to the laparoscopic approach. The purpose of our study was to compare these approaches in a cohort of patients who underwent elective laparoscopic or open sigmoid colectomy by a group of surgeons who have performed ≥20 laparoscopic colonic resections prior to the study period.

METHODS: This was a retrospective review of 249 patients who underwent elective open (N = 127) or laparoscopic (N = 122) sigmoid colectomy with primary anastomosis for diverticulitis between July 2001 and February 2008. Our primary endpoint was the combined rates of free and contained anastomotic leaks (diffuse peritonitis or localized peri-anastomotic abscess). We used intent to treat analysis to compare groups as far as other differences such as demographic factors, medical comorbidities, surgical indications and ultimate surgical outcomes (chi square, t-test). A logistic regression model was then fitted to determine predictors of anastomotic leaks while controlling for these differences.

RESULTS: Laparoscopic and open patients were similar in age (p = 0.56), sex (p = 0.62), history of diagnosed intraabdominal abscess (9.8% vs. 11.8%, p = 0.68) and history of IR drainage prior to surgery (4.1% vs. 4.7%, p = 0.81), but open patients had a higher comorbidity index (1.6 vs. 1.2, p = 0.035). Splenic flexure mobilization was much more frequently performed in the laparoscopic patients (82.8% vs. 26.7%, p < 0.0001); however the length of colon resection (19.9 vs. 19.1 cm, p = 0.231) was similar. Conversion was required in 22 laparoscopic patients (18%). The postoperative rates of wound infections, early small bowel obstructions, ileus, renal and cardiac complications were similar. However, laparoscopic patients had lower rates of anastomotic leaks (2.5% vs. 8.7%, p = 0.036). This finding held true on logistic regression analysis (OR 0.67, 95% CI 0.008–0.567, p = 0.01) even when controlling for age (p = 0.9), Charlson Comorbidity Index (p = 0.2), splenic flexure takedown (p = 0.4), and length of resected bowel (p = 0.9).

CONCLUSION: Anastomotic leaks are less common following laparoscopic sigmoid resection than open sigmoid colectomy. Although splenic flexure mobilization was more commonly performed in laparoscopic patients, other factors seem to account for the observed differences.

M1538

Laparoscopic Colectomy for Crohn’s Colitis: A Large Prospective Comparative Study
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BACKGROUND: Patients with Crohn’s colitis have traditionally been approached with open procedures. The advent of laparoscopic colectomy has shown benefits such as quicker return of bowel function, decreased use of post-operative narcotics, and shorter hospital stay. However, due to complexity of the disease and the difficulty of such a surgical approach, little data exists comparing the outcomes of laparoscopic and open colectomy in Crohn’s disease. The purpose of this study was to compare short-term outcomes of laparoscopic (LC) versus open colectomy (OC) in the largest series to date of consecutive patients with Crohn’s colitis.

MATERIALS AND METHODS: We collected data on all patients undergoing colectomy for primary or recurrent Crohn’s disease confined to the colon from July 2002 to August 2008. The indications for surgery included failed medical management, obstructive symptoms, intractable pain, abscess, fistula, dysplasia and cancer. Patient and disease specific characteristics, perioperative and short-term postoperative outcomes, were prospectively collected and analyzed.

RESULTS: 119 colectomies were performed during the study period, of which 55 LC (46.2%). There were 7 (13%)
The Stage of Recurrence Is a Major Arbiter of RO Resectability and Outcome in Patients with Recurrent Rectal Cancer
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PURPOSE: Locally recurrent rectal cancer occurs in 10–30% of patients following primary resection and extra pelvic metastases occur in an additional 30–40%, some of which are resectable. The ability to achieve an RO resection of recurrence is governed by stage and biology of the disease which is the subject of this review.

METHOD: Patients with recurrent rectal cancer (1990–2005) were staged as follows: TR local recurrence at primary site, TR1-invasion of mucosa, TR2-submucosal invasion into musculis propria, TR3-full thickness penetration into peri-rectal tissue, TR4 (locally extensive) penetrates soft tissue or adjacent organ, TR5-invades bone, ligaments of pelvis. TanyNanyM1 distant mets, (visceral sites). All patients had been irradiated either prior to or after having recurrence (45–50 Gy), usually with sensitizing chemotherapy.

PATIENT DATA: 156 patients were reviewed for recurrent recto-sigmoid cancer, 123 with rectal cancer and 32 with rectosigmoid cancer. All had adjuvant neoadjuvant chemo radiation or if not were give chemo radiation prior to salvage surgery. Patient treatment groups included palliative therapy in 58 pts: no surgery (chemo/radiation only 22 pts), palliative surgery-resection/bypass (13 pts)/ pelvic perfusion (23 pts) and resectional surgery with curative intent (98 pts). The latter included salvage by anterior resection/abdominal perineal resection ± exenterations (34 pts) and abdominal sacral resection ± exenterations in 58 pts. Distant disease was identified in 16 potentially resectable patients with liver (9), Lung (4) & Brain (3) metastases; all had resection with curative intent.

CONCLUSIONS: Tumor stage directed RO resection of locally recurrent rectal cancer can achieve long term survival in approximately 30% of patients and mimics the well established resectional results of patients with liver metastases.

M1540
Feasibility of a Colorectal Surgery Specific NSQIP
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1General Surgery, Cedars Sinai Medical Center, Los Angeles, CA; 2Colon and Rectal Surgery, Cedars Sinai Medical Center, Los Angeles, CA

INTRODUCTION: The National Surgical Quality Improvement Program (NSQIP), currently the most widely recognized quality measurement system for surgery, focuses on patients undergoing general and vascular surgical procedures with the same data collected on every patient, regardless of procedure or specialty. In this study, we sought to develop a colorectal surgery specific NSQIP with collection of core variables, along with additional information of particular interest to colorectal surgeons.

MATERIALS AND METHODS: A comprehensive database was completed for patients undergoing major procedures by eight colorectal surgeons at a single, urban, private hospital. We collected information about patient demographics, preoperative comorbidities, intraoperative variables, and anesthesia related factors. In addition, we included several colorectal specific factors such as steroid and immunomodulator use in patients with inflammatory bowel disease,
type of bowel preparation, and extent of adhesiolysis. Postoperative complications were categorized as major surgical, minor surgical, major medical, and minor medical. Postoperatively, we recorded the times to first flatus, first bowel movement, and initiation of clear liquid and low residue diets. All data was collected and analyzed prospectively by a fourth year surgical resident.

RESULTS: Of the 100 patients studied thus far, 50 (50%) were male, with a median age and body mass index of 47 years and 23, respectively. Operations performed included: ileostomy closure (20), sigmoidectomy (15), ileocolicectomy (12), ileal-pouch anal anastomosis (12), small bowel resection (7), right hemicolectomy (6), low anterior resection (5), abdominal colectomy (4), and other procedures (n = 19). The overall complication rate was 33%, and included 5 major medical complications (4 deep incisional infections, 1 wound dehiscence), 22 minor surgical complications (9 ileus, 7 superficial infections, 4 severe pain, 1 intraabdominal hematoma, 1 urinary incontinence), 5 major medical complications (2 atrial fibrillation, 2 pneumonia, 1 stroke), and 1 minor medical complication (urinary retention). Seven patients (7%) were readmitted within 30 days of discharge due to small bowel obstruction (2), ileus (1), back pain (1), fever (1), constipation (1), and pelvic abscess (1).

CONCLUSION: We have demonstrated that conducting a specialty specific NSQIP is feasible. This meticulous, prospective data collection can serve as a model for future specialty specific NSQIP and ultimately help improve the quality of surgical care.

M1541

Hybrid Laparoscopic-Open Resection for Rectal Carcinoma Is Oncologically Safe: A Long-Term Follow Up Study
Columbia University, New York, NY

PURPOSE: The hybrid laparoscopic-open procedure was devised as a means of providing benefits of minimally invasive methods to rectal cancer patients in whom a fully laparoscopic operation may not be feasible. Hybrid methods use a small infra-umbilical incision to perform open TME and cancer resection after closed splenic flexure mobilization, proximal devascularization, and division of the proximal bowel. Currently, we perform laparoscopic, hand-assisted and hybrid procedures. The purpose of this study is to assess the pathologic and long-term oncologic results of hybrid resection for rectal carcinoma.

METHODS: We retrospectively reviewed pathologic and oncologic data from 75 patients who underwent hybrid rectal cancer resection at Columbia University from 1995 to 2004. Mean follow up was 3.3yrs. Half of our population had follow up for mean of 5.3 yrs.

RESULTS: Procedures included rectosigmoidectomy = 10, LAR = 49 and APR = 15. Tumors were located in the proximal = 28, middle = 29 and distal = 18 rectum. Anatomoses included EEA = 57 and hand-sewn coloanal = 3. Diverting stomas were used in 19 patients. Mean results of clinical and pathologic outcome data are: incision length 10 cm (SD 4.5); days to flatus 3.8 (SD 2), length of stay 7.4days (SD 4), distal margin 3.2 cm (SD 1.5), proximal margin 19.7 cm (SD 7.2), lymph node harvest 14 (SD 7.5). 5-year disease-free survival for hybrid rectal resections was 80%; 28 patients (37%) had preop XRT (figure).

CONCLUSIONS: Hybrid rectal resections do not compromise LN harvest or margins and are feasible even in the context of neoadjuvant radiation therapy. Our 5-year disease-free survival of 80% is comparable to rates achieved by open surgery (64%, SEER data).

M1542

Population-Based Patient Characteristics as Predictors of Laparoscopic Versus Open Colorectal Surgery Vary Among Pathologies
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OBJECTIVES: The objective of this study is to examine the trends in utilization of laparoscopy in the treatments of colorectal cancer, inflammatory bowel disease, diverticular disease and other pathologies.

METHODS: We performed a retrospective analysis using the Healthcare Cost and Utilization Project Nation-wide Inpatient Sample from 2002 and 2005 identifying patients who underwent elective laparoscopic or open colectomy (N = 149,304). Patients were then divided into four categories based on pathology: cancer (N = 63,279), inflammatory bowel disease (IBD) (N = 5,325), diverticulitis (N = 27,412) and other (N = 53,288). Weighted univariate analyses were used to evaluate statistical significance in patient characteristics between laparoscopic and open treatment for these pathologies.
RESULTS: Trends toward higher utilization of laparoscopic treatment of all pathologies were seen at urban teaching hospitals, and regionally in the northeastern and western geographical location. No other trends were noticed among patients with IBD. Patients who had pathology other than IBD (cancer, diverticulitis and other) were more likely to have laparoscopic surgery if they had private insurance or a higher than average income. Interestingly, younger age and race (Hispanics, other) predict laparoscopic treatment only for diverticulitis.

CONCLUSIONS: Laparoscopic techniques have clear benefits in morbidity and outcome over traditional open technique in both benign inflammatory diseases and cancer. There are disparities amongst patients who receive laparoscopic colorectal surgery which should be further investigated in an attempt to improve outcomes of all patients.

M1543
System Time and Patient Factors in Acute Appendicitis: A Five Year Analysis from a Rural, Teaching Hospital
Toms Augustine, Catherine M. Dickinson, Thomas J. Vandermeer, Burt Cagir
Guthrie-Robert Packer Hospital, Sayre, PA

INTRODUCTION: The aim of this study was to patient factors associated with increased system time in the management of acute appendicitis at a rural center.

METHODS AND PROCEDURES: Retrospective analysis of 378 patients who underwent appendectomies from January 2000 to June 2005 at a rural teaching hospital. Patients undergoing an interval, incidental or negative appendectomy were excluded.

RESULTS: The average delay before presentation to emergency department (ED) was 24 hours. It was significantly decreased for adults younger than 45 years (35 vs. 47 hours, P = 0.0009), married patients (34 vs. 45 hours, P = 0.0089), first examined in hospital ED (30 vs. 57 hours, P = 0.0001) and history of fever (36 vs. 45 hours, P = 0.0008). In a multivariate regression model initial examination outside of hospital ED (risk ratio 5.3, P < 0.005), and lack of periumbilical pain (P = 0.035) were significant predictors of delay in presentation (adjusted for age, sex, marital status, fever, nausea or vomiting, anorexia, comorbidities, distance and insurance status). The average delay from presentation to surgery was 9.8 hours. It was significantly decreased for patients referred from an outside facility (6 vs. 11 hours P = 0.0001), patients with classic presentation (9 vs. 10 hours P = 0.0118), or severe appendicitis (9 vs. 10 hours P = 0.011), or leading diagnosis of acute appendicitis (9 vs. 16 hours P = 0.0014), and no CT scan on admission (11 vs. 8 hours, P = 0.0001). In a multivariate regression model leading diagnosis of acute appendicitis (P = 0.004) was the only significant predictors for faster time to surgery (adjusted for age, sex, marital status, severity of presentation, comorbidities, and insurance status).

CONCLUSION: In a rural population, patients examined in the hospital ED have a significantly shorter overall duration of symptoms before final presentation. Additionally a leading diagnosis of acute appendicitis by the physician is the only variable predictive of decreased time to surgery.

M1544
Colonoscopic Splenic Injuries: Incidence and Management
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PURPOSE: Colonoscopic splenic injuries are rare. We reviewed our institutional experience with splenic rupture as a result of colonoscopy to define the incidence and management.

METHODS: Review of all patients from 1980 through June 2008 sustaining a splenic injury during colonoscopy.

RESULTS: Four patients (of 296,248 colonoscopies) sustained a splenic injury directly from colonoscopy performed at our institution (incidence 0.001%). Three additional patients were treated at our tertiary referral center after splenic injury from colonoscopy performed elsewhere. Follow-up was complete in all patients over a median of 22 months (range 1–164 months). The seven patients ranged in age from 40 to 70 years old. Indications for colonoscopy included diarrhea (n = 3), abdominal pain (n = 2), screening (n = 1), and colonic polyps (n = 1). Only 2 patients had a history of prior abdominal operation(s). All patients had an adequate bowel preparation and only 2 colonoscopies were described as difficult. The most common symptom of splenic rupture was abdominal pain (n = 4) with a mean decrease in hemoglobin of 6.5 g/dl (range 4.5–8.5 g/dl). Six patients received a mean of 5.5 units of packed red blood cells (range 2–14 units). Splenic injury was diagnosed by computed tomography (CT) in 5 patients. Two (of the 5) CT scans were performed at our institution and available for review showed grade III splenic lacerations. All patients were managed with emergent splenectomy upon diagnosis; 6 within 24 hours of the index colonoscopy, and 1 who presented more than 24 hours after colonoscopy. No patients had pre-existing splenic disease on surgical pathology. There were no post-operative complications or deaths. The mean duration of stay was 10 days (range 7–15).

CONCLUSION: Splenic injury during colonoscopy is a rare but serious complication. Patients present with abdominal pain, a precipitous decrease in hemoglobin and require emergent splenectomy due to the acute nature of their presentation. Splenic injury can occur in the absence of splenic pathology or adhesions from prior celiotomy.
Utility of Pelvic CT with Rectal Contrast to Identify Pelvic Abscess and Anastomotic Leaks
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INTRODUCTION: Water-soluble contrast enema is routinely used to evaluate the status of pelvic anastomosis prior to closure of diverting stomas. Limited computerized axial tomography (CT) with rectal contrast may be a better option because of its ability to detect clinical or sub clinical abscesses, its requirement of less radiologic expertise and its better tolerance by patients. However, the sensitivity of CT with rectal contrast for detecting an anastomotic leak has not been prospectively evaluated. Our goal was to determine the value, efficacy and feasibility of a limited pelvic CT with rectal contrast for diagnosis of pelvic abscess with or without an anastomotic leak.

METHODS: We conducted a prospective quality improvement study of 28 patients with proximal diverting stomas following low anterior resection with colorectal (n = 7) and coloanal anastomosis (n = 16) or total proctocolectomy with ileal pouch anal anastomosis (n = 5). All patients underwent CT with rectal contrast prior to closure of diverting stoma. Scans were evaluated for the presence or absence of pelvic abscess and anastomotic leak. Closure of stoma was performed once there was no evidence of leak or abscess. Repeat studies were necessary when leak or abscess were present. A total of 56 CT scans with rectal contrast were performed. Patients were followed clinically for 6 months for signs of pelvic infection after closure of stoma.

RESULTS: Of the 56 studies, 17 scans in 11 patients showed pelvic abscesses, and 43 showed no anastomotic leak. An anastomotic leak was demonstrated in 7 of 8 patients on the first CT and in one, on the subsequent CT evaluation. After closure of diverting stoma, no patient developed signs of pelvic infection. Sensitivity for detection of anastomotic leak on the first study was 100% (95% CI = 76%, 100%) and specificity was 96% (95% CI = 88%, 100%). Adverse effects included only mild discomfort during administration of rectal contrast but no significant complications occurred.

CONCLUSIONS: These results suggest that pelvic CT scan with rectal contrast is a sensitive and safe study for detection of anastomotic leak following low pelvic anastomosis. Limited CT scan with rectal contrast represents a one-step diagnostic modality for detection of pelvic sepsis. We recommend that CT scan with rectal contrast may be considered as the study of choice when there is concern for pelvic abscess with or without anastomotic leak following low pelvic anastomosis in the preoperative planning for take down of proximal diverting ostomies.

Clinical: Esophageal

The Number and Ratio of Metastatic Lymph Node, But Not Total Number of Resected Lymph Node, Predict Survival in Esophageal Cancer
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OBJECTIVE: The current AJCC staging system for esophageal cancer is based on lymph node location, irrespective of the number of involved and examined lymph nodes. Here we review our experience with N stage subclassification.

METHODS: We enrolled 488 patients (94% with squamous cell carcinoma) receiving primary curative resection without neoadjuvant therapy for esophageal cancer between 1995 and 2006. The impact of total resected lymph node number (TLN), metastatic lymph node number (MLN) and ratio (MLR) on patient survival was investigated.

RESULTS: The overall 3-year survival rate was 35.4% for the entire population. The 3-year survival rate was equivalent among patients in N1 (23.3%), M1a (22.0%), and nonregional lymph node metastasis-related M1b (18.5%, p = 0.321). There was no survival difference between patients with TLN <15 and TLN ≥15 (Figure 1A, p = 0.249). In contrast, both MLN and MLR significantly predicted patient survival. The 3-year survival rate was 52.3%, 29.2%, and 8.0% for patients with MLN = 0, 1–3, and ≥4, respectively (Figure 1B, p < 0.001). For patients with MLR = 0–0.2 or >0.2, the 3-year survival rate was 28.7% and 9.8%, respectively (Figure 1C, p < 0.001). However, survival rate differences became insignificant when TLN was less than 15 (MLN = 1–3 vs. ≥4: p = 0.252; MLR = 0–0.2 vs. >0.2: p = 0.109).

CONCLUSIONS: We recommend designating both regional and nonregional lymph nodes as N nodes and reserving the M1 stage for distant organ metastasis. Examination of a minimum of 15 lymph nodes is required for nodal staging subclassification. MLN and MLR, but not TLN, predict survival in esophageal cancer.
M1570

Does the Value of PET-CT Extend Beyond Pretreatment Staging? An Analysis of Survival in Patients with Esophageal Cancer

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BACKGROUND: Most studies of pre-treatment positron emission tomographic (PET-CT) scanning have focused upon its use in tumor staging. The role of PET-CT in predicting survival has received comparatively less attention. As such we sought to assess the relationship of pretreatment SUVmax to overall survival in surgical patients with esophageal cancer.

METHODS: The study population consisted of 57 patients who underwent esophagectomy for adenocarcinoma (n = 47) or squamous cell carcinoma (n = 10) of the esophagus. Patients were taken from a cohort of 116 consecutive esophagectomy patients between 7/2005 and 9/2008. PET-CT scanning was performed at a single center and SUVmax was recorded for each patient prior to any therapy. Ten of the 57 patients received neo-adjuvant chemotherapy (n = 7) or chemoradiation (n = 3). Median follow-up was 14.5 months. Survival was assessed using Kaplan-Meier analysis.

RESULTS: The median SUVmax on pretreatment PET-CT was 6.4 (range 0–59). Receiver operating characteristic (ROC) curve identified a SUVmax of 4.6 to optimally discriminate survival. Patients with low SUVmax (<4.6; N = 21) had significantly (p < 0.001) better survival (median survival not reached) than those with high SUVmax (>4.6; N = 36; 19.27 months). Interestingly, Stage 3 patients with low SUVmax (n = 8) had significantly better survival (p < 0.05) than Stage 3 patients with high SUVmax (N = 17). Likewise, N1 disease patients with low SUVmax (N = 11) had significantly better survival (p < 0.05) than high SUVmax N1 patients (N = 26). There was a significant association between SUVmax and death on univariate logistic regression (p = 0.022, HR 1.03, CI 1.00–1.06); age, gender, endoscopic tumor length, and pN, were not significant. When controlling for stage and grade on multivariate analysis, SUVmax remained independent of grade (p < 0.05), but not stage (p = 0.993).

CONCLUSIONS: Pretreatment PET-CT SUVmax is strongly associated with survival in patients with esophageal carcinoma. Longer overall survival of Stage 3 or N1 patients with low pretreatment SUVmax may suggest more favorable tumor biology in this cohort of patients. This may be valuable prognostic information for patients with advanced disease.

M1571

Manometric Features of the Laparoscopic Hill Repair Versus the Nissen Fundoplication for Gastroesophageal Reflux Disease (GERD)

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INTRODUCTION: Multiple surgical methods exist to restore the antireflux mechanism of the lower esophageal sphincter (LES). Techniques can be grouped into 3 categories: fundoplication, reconstruction of the angle of His and esophago-gastropexy and reconstruction of the valve mechanism. In a randomized controlled trial comparing the Hill repair with the Nissen fundoplication, we hypothesized there would be manometric differences between the 2 procedures that could explain their respective mechanisms of reflux prevention.

METHODS: 123 patients (Hill = 52, Nissen = 71) were randomized under an IRB protocol to receive either a laparoscopic Nissen or Hill procedure. To avoid institutional procedure bias, all procedures were done under the guidance of a Nissen (LS) or Hill (RA) expert. Standard preoperative and post operative testing were performed. For this study, high resolution manometry performed after surgery was available for 32 patients. High resolution manometry was analyzed and interpreted by blinded observers marking the following: Results: proximal and distal LES borders, maximum and nadir LES pressure, esophageal body peristalsis, percent relaxation, and distal amplitude.

RESULTS: 32 patients (15 Hill, 17 Nissen) underwent post operative high resolution manometry (mean = 15 months). All patients had normal post-operative overall LES length (3.7 cm Hill vs. 3.3 cm Nissen, p = 0.9). More patients had an increase in the LES length in the Nissen group compared to pre-op (0.9 cm Nissen vs. –0.5 cm Hill, p = 0.02). However, no difference was seen in intra-abdominal length between the Hill and Nissen (2.0 cm vs. 2.1 cm, p = 0.9), resting pressure (19.4 mmHg vs. 20.4 mmHg, p = 0.8), relaxation (residual pressure 10 mmHg vs. 12 mmHg, p = 0.5), esophageal body function (peristalsis 92% vs. 89%, p = 0.6), or distal esophageal contraction amplitude (92 mmHg vs. 89 mmHg, p = 0.8). A short intra-abdominal length (<1.49 cm) was found in 2/15 Hill and 5/17 Nissen patients (p = 0.3).

CONCLUSION: Overall, the Hill repair and the Nissen fundoplication reconstruct the LES with similar characteristics. There was a non-significant trend toward restoring more LES length in the Nissen but the Hill may be better at restoring intra-abdominal length. These findings correspond to the differences in surgical technique and may indicate a role for the Hill in patients with shortened esophagus.
M1572
Outcomes Associated with Open and Minimally Invasive Approaches to Esophageal Cancer
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INTRODUCTION: Traditionally esophagectomy is associated with considerable morbidity, mortality and lengthy recovery. While often performed on patients with esophageal cancer who have substantial co-morbidities, outcome comparisons are further confounded by the multitude of open and minimally invasive surgical techniques. We report our experience with open esophagectomy (OE) and minimally invasive esophagectomy (MIE) for malignant diseases of the esophagus.

METHODS: Using a comprehensive esophageal cancer database we identified patients who underwent either OE or MIE between 1994 and 2008 for esophageal cancer. Clinical and pathologic data were compared using Fisher's exact, chi-square, and Kaplan Meier estimates where appropriate.

RESULTS: We identified 530 patients with a mean age of 64 ± 10 years who underwent either OE (N = 443) or MIE (N = 87) with a mean follow-up of 21 ± 24 months. The median operative time was 285 minutes in OE and 235 minutes in MIE (p < 0.001). The median EBL in OE was 250 ml and 150 ml in MIE p = 0.57. The leak rate was similar between patients undergoing OE (5.1%) and MIE (8.6%) p = 0.2. However, there was a higher stricture rate in MIE (22.5%) compared to OE (12.8%) p = 0.02. There was also a higher incidence of wound infections (16.1% v/s 5.1%, p = 0.001), and aspiration/pneumonia (35.8% v/s 13%, p = 0.001) in the MIE group compared to OE. There were no differences in length of ICU (p = 0.59), median LOH (OE 10 days, MIE 10 days, p = 0.17) or 30-day mortality (OE 3.6%, MIE 7.4%, p = 0.12). More patients who underwent MIE received neoadjuvant therapy then those in the OE group (67% v/s 33%, p = 0.02). Multivariate analysis confirmed a higher incidence of wound infections (OR = 4.8; 95% CI 2.0–11.4), and aspiration/pneumonias/effusions (OR = 3.7; 95% CI 1.5–8.8) in patients undergoing MIE after controlling for age, stage, and neo-adjuvant therapy. There were no differences in lymph nodes sampled (OE (8.7) MIE (9.0), p = 0.62) or recurrence rate (OE (21.6%) MIE (25.9%), p = 0.39) between groups. Overall survival (p = 0.32) and disease-free survival (p = 0.91) did not differ between the two cohorts.

CONCLUSIONS: MIE and OE are both acceptable approaches to malignant diseases of the esophagus with equivalent post-operative and oncologic outcomes. However, theoretical benefits of improved LOH, post-operative complications, and shorter ICU stay are not observed with the MIE approach, however, some of these differences may be explained by difference in approach (transhiatal versus transthoracic).

M1573
A Comprehensive Review of Laparoscopic Re-Do Nissen Fundoplication
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BACKGROUND: Laparoscopic Nissen fundoplication has become the standard of care for medically refractory gastroesophageal reflux disease (GERD). While the procedure is highly effective, complications may occur necessitating reoperation. Results of laparoscopic re-do operations have been reported in the literature, most of which are relatively small single-institution case-series. The purpose of this study was to review published reports of laparoscopic re-do fundoplications in order to cumulatively analyze peri-operative and intraoperative findings and outcomes.

METHODS: A systematic search was performed of the PubMed Medline, Ovid and Cochrane Clinical databases from January 1999 to August 2008. Only primary studies with data on more than 25 laparoscopic re-do procedures were included. Subject demographics, pre-operative indications, intraoperative findings and peri-operative complications were extracted from each study and entered into a database. Descriptive analyses were performed.

RESULTS: The literature search yielded 98 potential studies. After application of exclusion criteria and abstract review, 16 qualified studies reporting a total of 1,099 cases were selected for the final analysis. Mean patient age was 50.8 years and 43.5% were male. The most common indication for re-do operation was recurrent GERD with the most common etiology of anatomic failure being herniation of the wrap. Mean operative time was 206 minutes and mean hospital stay (LOS) was 3.2 days. Conversion rate from laparoscopic to open was 7.7%. Intraoperative complications were reported in 17.6% of cases with the most common being gastrointestinal perforations (15.5%). Post-operative follow-up averaged 21 months. Post-operative complications were encountered in 18% of patients with the most common categorized complication being incisional hernia (4.7%). The average reported success rate was 81% as determined by either subjective patient reporting or objective test criteria.

CONCLUSIONS: Laparoscopic re-do Nissen fundoplication is a feasible corrective procedure for patients who have technical complications after undergoing a primary Nissen. The most common presenting symptom necessitating re-do laparoscopic fundoplication was recurrent GERD with the most common etiology being herniation of the fundoplication wrap. Re-do operations are technically challenging as demonstrated by prolonged operating times and LOS, a conversion rate of 8%, and intraoperative complications in 18%. Ultimately, satisfactory outcomes were experienced by over 80% of patients at medium-term follow-up.
M1574

Esophagectomy for Cancer in Octogenarians
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BACKGROUND: Due to changes in life expectancy there are an increasing number of elderly patients with esophageal cancer. The aim of this study was to assess the outcome of esophagectomy for cancer in patients 80 years or older.

METHODS: Retrospective review of the records of all patients who underwent esophagectomy for cancer from 1992 to 2007. A cardiac and pulmonary evaluation was obtained on individual basis in the younger patients, and in all octogenarians.

RESULTS: Among 558 patients with esophagectomy for cancer 45 (8%) were octogenarians. The median age of the younger group (n = 513) was 63 years (IQR 56–71). Octogenarians had significantly more Stage III disease (49% vs. 31%, p = 0.0152) but received less neoadjuvant therapy than younger patients (2% vs. 21%, p = 0.0020). In octogenarians the transhiatal resection was more common than in the younger group (77% vs. 36%, p < 0.0001). Symptoms and weight loss prior to surgery were similar in both groups, but BMI was significantly lower in octogenarians (25 vs. 28, p = 0.0002). There was no difference between the two groups regarding major or minor complications (p = 0.8222, p = 0.2830) as well as reoperation rate (16 vs. 19%, p = 0.6854). Hospital mortality was 9% for octogenarians vs. 4% in the younger group (p = 0.1335). Cancer related survival was similar (48.9 vs. 59.3 months, p = 0.3107; Figure 1).

CONCLUSION: Esophagectomy can be safely performed in carefully selected octogenarians with good cardiac and pulmonary function. Patients should not be denied an esophagectomy based only on their age.

Figure 1: Cancer related Survival

M1575

The Clinical Significance of Elevated Esophageal Contraction Amplitudes: A High Resolution Manometric Study of “Nutcracker” Esophagus
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BACKGROUND: The clinical significance and manometric profile of patients with high-amplitude peristaltic contractions (“nutcracker esophagus”) is increasingly debated. Some consider it a manometric “curiosity” while others report an association with symptoms including chest pain and dysphagia. Our aim was to assess the symptomatic presentation of patients with distal esophageal amplitudes >180 mmHg.

METHODS: The study population consisted of 39 patients (mean age 55.2 years, M:F 9:30) with distal esophageal body contraction amplitudes >180 mmHg (5–10 cm above LES). Study patients were taken from a cohort of 549 referred for evaluation of foregut symptoms and undergoing esophageal manometry from 2005–2008. The primary symptom was dysphagia in 13 (33%), heartburn in 8 (21%), chest pain in 6 (15%), regurgitation in 5 (13%), bloating in 4 (10%), and vomiting, cough and hiccups in 4 (10%), each. Twenty-two had no obvious anatomic abnormality while 17 did (epiphrenic diverticulum in 4, intrathoracic stomach in 4, fundoplication in 5, and peptic stricture in 4). Patients were stratified into 2 groups: A (180–220 mmHg; n = 23) and B (>220 mmHg; n = 16).

RESULTS: The proportion of patients presenting with dysphagia increased with increasing contractions amplitudes: 56% (9/16) in those with amplitudes >220 mmHg and 17% (4/23) with amplitudes <220 mmHg (p < .01). On average, patients presenting with dysphagia had significantly higher amplitudes than patients presenting with other symptoms (253.2 mmHg vs. 205.4 mmHg, p < .01). Contraction duration (A: 5.4s vs. B: 4.5s, p < .05) and the prevalence of high intrabolus pressure (A: 12/16, 75% vs. B: 8/20, 40%, p < .05) were significantly increased with higher contraction amplitudes, suggesting a relationship to outflow resistance. Interestingly, the resting pressure of the LES (A: 26.6 mmHg vs. B: 38.2 mmHg, p < .05) increased and the proportion of patients with short abdominal LES length (A: 14/22, 64% vs. B: 4/16, 25%, p < .05) significantly decreased with higher amplitudes.

CONCLUSION: Both symptomatic and physiologic data suggest that “nutcracker” contraction amplitudes in the distal esophagus have clinical significance and are associated with dysphagia, a hypertensive LES, high intrabolus pressures and increased contraction duration.
M1576
Prognostic Influence of Lymph Node Ratio and Neoadjuvant Chemoradiation After Resection of Esophageal Cancer
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The incidence of esophageal cancer still increases in many countries. Overall prognosis is poor despite advances in surgical and multimodal therapy. Lymphatic spread per se is a strong prognostic factor but some newer data proposed a better prognostic value of the lymph node ratio (LNR). The role of neoadjuvant chemoradiation (neoCRTx) is still discussed controversially. We evaluated the long-term outcome after resection of esophageal cancer in 221 patients (58% after neoCRTx).

METHODS: We analyzed the outcome in 221 patients (83% male, median age 60 years) who underwent esophagectomy since 1988. Initial staging consisted in CT-scans and endosonography, 59% had squamous cell carcinoma and 41% adenocarcinoma. Tumors were in the lower third in 60% and in the middle/upper third in 33%/7%. NeoCRTx (36 Gy + FU + Cisplatin) was applied in 58% (indications >T2 or node positive). At initial staging 52% of all patients were staged node-positive (cN+). In the group undergoing neoCRTx 68% were initially cN+ whereas in the patients without neoCRTx only 29% were cN+. Survival was analyzed by the Kaplan-Meier- and Cox-models.

RESULTS: After neoCRTx 99 of 128 patients (77%) showed partial or complete remission. Free resection margins were achieved in 91%. At pathological assessment 42% of all patients were node-positive (pN+). Compared to initial staging, the final nodal status increased from 29% (cN+) to 47% (pN+) in patients without neoCRTx but decreased from 68% (cN+) to 43% (pN+) after neoCRTx. Actuarial five-year survival was 28%. Univariate five-year survival was better in patients with high differentiation (32% in G1/2 vs. 18% in G3/4; p < 0.01), with negative LN (47% vs. 10% in pN+; p < 0.001), with a LNR ≤0.1 (42% vs. 5% in LNR > 0.1; p < 0.001), with response to neoCRTx (53% vs. 16% in pts. without CRTx or response; p < 0.001) or with free margins (34% vs. 12% in R+; p = 0.001). The number of examined LN and histological type did not influence survival. Multivariate analysis revealed good differentiation (p < 0.03), neoCRTx (p < 0.03) and a LNR <0.1 (p < 0.001) as independent prognostic factors. The resection margin was not a significant factor in the Cox-model. This might be explained by the low rate of positive margins after neoCRTx (2% vs. 14% without CRTx; p < 0.01) and the low total number.

CONCLUSIONS: Initial evaluation understaged nodal disease. The LN-ratio is the strongest predictive factor after resection of esophageal cancer. The effect of neoadjuvant chemoradiation on survival was mainly due to an increase in the rate of negative resection margins and to the eradication of tumor cells in initially positive LNs.
performed, we have only encountered problems with removal of a specimen in the transgastric route: while attempting to remove the gallbladder, we were unable to extract the specimen due to large gallstones in two patients. The gallbladders were removed through the umbilicus for patient safety. In order to understand this problem, we developed a cadaveric human model for measuring the maximum size of specimen removal through the esophagus.

METHODS: After the stomach was identified, a gastrotomy was made and the stomach irrigated to ensure a clear view. An upper endoscope was passed into the stomach and an endocatch bag containing different sized spheres was grasped with an endoscopic grasper. Under direct visualization a simulated gallbladder removal through the mouth was attempted. The force needed to pass the GE junction and the cricopharyngeal junction was noted using a spring loaded scale. Lastly, the stomach and distal esophagus was explanted and examined.

RESULTS: Three different sized spheres were used to simulate large gallstones. These ranged in diameter from 2.5 to 4 cm in diameter. We found that the largest was unable to cross the GE junction with a reasonable amount of force. The medium sized ball, 3 cm, crossed the GE junction with 39.2 N force and 7.45 N to transverse the cricopharyngeal junction. The smallest ball 2.5 cm crossed the GE junction with 7.84 N of force and crossed the cricopharyngeal junction with 83.35 N of force. Upon inspection of the explanted stomach small tears in the mucosa were noted at the GE junction.

CONCLUSIONS: New challenges recurrently surface as we move from the animate lab to a clinical setting. Those patients where a large gallstone is noted on preoperative ultrasound may not be a candidate for transgastric removal until a solution has been found. The gastrointestinal literature has extensively noted the maximum diameter of an object that can be safely removed per oral. This experiment confirmed a safe size is under 2 cm. The tensile strength of the esophagus is 25–27 N thus the forces we applied in this experiment far surpass the safe level in a clinical setting. We propose that intragastric lithotripsy may be an effective alternative, however further work will need to be done before introducing this to the clinical arena.

M1579

Should Laparoscopic Heller-Dor Be Performed Regardless of Age?

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BACKGROUND: Clinical guidelines for the treatment of achalasia encourage surgical myotomy for patients under age 45, based on poor outcome of balloon dilatation of patients in this age group and a perceived higher operative risk in older patients, who are generally switched to endoscopic treatments. The purpose of this study was to evaluate the impact of age on the outcome of laparoscopic myotomy as primary treatment for esophageal achalasia.

METHODS: From 1992 to December 2007, 407 laparoscopic Heller-Dor (LapHD) procedures were performed by 4 staff surgeons at the same institution. Eighty-nine patients who underwent surgery after failed endoscopic treatment were excluded from the analysis. The study population was divided in 3 groups according of age (Group A: patients >45 years; Group B patients older than 45 and younger than 65; Group C: patients > older than 65). All patients were evaluated preoperatively by a detailed symptom questionnaire, esophageal manometry, endoscopy and barium swallow.

RESULTS: There were 179 patients in the group A, 103 in the group B and 36 in the group C. The median duration of symptoms was similar in the three groups. Regarding the functional and radiological findings, the three groups differed for the symptoms score (Group A: median 25 [IQR 18–34], Group B median 27 [IQR 23–37], Group C: median 27 [IQR 22–39]; p < 0.05), the esophageal diameter (Group A: median 35 mm [IQR 30–45], Group B median 40 mm [IQR 30–47], Group C: median 40 mm [IQR 35–50]; p < 0.05) and the total length of the LES pressure (Group A: median 40 mmHg [IQR 34–47], Group B median 41.5 mmHg [IQR 34–50], Group C: median 49.5 mmHg [IQR 38.5–57.5]; p < 0.05). Mortality was nil. The frequency of intraoperative complication (i.e. mucosal lesions) was higher in the group C (5/179, 2.8% vs. 5/103, 4.9% vs. 5/36, 13.8%; p < 0.05). Findings on manometry (sphincter length, resting pressure, sphincter relaxation) were similar in the three groups. The symptoms score similarly decreased in the three groups (p < 0.05). At a median follow up of 32 months, the percentage of patients classified as failure and requiring further treatment was similar in the three groups (19/179, 10.6% vs. 9/103, 8.7% vs. 3/36, 8.3%; p = n.s.). The same applied for patients showing post-operative GERD.

CONCLUSION: Despite a higher frequency of intraoperative perforations ageing does not affect the feasibility and final outcome of LapHD. Surgical myotomy is an effective procedure that significantly improves symptoms in all patients, irrespective of age.

M1580

Predictors for Anastomotic Leak Following Esophagectomy: Highlighting the Importance of the Learning Curve

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INTRODUCTION: Anastomotic leak (AL) is one of the most feared complications following esophagectomy. Despite the complexity of the operation, the influence of the learning curve on AL has not been extensively studied. We sought to determine the predictors of esophageal AL with a particular focus on the learning curve.
METHODS: A prospective clinical database identified the first 100 esophagectomy patients by a single surgeon from 7/05–9/08. Patient and tumor characteristics, and operative variables were assessed for predictors of AL. Fisher’s or M-W U-test determined significance (*p < 0.05). Multivariate logistic regression determined independent predictors. Cumulative Sum (CUSUM) analysis was used to generate a learning curve with unacceptable/acceptable leak rates set at 30%/10% and type I/II error at 0.05/0.20.

RESULTS: 92 cancers (ADC = 66/SCC = 16/Other = 10) and 8 benign conditions were resected by Ivor-Lewis = 37, 3-hole = 19, laparoscopic = 9, thoraco-abdo = 23, and trans-abdo = 12. AL was present in 14/100 and was more likely in the first 30 cases (8/30(26%) vs. 6/70(8%))*, cervical anastomosis (8/28 vs. 6/73)*, tube jejunostomy insertion (6/25 vs. 7/74 – p = 0.08), immediate post-op vasopressor use (4/16 vs. 6/75 – p = 0.07), and absence of anastomotic re-enforcement with pleura/omentum (14/82 vs. 0/14 – p = 0.09). Extent of resection (en-bloc 7/59 vs. standard 7/41), anastomotic technique (hand-sewn 10/85 vs. stapled 4/15), lymphadenectomy (D2 9/75 vs. D1 5/25), or prior radiotherapy (3/10 vs. 11/90), had no significant influence on AL. Independent predictors of AL included cervical anastomosis* and early surgeon experience (first 30 cases)*. The point of inflection of the CUSUM analysis curve was at the 34th case, after which the rate of anastomotic leak diminished significantly (see figure).

CONCLUSIONS: Surgeon experience is a major predictor of AL following esophagectomy and represents an accumulation of a series of technical refinements and post-op management. By the 34th case of this complex procedure, an acceptable leak rate can be achieved by a dedicated esophageal program.

M1581
Reoperation for Failed Antireflux Surgery: May the Outcome Results Be Predicted on the Basis of Radiologic and Endoscopic Findings?
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BACKGROUND: Redo fundoplication may be a challenging operation with often unpredictable results. Aim of this study was to evaluate if the morphologic characteristics of the failure—as assessed by barium swallow and endoscopy—could predict the outcome of Redo fundoplication.

PATIENTS AND METHODS: Between 1991 and September 2008, 70 patients underwent surgical revision for failed antireflux surgery. Patients were evaluated for symptoms using a detailed questionnaire, dynamic barium swallow, endoscopy, esophageal manometry and 24-h pH, before and after surgical revision. Main symptoms were: dysphagia (78%), chest or epigastric pain (76%), heartburn (59%), gas bloat syndrome (54%). On the basis of radiologic and endoscopic findings, failures were classified as: a) too tight-a-wrap (TT) in 15 pts b) slipped or disrupted fundoplication (SF) in 40 c) telescoping (TS) in 10 d) no anatomic changes (NC) in 5. Unsatisfactory results after Redo operation were defined as: 1) symptom score >10th percentile of the preop score of 100 consecutive GERD pts who underwent primary antireflux surgery or 2) persistence of an anatomic defect.

RESULTS: Mortality was nil. Follow-up was available in all but one of the patients with a mean of 66 months (12–160). When the conversion from a Nissen to a Toupet fundoplication was performed for TT, 13/15 pts were cured (87%). SF was treated with a new fundoplication in 32 pts, with mesh addition in half of them. In 8 pts a Collis lengthening procedure was necessary. These operations were only successful in 24/40 (60%). However, 7/9 pts in this group who underwent a third operation (esophago-gastric resection or a Collis gastroplasty was required in 6) had a significant improvement in symptoms, increasing the overall good results to 77.5%. In the TS group, 6 redo fundoplications and 3 Collis gastroplasty were performed: only 3/9 pts (33%) had satisfactory results and 3 required further operations (1 pt lost to F/U). In both the SF and TS, preoperative function tests were not related to the final outcome. All the pts who underwent surgical revision for NC had persistent or recurrent symptoms (partial fundoplication in 4, gastrectomy + Roux-en-Y in 1). The difference in results in the 4 groups of patients was statistically significant (p < .01, Chi-square test).

CONCLUSIONS: Refundoplication is safe. Revision for TT is recommended. SF can be also cured in the majority of cases but, often, more than one operation may be required. Revision for TS is more challenging and less rewarding, probably for a more complex anatomical and functional defect. Reoperation for symptoms persistence in spite of normal anatomical findings is not indicated.
Evaluation of 102 Redo Fundoplications: Effects of the Learning Curve
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BACKGROUND: There has been an increase in the number of redo fundoplication procedures being performed for failed anti-reflux surgery. We aim to study the learning curve of a single surgeon performing redo fundoplications.

METHODS: A retrospective chart analysis was done on consecutive 102 redo fundoplications performed by single surgeon at our center between December 2003 and March 2008. The patients were divided into two groups, first 51 (Group 1) and subsequent 51 (Group 2).

RESULTS: There was no difference in mean age (53.7 ± 15 yrs vs. 54.3 ± 13 yrs) and mean duration since last procedure (59 months vs. 52 months) in the groups. In all laparoscopic redo fundoplication was attempted in 75 patients and was successfully accomplished in 68 patients (90.7%). Twenty one (20.5%) patients underwent elective thoracotomy while remaining 7 patients underwent elective laparotomy. Laparoscopic procedure was attempted in 28 (55% with 82% successful completion) in group 1 as compared to 47 patients (92% with 96% successful completion) in group 2 with corresponding decrease in number of elective trans-thoracic procedures (19 vs. 2, p < 0.001). This was associated with a significant decrease in mean operative time (231.4 ± 68.8 minutes vs. 184.4 ± 58.5 minutes, p < 0.0001), estimated blood loss (279 ± 96.1 ml vs. 136 ± 110.1 ml, p = 0.02) and hospital stay (8.14 ± 7.3 days vs. 6.4 ± 10.4 days, p = 0.0084). There were no significant differences in inadvertent enterotomy (13 vs. 11), post-operative leak (3 vs. 2) and post-operative complications (16 vs. 16). There was no mortality in either group.

CONCLUSIONS: With experience a greater percentage of re-operative anti-reflux procedures can be performed laparoscopically with significant decrease in operative time, blood loss and hospital stay. Key words: redo fundoplication, learning curve

Ultrasoundography and Intraoperative Assessments Are Better Predictors of Non-Alcoholic Fatty Liver Disease (NAFLD) in Patients Undergoing Roux-en-Y Gastric Bypass (RYGB) Compared to Pre-Operative Laboratory Evaluations
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BACKGROUND: Morbid obesity is associated with non-alcoholic fatty liver disease (NAFLD), which may progress to cirrhosis in up to 25% of patients. Pre-operative liver function tests (LFTs), abdominal ultrasonography (US), and intra-operative assessments (IA) have been proposed to evaluate for NAFLD. We sought to determine the prevalence of NAFLD in patients undergoing roux-en-y gastric bypass (RYGB) and compare the liver histology to the LFTs, US, and IA to determine if a correlation exists.

METHODS: Patients undergoing RYGB were retrospectively reviewed in our database from January, 2000 to September, 2007. LFTs, US, and IA were compared to liver pathology classified according to the National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK) and National Institute of Health (NIH) guidelines. The student’s t- and Chi-square tests were used to compare continuous and categorical variables, respectively.

RESULTS: 251 patients (38 men and 213 women with median age and BMI of 43.4 ± 11.1 and 47.9 ± 7.8 respectively) had routine liver biopsies performed during RYGB. Histology suggested 3% normal, 24% <5% steatosis, and 73% NAFLD. NASH (NAFLD activity score > or = 5) was present in 18% while fibrosis was present in 34%. NAFLD was equal amongst gender (82% men vs. 71% women) and more prevalent in patients > or = 45 years compared to those <45 years (83% vs. 65%; p = 0.0005). 83% of IA suggesting fatty liver had evidence of NAFLD (p = 0.001). 246 patients had LFTs while 112 had ultrasounds. LFTs were elevated in 25.6% with AST/ALT >1 in 23.6%, which did not correlate with predicting NAFLD. 89% of those with NASH correlated with AST/ALT <1 (p = 0.035). US detected fatty liver in 48.2%. 58% of patients with fatty liver on US had a diagnosis of NAFLD (p < 0.001).

CONCLUSION: NAFLD is prevalent among morbidly obese patients, especially those > or = 45 years undergoing RYGB. US and IA are good predictors of NAFLD as compared to pre-operative LFTs and AST/ALT ratio. NASH is associated with an AST/ALT <1.
Hepatic Neuroendocrine Metastases: Intraoperative Detection of the Occult Primary Tumor
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BACKGROUND: Neuroendocrine tumors (NET) can present as hepatic metastatic disease without a known primary site. Questions regarding the optimal surgical management in such cases remain unanswered. The aim of this study was to define the clinical characteristics of metastatic NET undergoing surgical therapy with an apparent occult primary. Specifically, we aimed to determine the ability of surgical exploration to identify the primary site and characterize the clinicopathologic features of these tumors.

METHODS: Patients undergoing liver resection/ablation for NET metastases between 1/1988 and 8/2008 at a single institution were identified. Data on demographics, preoperative assessment, operative details, primary tumor status, and follow-up were collected.

RESULTS: In a cohort of 117 patients undergoing liver surgery for NET, 89 (76%) presented with liver metastases at the time of initial diagnosis. More than two-thirds were non-functional based on clinical or biochemical evaluation. Preoperative assessment included chest/abdominal/pelvis CT/MRI imaging in all patients and somatostatin receptor scintigraphy in one half. Of these, the primary tumor site was identified or suspected preoperatively in 65 (77%) whereas the primary remained unknown in 24 patients (27%). Of those with preoperative occult primaries, the tumor was detected intraoperatively in 67%. Histologic tumor type significantly impacted on pattern of primary tumor detection. Specifically, NET of pancreatic origin were significantly more likely to be detected preoperatively (p = 0.008) compared to carcinoid tumors, whereas 10 of 11 (91%) tumors detected intraoperatively (p = 0.00166), residual tumor (p = 0.0245), and intrahepatic metastasis (p = 0.0026) to be significant prognostic factors. Multivariate analysis revealed serosal invasion (p = 0.005) and intrahepatic metastasis (p = 0.002) to be significant prognostic factors. There were longer operative time (p = 0.0034) and a larger amount of intraoperative bleeding (p = 0.0041) in patients with Vp4, but no significant difference in mortality, morbidity and survival between patients with Vp3 and Vp4.

CONCLUSION: A favorable prognosis might be expected in patients with Vp3 and Vp4, without intrahepatic metastases and serosal invasion. Hepatectomy and thrombectomy for patients with Vp4 seemed to be a safe and effective surgical treatment in the selected patients, because there was no significant difference in mortality, morbidity and survival between patients with Vp3 and Vp4.

Efficacy of Hepatectomy and Tumor Thrombectomy for Hepatocellular Carcinoma with Tumor Thrombus Extending to the Main Portal Vein
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BACKGROUND: Hepatocellular carcinoma (HCC) with portal vein tumor thrombus (PVTT) extending to the main trunk of the portal vein have been considered to be a contraindication to surgical intervention, because tumor cells might be spreading to the opposite lobe of the liver at the time of hepatectomy, and the prognosis of HCC with severe portal invasion is known to be poor. The aim of this study is evaluate the efficacy of hepatectomy and tumor thrombectomy for HCC with tumor thrombus extending to the main portal vein trunk.

METHODS: Among 979 patients who consecutively underwent primary hepatectomy for HCC in National Cancer Center Hospital, Tokyo, Japan, from 1992 to 2008, forty-five patients with PVTT extending to the first portal branch and main portal vein trunk were evaluated retrospectively. According to the classification the Liver cancer Study Group of Japan, tumor thrombus in first order portal branches, and the main portal vein trunk or the opposite-side portal vein branch were defined as Vp3 and Vp4, respectively. Clinicopathologic data and surgical outcomes between HCC with Vp3 (n = 26) and with Vp4 (n = 19) were compared.

RESULTS: The 1, 3 and 5 year survival rates in all the patients (n = 45) were 69.8%, 36.6% and 19.0%, respectively, with a median survival time of 20 months. In the univariate analysis, the indicators of an unfavorable prognosis included tumor size (p = 0.0060), alpha-fetoprotein (p = 0.0057), surgical margin (p = 0.0198), serosal invasion (p = 0.00166), residual tumor (p = 0.0245), and intrahepatic metastasis (p = 0.0026) to be significant prognostic factors. Multivariate analysis revealed serosal invasion (p = 0.005) and intrahepatic metastasis (p = 0.002) to be significant prognostic factors. There were longer operative time (p = 0.0034) and a larger amount of intraoperative bleeding (p = 0.0041) in patients with Vp4, but no significant difference in mortality, morbidity and survival between patients with Vp3 and Vp4.

CONCLUSION: A favorable prognosis might be expected even in patients with Vp3 and Vp4, without intrahepatic metastases and serosal invasion. Hepatectomy and thrombectomy for patients with Vp4 seemed to be a safe and effective surgical treatment in the selected patients, because there was no significant difference in mortality, morbidity and survival between patients with Vp3 and Vp4.

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Daisuke Ban*, Kazuaki Shimada, Satoshi Nara, Minoru Esaki, Yoshihiro Sakamoto, Tomoo Kosuge
National Cancer Center Hospital, Tokyo, Japan

BACKGROUND: Hepatocellular carcinoma (HCC) with portal vein tumor thrombus (PVTT) extending to the main
AIM: To assess the effect of preoperative PVE on liver volume and function 3 months after major liver resection.

METHODS: Retrospective case-control study. Data were collected of patients who had undergone PVE prior to (extended) right hemihepatectomy and of control patients who had undergone the same resection without prior PVE. Remnant liver volume was measured by CT volumetry before PVE, 3 weeks after PVE, and 3 months after liver resection. Hepatobiliary scintigraphy (HBS) using the uptake rate of 99mTc-mebrofenin has been introduced for non-invasive assessment of liver function. This test was used for initial assessment of liver function before and 3 months after liver resection.

RESULTS: Ten patients were included in the PVE group and 13 in the control group. Groups were comparable for gender, age, and number of patients with a compromised liver. The mean ± SD future remnant liver volume was 33.0 ± 8.0% prior to PVE in the PVE group and 45.6 ± 9.1% in the control group (p < 0.01). HBS showed no significant differences in total liver function prior to PVE or resection. Three months postoperatively the mean remnant liver volume was 81.9 ± 8.9% of the initial total liver volume in the PVE group and 79.4 ± 11.0% in the control group (n.s.). Function of the remnant liver was also not different in both groups and increased up to 88.1 ± 17.4% and 83.3 ± 14% of initial total liver function, respectively.

CONCLUSION: Regeneration of the remnant liver 3 months after major liver resection is not hampered after preoperative PVE.

M1550
Perioperative Serum D-Dimer Changes in Patients Undergoing Laparoscopic Radiofrequency Ablation of Liver Tumors: A Prospective Study
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INTRODUCTION: A concern for radiofrequency ablation of liver tumors was whether coagulopathy would occur similar to cryoablation. The aim of this study was to investigate the perioperative changes in d-dimer levels in patients undergoing laparoscopic radiofrequency ablation of liver tumors.

PATIENTS AND METHODS: Serum d-dimer levels were obtained perioperatively and quarterly in 551 patients undergoing laparoscopic radiofrequency ablation between 2000–2007. The relationship between serum d-dimer and various perioperative parameters was analyzed. D-dimer levels >500 ng/ml were accepted as elevated. Statistical analysis was performed with Kaplan-Meier, Cox proportional hazards and Anova.

RESULTS: Tumor type included colorectal cancer (295 patients), HCC (114 patients), neuroendocrine tumor (72 patients) and other tumors (70 patients). Preoperative serum D-Dimer levels were: 782.6 ± 88 ng/ml in colorectal, 978 ± 131 ng/ml in HCC, 603.9 ± 116.6 ng/ml in neuroendocrine and 841.6 ± 193 ng/ml in other tumor types. Preoperative d-dimer levels were elevated in 99 patients (33%) with colorectal, in 40 patients (35%) with HCC, in 16 patients (22%) with neuroendocrine and in 22 patients (31%) with other tumor types. On bivariate analysis, preoperative d-dimer levels correlated with liver tumor volume, only in patients with colorectal liver metastasis (p = 0.007). Preoperative d-dimer levels correlated with alfa-fetoprotein and carcinoembriogenic antigen levels (p = 0.01, r2 = 0.08 and p = 0.004, r2 = 0.053, respectively), but not with chromogranin A levels. Age and gender did not affect preoperative D-dimer levels within a week after RFA. D-dimer levels increased by 10.6 ± 1.3, 5.4 ± 0.7, 16.9 ± 2.8 and 11.3 ± 1.9 folds in patients with colorectal, HCC, neuroendocrine and other tumor types, respectively. The magnitude of this increase correlated with the number of lesions ablated in all tumor types, but HCC. D-dimer levels returned back to baseline in 3 months. The postoperative increase in d-dimer levels was not associated with any coagulopathy or related clinical adverse events in any patient.

CONCLUSION: This is the first systematic evaluation of the perioperative d-dimer profile in patients undergoing laparoscopic radiofrequency of liver tumors. D-dimer levels preoperatively correlate with tumor volume and tumor markers in certain tumor types. Despite postoperative elevations which return to baseline in 3 months, coagulopathy is not observed after laparoscopic radiofrequency ablation.

M1551
Initial Experience with Radiofrequency Ablation (RFA) Assisted Liver Resection
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PURPOSE: Although surgical resection is the standard of treatment for liver neoplasm, the traditional resection techniques may be complicated by significant intraoperative blood loss and post-operative complications. We utilized a novel technique that facilitates resection by pre-ablating the line of resection with radiofrequency energy. Standard radiofrequency ablation probes were utilized to generate this line of ablation followed by resection utilizing the CUSA ultrasonic dissector for parenchymal division. We report our initial experience with this new technique and compare the outcomes to patients who underwent traditional approach.

METHODS: A retrospective review was conducted of 6 patients who underwent RFA-assisted liver resection and comparison was made to the patients who underwent traditional liver resections. The charts were analyzed for patient demographics, estimated blood loss (EBL), length of stay (LOS), and post-operative complications. P-values were determined using Student’s t-test.

RESULTS: All study patients completed a successful RFA-assisted liver resection. They were compared to 6 patients who underwent similar resections using a standard crush and clamp liver parenchymal division technique. The study group included 2 segmentectomies and 4 bisegmentectomies.
The control group included 1 wedge resection, 1 segmentectomy, 1 bisegmentectomy, and 2 lobectomies. The average age of the study group and of the control group was 48.3 years and 64.5 years, respectively. The mean EBL was significantly lower in the study group (91.7 vs. 1016.7 ml, p < 0.01). Significantly reduced LOS was seen in the study group as well (4.5 vs. 9 days, p < 0.05). The post-operative complications for the RFA-assisted group included one patient with biloma which required percutaneous drainage. Complications from the control group included wound infection, ileus, and pneumonia.

CONCLUSION: Our initial experience with radiofrequency ablation assisted liver resection indicates that it can be performed safely with significantly less blood loss and a shorter hospital stay.

Clinical: Pancreas

M1552
Intraoperative Blood Transfusion Is Associated with Worse Long-Term Survival in Patients with Pancreatic Cancer Undergoing Pancreatoduodenectomy
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BACKGROUND: There are an estimated 37,680 new cases per year and 34,290 deaths per year related to pancreatic cancer according to the National Cancer Institute in 2008. However, there has been a steep decline in perioperative mortality from 20% to less than 5% over the last decade due to experience at high-volume institutes. Blood transfusion may be a factor in long-term survival in patients with pancreatic cancer undergoing pancreaticoduodenectomy (PD). A recent study of the effects of perioperative blood transfusion (allogenic vs. autologus) on the immune system in gastric cancer patients revealed a down-regulation of key components of cell-mediated immunity indicating immunosuppression. It is the aim of this study to examine survival in patients with pancreatic adenocarcinoma receiving perioperative blood transfusions with PD.

METHODS: Data was collected between 1995 and 2007 for patients with pancreatic adenocarcinoma who were treated by PD at our institution. The blood transfusion data was obtained and recorded directly from blood bank records and all transfusions during the same hospital admission. Estimated survival was analyzed using Kaplan-Meier log-rank tests.

RESULTS: A total of 185 patients underwent pancreaticoduodenectomy for pancreatic adenocarcinoma between 1995 and 2007. The median survival of patients transfused intraoperatively (N = 70) versus not transfused (N = 115) was 14 vs. 19 months respectively (p = 0.05). Patients were further stratified based on stage. T3 disease was present in 114 patients (62%). Of these, 52 patients were transfused and 62 patients were not transfused with a median survival of 13 and 18 months respectively (p = 0.02). Patients with node-positive disease (N = 126) had similar survivals whether or not a blood transfusion was given. Patients with node-negative disease had median survival of 18 months when a transfusion was given compared to 54 months when there was no transfusion (p = 0.07). In addition, patients transfused intraoperatively were more likely to develop intraabdominal abscesses (p = .03). CONCLUSION: Patients with pancreatic adenocarcinoma who receive a blood transfusion during panreatoduodenectomy have a worse long-term survival than those who do not receive an intraoperative transfusion and are more likely to suffer an intraabdominal abscess. This holds true for T3 disease and trends toward significance in patients who are node-negative and have the best curative potential. Surgical technique and avoidance of intraoperative blood transfusion is of the utmost importance during PD to minimize complications and maximize long-term survival.

M1553
Should High Serum CA 19-9 Levels Preclude Surgery in Patients with Resectable Pancreatic Head Adenocarcinoma?
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An elevated serum CA 19-9 in patients with pancreatic adenocarcinoma (PA) has been associated with a poor prognosis. This study was conducted to assess the outcome of patients with resectable pancreatic head adenocarcinoma associated with high serum CA 19-9 levels.

METHODS: From 2000–2007, 344 patients underwent pancreaticoduodenectomy for resectable PA. Standard pre-operative staging included dual-phase helical CT scanning ± endoscopic ultrasound. Fifty-three patients (elevated group) had preoperatively elevated serum CA 19–9 levels (>400 IU/ml) after correction for obstructive jaundice. Of these, 27 patients had high levels (400-899 IU/ml (HL)) and 26 patients had very high levels >900 IU/ml (VHL). Patients with a serum bilirubin of > 2 mg/dL at the time of serum CA 19-9 measurement were excluded. Serum CA 19-9 levels were re-measured after surgery and before adjuvant treatment. Fifty patients with normal preoperative serum CA 19-9 levels (<37 IU/ml) comprised the control group.

RESULTS: Both median survival (22 mos, vs. 15 mos, p = 0.02) and overall 3-year survival (32% vs. 14%, p = 0.03) were significantly longer in the control group (n = 50) compared to the elevated group (n = 53). There was no significant differences in the median survival or overall 3-year survival rates between patients with HL and VHL. Seven patients in the elevated group (4 HL and 3 VHL) are still alive after a mean follow-up of 34 months. Patients in the elevated group who normalized their serum CA 19-9 levels after resection (n = 11) had a survival equivalent to patients in the control group.
CONCLUSIONS: Patients with resectable PA and high preoperative CA 19-9 levels have equivalent perioperative morbidity and mortality but a shorter survival compared to patients with normal preoperative serum CA 19-9 levels. Patients who normalized their serum CA 19-9 levels after resection, however, had equivalent survival to patients with normal preoperative serum CA 19-9 levels. Pre-operative serum CA 19-9 level, by itself, should not preclude resection in patients who have undergone careful preoperative staging.

M1554
Review of Studies on Gastric Emptying Assessment After Pancreatoduodenectomy
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BACKGROUND: Delayed gastric emptying (DGE) is the most prevalent complication after pancreatoduodenectomy (PD). The International Study Group of Pancreatic Surgery (ISGPS) published a consensus definition that defines DGE by clinical criteria (days of nasogastric intubation and first postoperative day solid food is tolerated). It has been suggested that diagnosis of DGE of clinical relevant grades B and C requires objectivation by a diagnostic test. Multiple tests are available to assess gastric emptying. Aim of this study was to review the literature of diagnostic studies that were directed to assess gastric emptying in the early postoperative period after PD and to derive potential universal diagnostic test criteria that define DGE.

METHODS: A systematic search by using the MESH terms “pancreatoduodenectomy”, “(delayed) gastric emptying”, “diagnostic techniques and procedures” of the medical databases Medline and Embase was performed to identify relevant papers.

RESULTS: Twenty-six papers that examined gastric emptying after PD were identified. In these studies 6 different tests were used. Nine studies (n = 384 patients) used gastric emptying scintigraphy with a radionuclide-labelled test meal to directly measure gastric emptying rate. Six of these formulated (different) reference values of normal emptying rate. A contrast passage study was used in 6 studies (n = 164 patients), of which 1 formulated objective criteria of delayed contrast passage. Indirect measurement of gastric emptying by paracetamol absorption test (based on rapid absorption of paracetamol in the small intestine) was used in 6 studies (n = 122 patients), of which 1 provided reference values for delayed emptying. Six studies (n = 109 patients), 4 from 1 center, indirectly assessed gastric emptying function by manometry (measuring gastric contraction pattern [phase III of the migrating motor complex]). Two studies (n = 124 patients) assessed gastric function by H2 breath test (measuring small bowel transit time), and another 2 studies (n = 9 patients) by electrogastrography. The studies’ heterogeneity in methodology and DGE definitions and lack of correlation with the clinical situation hampered defining universal criteria for the different diagnostic tests.

CONCLUSIONS: Direct measurement of gastric emptying after PD by scintigraphy seems the most acknowledged test that might diagnose DGE. However, universal criteria could not be deducted due to the heterogeneous methodology of the different studies and lack of correlation with the clinical situation. Further studies are needed to establish these criteria and to determine the exact role of a diagnostic study in defining DGE.

M1555
MRI Evaluation of Patients with Possible Adenocarcinoma of the Head of the Pancreas: Do We Still Need Laparoscopy?
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INTRODUCTION: CT is considered the standard imaging modality in evaluation of patients with pancreatic head tumors; MRI technology is under evaluated and has some potential advantages for these patients.

METHODS: We reviewed all consecutive MRI exams obtained between 05/2004 and 10/2008 for patients with suspicion of adenocarcinoma of the head of the pancreas. All clinical decisions were based on MRI findings, and all patients underwent Whipple procedures.

RESULTS: 129 patients underwent MRI during the study period. 37 were considered unresectable (mets or locally advanced) and were not offered surgical treatment. 52 patients were considered resectable (R group)(minimal invasion of PV/SMV or not at all) and 40 were borderline resectable (B group) (abuttment—not encroachment—of PV/SMV or minimal arterial involvement). From R group, 38 were resected (3 with associated vascular resection), 5 had positive margins (13%), 4 unsuspected metastases (8%), 6 vascular involvement precluding R0 resection, 21 with positive lymph nodes (68%). From B group, 26 were resected (6 with vascular resection), 8 had positive margins (32%), 1 unsuspected metastases (3%), 7 vascular involvement precluding R0 resection, 17 with positive lymph nodes (55%). 2 patients had final diagnosis of chronic pancreatitis (1 resected, 1 unresected, both from B group). There was no difference (R vs. B) on incidence of positive lymph nodes (p = 0.45), unsuspected metastases (p = 0.40) and a trend for positive margins on B (p = 0.11) (All Fisher’s Exact Test). Only 6 patients from both groups (R + B) had unsuspected metastases (7%).

CONCLUSION: MRI is accurate for predicting presence of pancreatic adenocarcinoma (head), and the absence of intrabdominal spread of the disease in this selected group of patients. Vascular involvement and positive margins are less accurately determined by MRI. MRI may be the only imaging study needed to offer surgical treatment to these patients.
M1556
Detection of Human Telomerase Reverse Transcriptase Expression by Immunohistochemistry in Pancreatic Juice
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BACKGROUND: Many studies have confirmed that a diagnosis of malignancy by cytology is highly reliable, and very few false-positive diagnoses have been recorded. However, the technique is limited by modest diagnostic sensitivity, so that a negative cytologic report is of less value. Human telomerase reverse transcriptase (hTERT), one of the subunits of telomerase, is a promising diagnostic marker for pancreatic cancer.

OBJECTIVES: To evaluate the feasibility of detection of hTERT expression by immunohistochemistry (IHC) for preoperative diagnosis of pancreatic malignancy.

METHODS: hTERT expression was examined by IHC in preoperative pancreatic juice samples.

RESULTS: In pancreatic juice samples, hTERT expression was detectable in 84% of pancreatic ductal adenocarcinomas (PDACs), while 62% of PDACs were positive by cytology. In intraductal papillary mucinous neoplasms (IPMNs), hTERT expression was detectable in 88% of malignant IPMNs, while only 22% were positive by cytology. The sensitivity, specificity, and overall accuracy of hTERT expression for differentiation between carcinoma and other benign diseases were 85.1%, 82.1%, and 84.3%, respectively, where as the same values for cytologic accuracy were 47.1%, 89.3%, and 57.4%, respectively. When the results of cytology and hTERT expression were combined, the sensitivity and overall accuracy increased to 92.0% and 87.8%, respectively.

CONCLUSIONS: Our results suggested that the assessment of hTERT expression in preoperative pancreatic juice increased the sensitivity and accuracy of diagnosis of PDACs and malignant IPMNs.

M1557
Survival Impact of Malignant Pancreatic Neuroendocrine and Islet Cell Neoplasm Phenotypes
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BACKGROUND: Neoplasms of pancreatic neuroendocrine or islet cell types encompass a wide variety of tumor types. The low incidence of malignant functional (F) or nonfunctional (NF) neuroendocrine islet cell tumors (ICTs) represents a challenge to precise posttherapeutic survival prediction.

METHODS: A pancreatic ICT data set was created from the SEER 1970–2004 database. Prognostic factors with survival impact, and relationships between surgical therapy and overall survival (OS) were analyzed with univariate and multivariate statistical methods.

RESULTS: Out of a cohort of 109,596 patients with a primary pancreatic malignancy, seven islet cell neoplasm histology groups with 2,350 individuals were identified. Histologic designations included carcinoid tumors (n = 176), islet cell carcinomas (n = 959), neuroendocrine (NE) carcinomas (n = 1052), and malignant gastrinomas (n = 68), insulinomas (n = 47), glucagonomas (n = 30), or VIPomas (n = 18). The median age was 60 years (range: 20–95), 55% of patients were male, and the median tumor size was 4.8 cm (0.2–33). Sixty-five percent of tumors had distant metastases; nonmetastatic, localized disease differed based on tumor histology and ranged from gastrinomas (5%) to VIPomas (41%, p < 0.0001). Resection frequency (mean: 31%) varied by tumor type; FICTs had a greater resection rate (43% vs. 30%, p = 0.003); 30-day and 90-day mortality (%) were 6 and 11 after resection, compared to 19 and 27 without resection (p < 0.0001). At a median follow up of 18 months (32 for survivors, range: 0–358), the median OS was 30 months, with group differences ranging from NE carcinomas (21) to VIPomas (96; p < 0.0001). Diagnosis group and resection status had an obvious OS association: the median OS of resected versus unresected FICTs was 172 versus 37 months, while that of NFICTs was 113 versus 18 months (p < 0.0001). Multivariate OS variables were: age, grade, surgical treatment, disease extent (all at p < 0.0001), node involvement (p = 0.0002), histopathologic group (p = 0.004), marital status (p = 0.008), and primary site (p = 0.03). Compared to VIPomas, hazard ratios were: gastrinomas 1.4, insulinomas 1.8, glucagonomas 1.9, carcinoid tumors 1.6, islet cell carcinomas 2.1, and NE carcinomas (NOS) 2.1. There was no significant OS impact by gender, ethnicity, tumor size, or radiation therapy.

CONCLUSIONS: When controlled for other established prognostic parameters, the histopathologic subtype assignment of pancreatic ICTs significantly affects survival prediction. Resective local treatment is associated with superior survival for all tumor types and remains the standard of care.

M1558
Pancreatic Cancer Biomarkers Discovery by SELDI-TOF-MS
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INTRODUCTION: SELDI-TOF-MS is a laboratory friendly technique to identify biomarkers for cancer. We explored the application of serum SELDI proteomic patterns to distinguish pancreatic cancer (PC) from chronic pancreatitis (CP), type II diabetes mellitus (DM) or healthy controls (HC).

METHODS: Sera from 12 HC, 24 DM, 126 PC (84 diabetics) and 61 CP (32 diabetics) were analyzed by SELDI-TOF-MS.
Spectra, generated on IMAC-30, were clustered and classified using Chipergen Biomarker Wizard and Biomarker Pattern software.

RESULTS: Peaks present in at least 5% of all spectra were selected. Two decision tree classification algorithms, including or not CA19-9 as predictor, were constructed. In the absence of CA19-9 the splitting protein peaks were at 1526, 1211 and 3519 m/z. When CA 19-9 entered the analysis, the former two peaks were maintained as splitters while the 3519 was replaced by CA19-9. The two classification trees performed equally in classifying HC (Se = 100%) and DM (Se = 100%); CA19-9 tree classified better both CP (Se = 89% vs. 79%) and PC (Se = 63% vs. 57%). The specificity of this classification tree was 93%, better of CA 19-9 alone (Se = 86%, Sp = 65%). We then constructed a classification tree considering only diabetic patients. The optimal tree resulted from the following main splitters: 1211, CA19-9, 7903, 3359, 1802. 100% DM, 97% CP and 77% PC were correctly classified. SELDI-TOF-MS features improved the diagnostic accuracy of CA19-9 (AUC = 0.883 for CA19-9; AUC = 0.935 for CA19-9 and SELDI-TOF-MS features combined).

CONCLUSION: SELDI-TOF-MS allowed the identification of new peptides which, in addition to CA 19-9, allowed to correctly classify the vast majority of PC patients and to distinguish them from CP or DM.

M1559

Pancreatic Head Resection with Segmental Duodenectomy in Patients with Carcinoma of the Papilla of Vater
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BACKGROUND: Pancreatic head resection with segmental duodenectomy (PHRSD) is a safe and reasonable technique appropriate for benign lesions of the head of the pancreas. Some reports have extended the indications of this technique to early stages of peripancreatic tumors. However, there is no evidence that an oncological operation may be performed with this procedure.

METHODS: To compare the perioperative factors and the degree to which regional lymph nodes were assessed, a matched-pairs analysis between PHRSD patients (n:15) and pylorus-preserving pancreatoduodenectomy (PPPD) patients (n:15) was performed. The groups were matched with regard to age, gender and TNM classification criteria. Surgical margins evaluated included pancreatic neck, common bile duct and posterior/radial margins. The median follow-up period was 20 months for PHRSD patients and 32 months for PPPD patients.

RESULTS: The 2 procedures were comparable in regard to operation time and intraoperative blood loss. The lymph node groups resected on bloc included (Japanese system) for PHRSD station 17, 13, 14 and 8 and for PPPD station 17, 13, 12, 14 and 8. The total number of lymph nodes examined for PHRSD was 10 + 2 (40% nodal involvement) and for PPPD group 17 + 3 (46% nodal involvement) [p < 0.05]. Postoperative complications were similar in both groups except delayed gastric emptying significantly higher in PPPD group 21% compared with the PHRSD group 13% [p < 0.05]. In both groups the only station of nodal involvement was 13 (posterior pancreaticoduodenal lymph node group). Ro resection was achieved in 90% of patients in both groups. One and 2 year survival was 85–80% in both groups.

CONCLUSION: When one considers the number of lymph nodes examined as a surrogate for adequacy of surgical resection, no only PPPD but PHRSD are appropriate procedures. The lymph node group (13) is the most important site for nodal metastasis. Nodal dissection around the superior mesenteric artery is needed to improve the prognosis of carcinoma of papilla of Vater. PHRSD is an adequate option in patients with carcinoma of the papilla of Vater despite that with this procedure the hepatoduodenal ligament lymph nodes are not dissected.

M1560

Clostridium Difficile Infection in Necrotizing Pancreatitis: How Big Is the Problem?
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BACKGROUND: The clinical spectrum of Clostridium difficile (CD) infection ranges from mild diarrhea to fulminating colitis with multi-organ failure and death. Emerging data show that both the incidence and the virulence of CD infection are increasing. Risk factors for developing CD infection include prolonged hospital stay and prior antibiotic use. Patients with necrotizing pancreatitis (NP) uniformly require prolonged hospitalization and commonly receive broad spectrum antibiotic treatment. We therefore hypothesized that patients with NP would be at increased risk for developing CD, and that NP patients with CD infection would have a more severe clinical course than those without CD infection.

METHODS: Administrative data from all patients hospitalized at our institution between January 2003 and December 2007 were reviewed. Of 255 patients with NP, 24 (9%) had a CD toxin confirmed assay (CD positive). These patients were matched by age, gender, body mass index (BMI), medical co-morbidities (diabetes, hypertension, coronary artery disease, pulmonary disease), and severity of pancreatitis with 24 patients without CD infection (CD negative). Clinical outcomes were compared. Data were analyzed with Student t-test, Chi square and Fisher exact test. P value of less than 0.05 was considered statistically significant.

RESULTS: The incidence of CD infection in all patients hospitalized during this time period (n = 56,668) was 2%. The incidence of CD infection was significantly higher (24/255, 9%) in patients with NP during this time period (p < 0.001). Length of stay, number of readmissions, hospital mortality, and need for colectomy were similar in NP patients with and without CD infection (Table). Five
patients in the CD positive group underwent colectomy; however, only one colectomy was required for CD toxic megacolon.

CONCLUSIONS: These data show that patients with necrotizing pancreatitis have a significantly increased incidence of Clostridium difficile infection compared to the general hospital population. Surprisingly, patients with necrotizing pancreatitis and Clostridium difficile infection had similar outcomes to those without Clostridium difficile infection. Judicious antibiotic use may decrease Clostridium difficile infection in patients with necrotizing pancreatitis.

M1561
Mesentericportal Vein Resection Does Not Impair Overall Survival or Recurrence-Free Survival After Pancreatoduodenectomy for Pancreatic Adenocarcinoma
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BACKGROUND: Up to 95% of patients who undergo a potentially curative resection for adenocarcinoma of the pancreas experience recurrence within two years. Still, pancreatoduodenectomy (PD) offers the only potential curative approach for pancreatic cancer (PC) and prolongs survival compared to patients with non-resectable disease. On this background the value of PD with mesentericportal vein resection (MPVR) remains controversial. Recent reports have shown that PD with MPVR can be performed safely at large volume centers with encouraging survival rates.

AIM: To compare overall survival and recurrence-free survival in patients undergoing PD with or without MPVR.

METHODS: We analyzed the data of 617 consecutive patients who underwent PD with (n = 99) or without (n = 518) MPVR for PC at our institution from 1981–2007. Tangential or segmental resection of the superior mesenteric or portal veins was performed when the tumor could not be separated from the vein.

RESULTS: MPVR included tangential resection with primary closure (n = 45), tangential resection with patch angioplasty (n = 6), segmental resection with primary anastomosis (n = 25), and segmental resection with interposition graft (n = 23). There were no significant differences between the two groups for age, sex, BMI, ASA class, UICC cancer stage, duration of hospital stay, perioperative complication rate, or 30-day mortality. Operative time (p < 0.0005), intraoperative blood loss (p = 0.0004), and rate of positive resection margin (p = 0.0028) were greater in the MPVR group. Median overall survival was 17.8 months in the MPVR group and 18.6 months in the standard PD group (p = 0.18). Median recurrence-free survival was 13.7 months in the MPVR group and 15.7 months in the standard PD group (p = 0.29). The effects of potential prognostic factors (MPVR, UICC tumor stage, resection margin) were analyzed in a multivariate Cox proportional hazards model. MPVR had no impact on overall survival or recurrence-free survival duration.

CONCLUSIONS: Patients who require MPVR have a median overall survival and recurrence-free survival that do not differ from patients undergoing standard PD. PD with MPVR for PC can be performed safely without significant increase in perioperative morbidity and mortality. MPVR should be undertaken in patients if MPVR will lead to a potentially curative resection.

M1562
Diagnosis and Treatment of Early Pancreatic Cancer: From Nation-Wide Pancreatic Registry
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Japan Pancreas Society has been conducting nation-wide pancreatic cancer registry since 1981. The definition of early pancreatic cancer is still controversial and current classification of pancreatic cancer divides in situ or intra ductal carcinoma from invasive cancer though there must be contiguous process of invasion. Only 1.8% of invasive cancer is JPS-Stage I, while most of the patients have JPS-Stage IVA and IVB disease. Out of 908 patients with invasive pancreatic cancer less than 2 cm in size, only 177 (19.4%) patients had JPS-Stage I disease with median survival of 69.5 months. The survival of the patients with jaundice or back pain was significantly worse than that of patients who was diagnosed without symptom. Pancreatic cancer seems to gain its aggressiveness during growth evidenced by the increased ratio of poorly differentiated carcinoma, lymphatic infiltration, vascular infiltration and
perineural infiltration. Even in small (<2 cm) tumor, the ratio of scirrhous carcinoma exceeded more than 30%, which was similar with larger tumors. The combined resection of peripancreatic plexus significantly increased the survival of patients with small (<2 cm) pancreatic cancer in the head of the pancreas. This effect was abrogated when the tumor exceeds 2 cm in diameter. The 5-year survival rate of 288 patients after pancreatectomy for in situ intraductal papillary mucinous neoplasm (IPMN) was 81.9%. When the tumor invades microscopically the 5-year survival of 113 patients was decreased to 70.9%, while that of patients with invasive carcinoma derived from IPMN was 32.1%. The early diagnosis and treatment of pancreatic cancer is still challenging and the definition of early pancreatic cancer needs to be clarified.

M1563

Pancreatic Quantitative Consistency
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INTRODUCTION: Consistency of the pancreas is one of the most important prognostic factors for pancreatic anastomosis. However, pancreatic stiffness had been evaluated subjectively. We introduce a tactile sensor for digitize the consistency of the pancreas. Materials and

METHODS: A material has its own resonance frequency. If material touches an oscillated object, a shift of the resonance frequency will be observed. The difference between the frequencies under pre and post oscillate conditions depends on the stiffness of the object. So, the consistency of material can be measured by monitoring the shift in the frequency. The tactile sensor system is composed of a sensor probe, an amplifier and a filter; the probe is connected to a piezoelectric transducer with a resonance frequency of 57 kHz. Measurements were made 200 times per second, and the magnitude of frequency change was processed by connected computer with original software. 61 patients with mean age 70.1 ± 9.5 were registered with this study. These patients did not have any clinical sign of pancreatitis. 34 patients had distal gastrectomy, 11 had total gastrectomy ± splenectomy and distal pancreatectomy, 3 had pancreatoduodenectomy, 5 had pancreatectomy alone and 8 patients had other procedures. Consistency of the pancreas was measured with a tactile sensor system (Venous Handy Biosensor system TM, AXIOM, Fukushima, Japan). Pancreas head and body (neck) were measured 2 or 3 times on the same point. If the patients had pancreatic tumor, the measurement was performed far from the tumor.

RESULTS: The consistency of the pancreas head was 721.7 ± 191.1 Hz. The consistency of the pancreas body was 741.2 ± 147.0 Hz.

CONCLUSION: This method is easily maintained the consistency of pancreas non-invasively. Further investigation will be needed for elucidate the relationship between consistency and pancreatic leakage.

M1564

High-Volume Pancreatitis Surgeon Can Make a Difference Regarding Concepts of Management in Acute Pancreatitis
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BACKGROUND AND AIM: Acute pancreatitis (AP) is a common disease, with incidence of 15.9 cases per year for each 100,000 inhabitants in Brazil. The treatment of AP remains controversial in some topics, due mainly to difficulties to develop clinical studies. We hypothesized that high volume AP surgeons could have more updated concepts to treat AP, promoting better results than low-volume AP surgeons. Our aim is to compare low-volume with high-volume surgeons regarding concepts in the management of AP.

METHODS: A questionnaire has been sent to 2,000 members of the Brazilian College of Surgeons, with 618 (30.9%) answers obtained. The questionnaire consisted of questions related to the surgeon experience and in particular to the treatment of AP. Then we compared concepts of management of AP between surgeons who attend up to 10 patients with AP per year (Group A - n = 329), with surgeons who attend more than 10 patients with AP per year
(Group B – n = 212). Questionnaires from surgeons who do not treat AP were excluded. Difference between groups was determined by Fisher test, with p < 0.05 as significant.

RESULTS: The comparison between group A and Group B showed that in Group B surgeons believe more often than Group A that CT should be done following severity criteria (36.1% vs. 56.2%, group A and B, respectively, p < 0.001) instead of perform a CT in all patients (58% vs. 41.4% group A and B, respectively, p < 0.001). In Group A, 56.2% and 38.1% in Group B believe that parenteral nutrition is the best way to feed patients with acute pancreatitis (p = 0.002). Enteral nutrition alone is the method of choice to nutritional support to 22.7% in group A and 32.9% in group B (p = 0.012). Regarding surgical treatment, 60.6% in Group A against 44.3% in Group B believe that the best period of time to operate a patient with AP is up to 14 days (p < 0.001). In Group A, 33.5% of surgeons give antibiotics to all patients with AP, in opposition to 16.7% in Group B (p < 0.001).

CONCLUSION: We conclude that high-volume pancreatic surgeons make a difference regarding concepts of management in AP, that could be implicated in a better treatment of these patients. Thus, patients with severe AP should be treated preferentially in high-volume centers.

M1565
Distal Pancreatectomy: Surgery with an Unjustified Reputation
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BACKGROUND: Resection of the body and tail of the pancreas are done in 10–15% of all pancreatic resections. There is a widespread view among surgeons that distal pancreatectomies are harmless operations with few complications compared to pancreaticoduodenectomies. Recent data from larger series would however indicate that this is not the case. Aims: To describe the morbidity pattern after resection of the corpus and tail of the pancreas and to analyze factors of significance for the occurrence of complications.

METHODS: Since 1997, 279 cases of pancreatic resection were registered prospectively in the database at Karolinska University Hospital Huddinge, Stockholm, Sweden. Among those had 48 patients a distal resection, 34 females and 14 males. Mortality and morbidities were analyzed with focus on pancreatic leak and fistula formation (PF).

RESULTS: The preoperative diagnoses were pancreatic tumor (41), chronic pancreatitis (4), trauma (1) and gastric cancer (2). All patients had an operation with stapling of the gland transection area in 34 and hand-sutured techniques in 14 cases. No postoperative mortality was observed. However, postoperative complications were registered in 21 pts (44%) with (PF) noticed in 17(35%) cases. Of the latter did 4 pts develop local abscesses, 1 patient had bleeding and 1 patient had delayed gastric emptying. All these complications were treated conservatively except for one case, where an additional operation was required. (PF) was more common in malignant disease (9/20: 45%) than in benign (8/28: 29%) (p = 0.35). Complications were more frequent after hand-sutured techniques (11/14; 79%) compared to the use of staplers (10/34, 29%) (p < 0.01).

CONCLUSIONS: Distal pancreatic resection is a complex operation with high morbidity even in a high volume center emphasizing the need for preventive measures. The rate of (PF) seems to depend on the surgical technique and the underlying disease state.

M1566
Role of Pancreatic Frozen Section at Margin of Resection in Intraductal Papillary Mucinous Neoplasms
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Intraductal papillary mucinous neoplasms (IPMN) are important premalignant neoplasms of the pancreas. Extent of resection can be difficult to determine as pancreatic ductal involvement is often diffuse but the morbidity of total pancreatectomy is rarely warranted. We reviewed our experience with resected IPMN to characterize the importance of frozen section in determining extent of resection and long-term outcome. Seventy patients (33 women, 37 men; mean age 64.4) operated on for IPMN from 1992 through 2008 were reviewed. There were 39 patients with main duct disease (MD), 28 with side-branch disease (SB), and 3 with mixed disease. Of patients with MD and mixed disease, 11 (26%) had pancreatic duct dilation (diameter >5 mm) localized to the head, 4 (10%) localized to the tail, 16 (38%) had diffuse duct involvement, and 12 (29%) had a mass. Based on preoperative imaging and operative findings, 9 (13%) underwent total pancreatectomy, 38 (54%) pancreaticoduodenectomy, 22 (31%) distal pancreatectomy, and 1 (1.4%) was managed with central pancreatectomy. Final pathology of the resected specimen was characterized as adenoma in 17 (24%), borderline in 26 (37%), carcinoma in situ in 13 (19%), and invasive carcinoma in 14 (20%). Frozen section examination of the pancreatic margin was performed in 49 of the 61 patients that underwent partial pancreatectomy. Frozen section was characterized as low grade dysplasia (LGD) in 9 patients (18%), IPMN/adenoma in 8 (16%), and “negative for malignancy” in 32 (65%). There were no cases of carcinoma in situ or invasive cancer on frozen section. Additional resection occurred in two patients as a result of the frozen section findings; one for a focus of IPMN and one for foci of dysplasia at the margin. At a mean follow-up of 17.4 months (range 1 to 118 months), three patients (4.3%) had invasive carcinoma detected in the pancreatic remnant with the final pathology of the original specimen being: main duct IPMN/invasive cancer, main duct IPMN/carcinoma in situ, and side-branch IPMN(borderline. Pathology of the pancreatic duct margin in these patients was benign IPMN in the first
patient and “negative for neoplasm” in the other two. In conclusion, the preoperative assessment of extent of ductal disease is the most valuable tool in predicting the extent of resection. The principal utility of frozen section on the resection margin is in determining the presence of invasive cancer. Long term follow-up of the remnant is important following resection of all patients with IPMN regardless of original pathology or margin status.

M1567
Not Just for Trauma Patients: Damage Control Laparotomy in Pancreatic Surgery
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INTRODUCTION: Damage control laparotomy (DCL) has been a major advance in modern trauma care. The principles of damage control which include truncation of operation to correct acidosis, hypothermia, and coagulopathy with subsequent planned definitive repair are applicable in managing patients undergoing abdominal operations. In order to define indications, technique, and outcome we undertook a retrospective review and analysis of pancreatic surgery patients in whom DCL was utilized.

METHODS: In a cohort of 835 patients who underwent elective pancreatic operations at the Medical University of South Carolina from 2001–2007, 8 patients were identified who required DCL. Under Institutional Review Board approval records were reviewed to define intraoperative blood loss, acidosis, hypothermia, and coagulopathy, operative techniques, timing of definitive operation, and hospital outcome.

RESULTS: There were 5 men and 3 women with a mean age of 51 years. The diagnosis was chronic pancreatitis in 7 patients and cancer in 1. The index operation was pancreaticoduodenectomy in 5 patients and distal pancreatectomy in 3. In 4 patients undergoing elective pancreatic resection intraoperative portal vein hemorrhage initiated damage control laparotomy. Four patients had damage control utilized at re-operation for abdominal sepsis (2) and hemorrhage (2). DCL techniques included external tube drainage (8), abdominal packing (7), staple closure of open bowel (4), and rapid abdominal closure (4). Operative blood loss ranged from 300 to 12,000 cc. Operative transfusions ranged from 0 to 44 units of packed red cells. Intraoperative INR was greater than 1.5 in 4 patients, pH ranged from 7.08 to 7.45, and temperature ranged from 34.8 to 38.8 degrees centigrade. Laparotomy for pack removal and intestinal reconstruction was undertaken 1 to 7 days after DCL. Length of hospital stay ranged from 7 to 80 days. Hospital mortality was zero.

CONCLUSION: Patients with exsanguinating hemorrhage and severe sepsis related to pancreatic surgery can be successfully managed with principles of DCL. Truncation of operation with abdominal packing, bowel closure, external drainage of bile and pancreatic ducts, rapid abdominal closure with planned subsequent completion laparotomy should be considered in pancreatic operations when patients risk intraoperative acidosis, hypothermia and coagulopathy due to sepsis or hemorrhage.

M1568
The Meaning of Measuring the Amylase Level of Acites in Pancreatic Fistula
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BACKGROUND: Despite progress in operative technique and developments in postoperative management, postoperative pancreatic fistula (PF) still occur about 5–30%, and sometimes developed morbid complication. But the criteria for PF was not established before. In 2005, the ISGPF (International Study Group on Pancreatic Fistura) has proposed a new criteria for pancreatic fistula based on clinical parameters. The purpose of this study is to assessment of pancreatic fistula followed by the criteria, and examine the meaning of measuring the amylase level of acites in PF.

METHODS: Between April 2006 and June 2008, 32 patients underwent pancreas resection at Shimane University Graduate School of Medicine, and we measured the amylase level of ascites in PF.

RESULT: Age and sex: 69.1 (47–83), Male; 12, Female; 20, Disease: carcinoma of pancreas; 15, intraductal papillary mucinous neoplasms or cystic neoplasms; 6, carcinoma of distal bile duct; 6, carcinoma of ampulla of Vater; 5, Operation method: Pancreaticoduodenectomy; 24, distal pancreatectomy; 7, partial pancreatectomy; 1, PF; No PF; 13 (40.6%), Grade A fistulas; 12 (37.5%), grade B; 6 (18.8%), and grade C; 1 (3.1%). There was significant difference in the amylase level of acites between No PF group and PF group; but no difference between the grade. And in the group of grade B and C, 5 patients (71%) were developed high amylase level of acites after 7th post operative day.

CONCLUSION: In the diagnosis of PF, to measure the amylase level of ascites followed by the ISGPF criteria is useful, but it is not correlative with the PF grade.

Clinical: Small Bowel

M1583
CT Transition Zones: Relevance in Management of Small Bowel Obstruction
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BACKGROUND: Computed tomography (CT) scans are becoming standard of care in workup of small bowel obstruction (SBO). Radiologists emphasize radiographic transition zones (RTZ), areas of abrupt change from dilated to collapsed bowel on CT, as pathognomonic for SBO presence and location. The relevance of RTZ in patient management, operative or conservative, remains unknown. The purpose of this study is to determine the surgical predictive value and intraoperative accuracy of RTZ.
METHODS: Retrospective study of 200 consecutive patients with secondary SBO from 2002–7 who underwent CT. Patients were equally matched for age, gender, comorbidity and clinical presentation. Significance was determined by unpaired t-test and multivariate analysis.

RESULTS: Of 200 patients, 150 (75%) had RTZ of which 58 (39%) required surgery and 92 (61%) were managed nonoperatively (p < 0.001). For the 50 patients without RTZ, 17 (34%) required surgery and 33 (66%) were managed nonoperatively (p < 0.001). RTZ did not increase likelihood of operative intervention (odds ratio (OR) = 1.19, 95% CI [0.61–2.32]). Presence of small bowel RTZ conferred an overall 37.9% operative positive predictive value (PPV) with 77% sensitivity. Though patients with proximal versus distal RTZ had increased likelihood of requiring surgical intervention (PPV 47.5% vs. 34.3%), this did not reach significance (p > 0.05). (Table 1) Correlation of RTZ and intraoperative location of obstruction occurred in 31 (63%) patients with overall 63.3% PPV and 62% sensitivity (p < 0.01). (Table 2)

Table 1. Surgical Versus Nonoperative Intervention Based on Location of TZ

<table>
<thead>
<tr>
<th>Transition Zone</th>
<th>Surgical (n = 58)</th>
<th>Nonoperative (n = 92)</th>
<th>PPV</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>All small bowel</td>
<td>58</td>
<td>92</td>
<td>38.7%</td>
<td>77%</td>
<td>26%</td>
</tr>
<tr>
<td>Proximal Small Bowel (n = 40)</td>
<td>19</td>
<td>21</td>
<td>47.5%</td>
<td>86%</td>
<td>34%</td>
</tr>
<tr>
<td>Distal Small Bowel (n = 110)</td>
<td>39</td>
<td>71</td>
<td>35.4%</td>
<td>74%</td>
<td>34%</td>
</tr>
</tbody>
</table>

Table 2. Correlation Between Radiographic and Intraoperative Location

<table>
<thead>
<tr>
<th>Transition Zone</th>
<th>Correlation (n = 31)</th>
<th>No Correlation (n = 18)</th>
<th>PPV</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>All small bowel</td>
<td>31</td>
<td>18</td>
<td>63.3%</td>
<td>62%</td>
<td>18%</td>
</tr>
<tr>
<td>Proximal small bowel (n = 19)</td>
<td>12</td>
<td>7</td>
<td>63.2%</td>
<td>80%</td>
<td>13%</td>
</tr>
<tr>
<td>Distal small bowel (n = 30)</td>
<td>19</td>
<td>11</td>
<td>63.3%</td>
<td>66%</td>
<td>21%</td>
</tr>
</tbody>
</table>

CONCLUSION: Presence of small bowel RTZ in patients with SBO does not increase likelihood of surgical intervention or predict patients who will need surgery (OR 1.19, PPV 37.9%). Significant correlation exists between radiographic and intraoperative location of SBO making RTZ useful for preoperative planning (PPV 63.3%, p < 0.01).

M1584

Intestinal Surgery for Crohn’s Disease: Predictors of Recovery, Complications and Health Related Quality of Life

Marco Scarpa¹, Cesare Ruffolo²,² Domenico Bassi¹, Riccardo Boetto², Renata D’Incà², Andrea Buda², Giacomo C. Storniolo², Imerio Angriman²

¹Department of Surgery, Veneto Oncological Institute (IOV-IRCCS), Padova, Italy; ²Department of Surgical and Gastroenterological Sciences, University of Padova, Padova, Italy; ³IV Unit of Surgery, Regional Hospital Ca Foscari, Treviso, Italy

INTRODUCTION: Four of five patients affected by Crohn’s disease (CD) require at least one surgical procedure. Minimally invasive surgery and strictureplasty were introduced to ameliorate the burden of surgery in these patients. However, extensive bowel resection and/or stoma creation may be still necessary. The aim of this study was to evaluate the predictors of recovery, complications and quality of life on an unselected cohort of patients submitted to intestinal surgery for CD.

PATIENTS AND METHODS: Forty-seven consecutive patients admitted for intestinal surgery for CD in our department from 2006 to 2008 were enrolled in this prospective study. The median CD duration was 79 (3–264) months and 11 patients presented a fistulizing phenotype. CD was localized in small bowel in 38 patients and in the large bowel in 9 patients; 7 patients had both localization. Surgical predictors (video assisted intestinal surgery, strictureplasty, stoma creation, ileal resection and colonic resection) as well as clinical predictors (age, gender, CD duration, activity and localization, recurrent CD) were evaluated. Outcome measures were medical and surgical complication, reoperation, day of first bowel movement, postoperative hospital stay and Barthel’s recovery score. After at least 3 months, an interview that included the Cleveland Global Quality of Life score, the Body Image Score and the Harvey-Bradshaw Activity Index (HBAI) was made. Univariate and multivariate analysis were performed.

RESULTS: Stoma creation was the only independent predictor of the post operative hospital stay (p = 0.006) in a model that also included minimally invasive surgery, colonic resection, small bowel resection and CD duration (R² = 0.38). Patients who had strictureplasty had their first bowel movement later than those who had bowel resection (p = 0.042). Barthel’s score on the 3rd postoperative day significantly correlated with number of intestinal localisation, stoma creation and perianal CD. After follow up, CGQL score correlated only with HBAI (tau = −0.42, p < 0.001). Body image score was independently predicted by the HBAI (p = 0.006) and the use of video assisted surgery (p = 0.036).

CONCLUSIONS: Stoma creation was associated to a long post operative hospital stay and strictureplasty was associated to a slower recovery of bowel function. However, none of them seemed related to postoperative complication. Body image score was independently predicted by disease activity and the use of video assisted surgery. Health related quality of life appeared to be significantly related only to current disease activity independently from the surgical procedure.
M1585

Permanent Gastric Electrical Stimulation Improves Symptoms of Post-Surgical Disordered Gastric Emptying

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1Digestive Diseases, University of Mississippi Medical Center, Jackson, MS; 2Surgery, University of Mississippi Medical Center, Jackson, MS; 3School of Medicine, University of Mississippi Medical Center, Jackson, MS

PURPOSE OF STUDY: Gastric Electrical Stimulation (GES) has successfully treated disordered gastric emptying (DGE) from diabetic, post-viral, and idiopathic etiologies. The utility of GES in DGE due to post-surgical etiologies has not been previously defined. We hypothesized that GES would significantly improve gastric symptoms and physiologic gastric emptying in patients with post-surgical DGE.

METHODS USED: Adult patients (n = 36, 5 M/31 F) with dietary and pharmacologic refractory post-surgical DGE characterized by chronic nausea and postprandial emesis underwent placement of a permanent GES system. Quantitative symptoms (nausea, vomiting, early satiety, bloating, abdominal pain, scored 0–4; total symptom score summed, 0–20) and measures of gastric emptying (of a low fat meal) were recorded at baseline and after permanent GES placement (permGES) (6–48 month postoperatively). Data from symptom measurements are reported as mean ± standard error of mean. Statistical analysis was performed using Student’s t-test. Improvements in gastric emptying were reported according to the differential pathology (rapid or delayed) common to this etiologic subset.

SUMMARY OF RESULTS: Patients with post-surgical DGE who underwent permanent GES implantation had significant improvement in DGE symptoms on long-term postoperative follow-up. Furthermore, 6 of the 11 patients whom were previously Delayed, and 3 of the 5 patients whom were previously Rapid, exhibited sustained improved gastric emptying (toward normal) after permGES placement.

Table 1. DGE Symptoms Before and After PermGES

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<tr>
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<tr>
<td>Baseline</td>
<td>3.29 ± 0.20</td>
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<td>14.2 ± 0.85</td>
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<tr>
<td>After PermGES</td>
<td>1.96 ± 0.30 *</td>
<td>0.89 ± 0.21 *</td>
<td>8.4 ± 0.85 *</td>
</tr>
<tr>
<td>Change from baseline</td>
<td>40.4%</td>
<td>67.4%</td>
<td>40.8%</td>
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</table>

*p < 0.05

CONCLUSIONS: In patients suffering from symptomatic refractory post-surgical disordered gastric emptying, permanent placement of gastric electrical stimulation system should be considered a viable option for symptom control.

CONCLUSIONS: Gastric Electrical Stimulation (GES) can significantly improve gastric symptoms and physiologic gastric emptying in patients with post-surgical DGE. Further study is needed to identify preoperative predictors of response based on our experience.

RESULTS: Patients with post-surgical DGE who underwent permanent GES implantation had significant improvement in DGE symptoms on long-term postoperative follow-up. Furthermore, 6 of the 11 patients whom were previously Delayed, and 3 of the 5 patients whom were previously Rapid, exhibited sustained improved gastric emptying (toward normal) after permGES placement.

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CONCLUSIONS: In patients suffering from symptomatic refractory post-surgical disordered gastric emptying, permanent placement of gastric electrical stimulation system should be considered a viable option for symptom control.
EPIYA-C Motifs Are Main Determinants of Intestinal Metaplasia and Gastric Mucosa Atrophy
Carlo-Federico Zambon1,2, Daniela Basso3, Alessia Stranges3, Grazia Guariso4, Fabio Farinati3, Stefania Schiavoni3, Filippo Navaglia3, Paola Fogar3, Eliana Greco5, Massimo Rugge3, Mario Plebani3,1
1Laboratory Medicine, University of Padova, Padova, Italy; 2Medical and Surgical Sciences, University of Padova, Padova, Italy; 3Pediatrics, University of Padova, Padova, Italy; 4Surgical and Gastroenterological Sciences, University of Padova, Padova, Italy; 5Diagnostic Medical Sciences and Special Therapies, University of Padova, Padova, Italy

Western H. pylori cagA+ strains with 2 or more EPIYA-C motifs significantly enhance gastric cancer risk. Our aims were to: 1) verify whether the differences in the degree of inflammation and activity found in cagA+ strains infected patients depend on EPIYA-C or on other H. pylori virulence genes, namely vacA and babA2; 2) ascertain which is the main virulence determinant associated with intestinal metaplasia (IM) and/or atrophy. We studied 191 H. pylori infected patients: 66 cagA− (54 gastritis, 12 duodenal ulcer) and 125 cagA+ (85 gastritis, 40 duodenal ulcer). Antrum and corpus biopsies were obtained for histology and H. pylori culture. The following histological parameters were considered: antrum and corpus inflammation, activity and H. pylori colonization grades and presence or absence of IM and atrophy. The following H. pylori virulence genes were PCR analysed in antrum and corpus isolates: vacA s, i and m polymorphisms and cagA EPIYA-C. babA2 status was studied in antrum isolates. In fasting sera pepsinogen A (PGA) and C (PGC) were assayed (ELISA) to calculate PGA/PGC ratio, a biochemical index of multifocal or corpus atrophy. Both antrum and corpus inflammation and activity were correlated with vacA s1 and i alleles and with cagA EPIYA-C motifs (p < 0.05); corpus inflammation and activity were also correlated with vacA m1 allele (p < 0.05). babA2 was not associated with any of the above parameters. IM was correlated with s1 (p < 0.001), i1 (p < 0.001) and m1 vacA (p < 0.001), with EPIYA-C motifs (p < 0.001), with babA2 (p < 0.01), with corpus inflammation (p < 0.05) and H. pylori colonization grade (p < 0.005). Only EPIYA-C was confirmed to be correlated with IM at binary logistic regression analysis (p < 0.05). Since only a minority of our patients had chronic atrophic gastritis, we biochemically defined the presence (BA) or absence (BN) of multifocal atrophy on the basis of PGA/PGC ratio (≤ or >4.7). BA was significantly correlated with s1 vacA (p < 0.05), babA2 (p < 0.005) and EPIYA-C motifs (p < 0.01). Only EPIYA-C motifs were confirmed to be significantly associated with BA at binary logistic regression analysis (p < 0.05; 1 EPIYA-C: OR = 1.7; 95% CI = 0.3–9; two or more EPIYA-C: OR = 4.7; 95% CI = 1.07–21.18). In 12 patients a different number of EPIYA-C motifs was found between antrum and corpus isolates; this feature did not correlate with any of the studied parameters.

In conclusion: among western H. pylori strains virulence determinants, the number of EPIYA-C motifs is mainly associated with IM and with the presence of biochemical signs of atrophy and this fits with an early involvement of multiple EPIYA-C in multistep gastric carcinogenesis.
**M1589**

**Long Term Results of a Prospective Longitudinal Study Comparing Laparoscopic Versus Open Gastrectomy for Advance Gastric Cancer**

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¹Surgery, Tor Vergata, University of Rome, Rome, Italy; ²Medicine, Tor Vergata University of Rome, Rome, Italy

**AIM:** Aim of the study was to compare the long term results of laparoscopic and open gastrectomy for advanced gastric cancer.

**METHODS:** from February 2000 to January 2004 all patients with adenocarcinoma of the stomach were assessed to entry in this longitudinal prospective non randomized trial. Patients agreed to receive either a laparoscopic or laparotomic approach. They were assigned to one or the other procedure at the multi-disciplinary meeting on the solely base of the availability of an upper gastro-intestinal surgeon expert in advance laparoscopic surgery and anyway trying to alternate the 2 procedures. Adjutant therapy was similar in both groups. The primary endpoint was cancer related survival and secondary endpoints were overall survival, evaluation of surgical complications and mortality, and time to return to normal activity. Patients completed an appropriate health profile questionnaires for the latter of secondary endpoints. Fisher’s exact test, Student’s t-test and Kaplan-Meyer survival analysis were used where appropriate for statistical analyses.

**RESULTS:** Fifty-one patients were enrolled in the protocol of study. Population of study was homogeneously distributed in the two groups. Eight patients were excluded from the analysis of primary endpoint: 5 because of findings during initial exploratory surgery and 3 who died within 90 days from surgery. Forty-three patients were followed-up (range 11–104, mean 44 months). Five patients were lost at F.U. Twenty-one patients underwent a laparoscopic gastric surgery (LGS) and 22 had a standard open procedure (OGS). No statistical difference was found between the two groups in terms of 5 years cancer related survival (44% vs. 45%, p 0.9), and 5 years overall survival (39% vs. 50%, p 0.9). We found no differences in surgical complications and postoperative mortality in the 2 groups. Operative time was significantly longer for LGS (p < 0.001). There was no conversion to open surgery in this series. Fisher’s exact test, Student’s t-test and Kaplan-Meyer survival analysis were used where appropriate for statistical analyses.

**CONCLUSIONS:** LGS is as effective as OGS in the treatment of advanced gastric cancer. There was a tendency of higher limitation of patient’s day-life in the immediate and late postoperative period in the OGS group. Based on these results, the authors cannot recommend routine use of LGS over OGS for the treatment of advanced gastric cancer.

**M1590**

**Bariatric Surgery Improves Musculoskeletal Quality of Life Independent of Weight Loss and Procedure Type**

Stephanie BRAVO, Gavitt Woodard¹, Tina Hernandez-Boussard, John Morton

Surgery, Stanford University, Stanford, CA

**BACKGROUND:** Obesity is the leading public health crisis of the industrialized world. Musculoskeletal disability is closely correlated with obesity by leading to weight gain and preventing exercise-induced weight loss. Increases in HDL and hs-CRP are positively associated with exercise and joint inflammation respectively. We hypothesize that bariatric surgery improves musculoskeletal function and that these improvements correlate with weight loss, increases in HDL cholesterol, and decreases in hs-CRP.

**METHODS:** 70 bariatric patients [45 Roux-en-Y gastric bypass (RNYGB), 17 laparoscopic adjustable gastric banding (LAGB), 8 sleeve gastrectomy (SG)] at an academic medical institution completed the validated Short Musculoskeletal Function Assessment questionnaire (SMFA) pre-operatively and at 3 and 6 months post-operatively. Outcome variables included SMFA total and six sub-domain results, percent excess weight loss (%EWL), HDL cholesterol, and hs-CRP. Pre and post-op values were compared with paired t-tests and Pearson correlations.

**RESULTS:** At 6 months, the %EWL was highest for RNYGB (66), followed by LAGB (41) and SG (36). For all 3 procedures, there were significant improvements in both HDL and hs-CRP. For SMFA, pre-operatively, the SG patients had the worst scores and LAGB had the best scores; however, the only significant differences between RNYGB, LAGB, and SG in any of the SMFA measures were SG patients reported worse arm function and were more bothered by their skeletal muscle function than RNYGB patients. Improvements in total SMFA score from pre-op to 3 and 6 months respectively were 54%/60% for RNYGB, 72%/56% for LAGB, and 46% for SG. All the SMFA improvements were statistically significant but not correlated to weight loss, procedure, HDL, or hs-CRP.

**CONCLUSIONS:** In this study, RNYGB, LAGB, and SG all significantly improved musculoskeletal functioning by every SMFA measure at 3 m and 6 m post-operatively. These improvements were independent of a patient’s weight loss, procedure, and improvements in HDL and hs-CRP.

**M1591**

**Laparoscopic Sleeve Gastrectomy with Duodeno-Jejunal Bypass: Early Clinical Experience with a New Procedure for Morbid Obesity**

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University of Rome Tor Vergata, Rome, Italy

**INTRODUCTION:** Main limit of the Roux-en-Y gastric bypass (RYGB) is the preclusion of exploring the bypassed stomach with conventional endoscopy and radiological
studies. For this reason, alternative procedures have been investigated for durable weight loss without any distal stomach left in situ. Laparoscopic sleeve gastrectomy (LSG), introduced as the first step of the biliopancreatic diversion with duodenal switch, has gained popularity as a single procedure for its effectiveness. Unfortunately, long-term weight loss results of LSG are still lacking. In an effort to join the advantages of RYGB and LSG while eliminating the disadvantages of both procedures some Authors have reported the feasibility of LSG with duodeno-jejunal bypass (DJBP) in the animal model. In this study we report the first world clinical experience with LSG and DJBP.

MATERIALS AND METHODS: 5 morbidly obese patients gave informed consent and were submitted to LSG and DJBP. Being a combination of previously standardized procedures we proposed the operation as a bariatic alternative in patients with morbid obesity. Routine pre-operative work-up included also a psychiatric visit. Laparoscopic standard sleeve gastrectomy was associated to a duodeno-jejunal bypass performed by transecting the duodenum and creating a gastro-jejunostomy. We evaluated operative time, complication rate and short-term weight loss.

RESULTS: Four female and 1 male patients entered the study. Mean age was 50.6 years (range, 46 to 53 years). Mean pre-operative BMI was 46.8 kg/m2 (range, 44 to 52 kg/m2). Mean operative time was 122 minutes (range, 85 to 142 minutes). Only one complication occurred with a patient who had a wound infection, successfully drained. Mean follow-up was 5.4 months (range, 3 to 8 months). Mean post-operative BMI was 39.8 kg/m2 (range, 37.6 to 41.0 kg/m2).

CONCLUSION: LSG and DJBP has the potential to promote a similar weight loss of RYGB with no excluded gastric stump. LSG with DJBP has also the potential of enhancing the long-term weight loss associated with LSG. Our early experience seems encouraging. More patients and a longer follow-up are needed.

M1592
Is There Any Role for Resection for Stage IV Gastric Cancers?
Stephanie Downing, Mashaal Dhir, Wayne Frederick, Tolulope Oyetunji, Christopher L. Wolfgang, Richard D. Schulick, David C. Chang, Nita Ahuja
1Surgery, Johns Hopkins University, Baltimore, MD; 2Surgery, Howard University Hospital, Washington D.C., DC; 3Oncology, Johns Hopkins University, Baltimore, MD

BACKGROUND: Stage IV gastric cancer is a disease with poor survival. The goal of our study was to determine if there is a curative advantage to surgical resection compared to palliative procedures such as bypass or no surgical intervention.

METHOD: The Surveillance, Epidemiology and End Results (SEER 1973–2003) database was used to evaluate all distant gastric cancers including distant metastases and those requiring en-bloc resection of adjacent organs (T4NxMx; Stage4, included in SEER before 2000), but patients with T1-3N3M0 (Stage 4) disease were excluded. Those who had total/subtotal gastrectomies or debulking procedures were considered to have cancer-directed surgery while patients with biopsies or intestinal bypass were considered palliative only. Cox regression was performed for survival analysis.

RESULTS: 18,372 cases of metastatic gastric cancer were identified with 64.6% males, 69.5% adenocarcinomas and 64% of tumors were poorly-differentiated. Median age at diagnosis was 68 years. Median survival was 4 months. Cancer-directed surgery was performed in 30.4% (n = 5,248) of patients. Median survival for those undergoing cancer-directed surgery was 7 months vs. 3 months for patients not undergoing surgery (P < 0.001). On logistic regression, people with undifferentiated carcinomas were less likely to get surgery (OR = 0.33, 95% CI = 0.21–0.51, P < 0.001) whereas patients with linitis plastic (OR = 1.67, 95% CI = 1.29–2.17, P < 0.001) were more likely to have surgery compared to adenocarcinoma patients. Females were more likely to have surgery (OR = 1.16, 95% CI = 1.06–1.28, P = 0.001). African-Americans (OR = 1.16, 95% CI = 1.02–1.32, P = 0.021), Japanese (OR = 1.45, 95% CI = 1.22–1.72, P < 0.001) and people of other Asian backgrounds (OR = 1.46, 95% CI = 1.17–1.83, P = 0.001) were more likely to have surgery compared to Whites. On survival analysis, African-Americans and Native Americans had an increased risk of death (HR = 1.07, 95% CI = 1.01–1.15, P = 0.02; HR = 1.30, 95% CI = 1.05–1.61, P = 0.016 (respectively), whereas, females had a decreased risk of death (HR = 0.89, 95% CI = 0.82–0.94, P < 0.001). Patients who underwent cancer-directed surgery have a survival advantage (HR = 0.54, 95% CI = 0.52–0.56, P < 0.001). Of those who had surgery, patients who had local tumor resections (n = 142) or total gastrectomies with resection of other organs (n = 770) had an increased risk of death over those who had a partial gastrectomy (HR = 1.84, 95% CI = 1.48–2.28, P < 0.001; HR = 1.16, 95% CI = 1.05–1.29, P = 0.003, respectively).

CONCLUSION: Stage IV gastric cancer is a disease with very poor survival but selected patients may benefit from resection. Further research needs to be done to identify patients who may benefit from resection.

M1593
Gastrointestinal Symptomatic Outcomes of Laparoscopic and Open Gastrectomy
Bilal Kharbutli, Vic Velanovich
Surgery, Henry Ford Hospital, Detroit, MI

BACKGROUND: Gastrectomy is the most effective treatment for a variety of gastric tumors. Gastrectomy, nevertheless, can lead to significant gastrointestinal symptoms. As minimally invasive surgery has advanced, laparoscopic gastrectomy is advocated as a treatment method with equivalent pathologic results, with faster recovery. However, very little data exists using objective, validated instruments of gastrointestinal symptoms for either laparoscopic and open gastrectomy. This study compares the laparoscopic and the open gastrectomy for short term morbidity, hospital length of stay and also long term gastrointestinal symptoms.
METHODS: Patients who have undergone gastrectomy had their medical records were reviewed for demographic data, type of gastrectomy, and short term morbidity, and hospital length of stay. Patients were contacted and asked to complete the Gastrointestinal Symptom Rating Scale (GSRS). The GSRS measures three domains of GI symptoms: dyspepsia Syndrome (DS) for the foregut (best score 0, worse score 15), indigestion syndrome (IS) for the mid-gut (best score 0, worse score 12), and bowel dysfunction syndrome (BDS) for the hindgut (best score 0, worse score 16). Statistical analysis was done using the Mann-Whitney U-test.

RESULTS: We had complete data on 32 patients: 7 laparoscopic and 25 open. Of these, 25 had a gastroenteric anastomosis and 6 did not. The table shows the results as medians with interquartile range.

<table>
<thead>
<tr>
<th>GSRS Domain</th>
<th>Open Gastrectomy</th>
<th>Laparoscopic Gastrectomy</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyspepsia Syndrome</td>
<td>1 (0–3)</td>
<td>0 (0–3)</td>
<td>0.02</td>
</tr>
<tr>
<td>Indigestion Syndrome</td>
<td>1 (0–2)</td>
<td>0 (0–2)</td>
<td>NS</td>
</tr>
<tr>
<td>Bowel Dysfunction Syndrome</td>
<td>2 (1–4)</td>
<td>1 (0–4)</td>
<td>NS</td>
</tr>
<tr>
<td>Partial Gastrectomy with Anatomosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyspepsia Syndrome</td>
<td>1 (0–3)</td>
<td>0 (0–1)</td>
<td>NS</td>
</tr>
<tr>
<td>Indigestion Syndrome</td>
<td>1 (1–4)</td>
<td>0 (0–1)</td>
<td>0.05</td>
</tr>
<tr>
<td>Bowel Dysfunction Syndrome</td>
<td>2 (1–4)</td>
<td>1 (0–1)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Table 1. Top Five Litigation Payouts

<table>
<thead>
<tr>
<th>Cause(s)</th>
<th>Injury Sustained</th>
<th>Payout in GBP (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator error</td>
<td>Chronic pain/nerve injury</td>
<td>372,000 (570,000)</td>
</tr>
<tr>
<td>Operator error</td>
<td>Delay in recognition of complications</td>
<td>212,000 (324,000)</td>
</tr>
<tr>
<td>Operator error</td>
<td>Testicular injury</td>
<td>185,000 (283,000)</td>
</tr>
<tr>
<td>Operator error</td>
<td>Visceral injury</td>
<td>179,000 (273,000)</td>
</tr>
<tr>
<td>Operator error</td>
<td>Chronic pain/nerve injury</td>
<td>175,000 (267,000)</td>
</tr>
</tbody>
</table>

CONCLUSION: Overall, patients have relatively little adverse gastrointestinal symptoms in any of the types of gastrectomies in any of the GSRS domains. This implies that most patients return to relatively good gastrointestinal function after gastrectomy. Patients with laparoscopic gastrectomy had slightly better median score in the DS domain compared to the open technique, while patients who had gastrectomy without an anastomosis had better median score in the IS domain. Implying that an anastomosis an mild adverse midgut effects.

Combined Science

M2088
A UK Perspective on Litigation Following Groin Hernia Repair
Bilal Alkhaffaf*, Bart Decadt
General Surgery, Stockport NHS Foundation Trust, Manchester, United Kingdom

BACKGROUND: Since 1995, litigation following surgical procedures has cost the National Health Service (NHS) over 1 billion GBP (1.5 billion USD). 75,000 groin hernia operations are performed annually in the UK. Despite it being the most commonly undertaken general surgical operation, no study has examined litigation claims in the UK following groin hernia repairs. We aimed to analyse the trends and relationships of litigation claims related to groin hernia surgery in an attempt to improve patient care.

METHODS: Data from the NHS Litigation Authority of all claims made from 1995 was analysed. Cases were grouped according to type of repair, cause of claim, injury sustained and outcome of claim.

RESULTS: In total 351 claims were made. By the end of 2007, 296 cases had been settled, of which 139 (47.0 per cent) were in favour of the claimant. The total cost to the NHS was 7.3 m GBP (11.2 m USD). Testicular injury and chronic pain was a feature in 40 per cent of all claims. Visceral and vascular injuries and injuries requiring corrective procedures were the only predictors of a successful claim (p = 0.029 and p = 0.001 respectively). Claims against visceral and major vessel injuries were more likely to be successful in laparoscopic than open repairs (p = 0.019). Chronic pain resulted in the highest average payout of 84,000 GBP (129,000 USD) (Figure).

CONCLUSION: Patients should be fully informed of the incidence of testicular injury and chronic pain during the consent process. Approaches minimising visceral and vascular injury particularly in laparoscopic repair should be adopted to reduce litigation and improve patient care.
M2089

The Impact of Laparoscopic Approach for Splenectomy on Surgical Risk Factors
Roger T. Lis*, Gordon G. Wisbach, Ali Tavakkolizadeh
Brigham & Women’s Hospital, Boston, MA

INTRODUCTION: Although laparoscopy has become the preferred surgical procedure for elective splenectomies, the risk factors for increased post-operative complications are not well defined. We identified the risk factors for post-operative complications for laparoscopic (LS) and open splenectomies (OS), to assess the impact of laparoscopic approach.

METHODS: A retrospective review of all patients that underwent an elective splenectomy for non-traumatic indications between 1/1/1997 to 1/1/2007 was performed. Patient demographics, operative time, spleen weight, length of stay (LOS), and inpatient morbidity and mortality were recorded. LS and OS were compared on an intention-to-treat basis, using t-tests. Logistic regression was used to identify independent risk factors for a complication, and the impact of the laparoscopic approach on these individual risk factors was assessed.

RESULTS: A total of 262 patients (184 OS, 78 LS) were identified, with an overall complication rate of 11%, and a mortality rate of 3%. The LS group was associated with a significant reduction in LOS, morbidity, and blood loss, but an increase in surgical time (Table 1). The conversion rate was 13%, with the splenic weight being higher in the converted cases against non-converted (487 g vs. 296 g, p < 0.05). Using logistic regression on pooled complication data, age (p = .049) and BMI (p = .003) were identified as independent risk factors for post-operative complications, whereas splenic weight was not. The effect of laparoscopic approach was compared to open surgery for these established risk factors. BMI (p = 0.004) remained independent risk factors for OS, but not for LS. Further analyzing the impact of BMI on surgical complications, malnutrition (BMI < 18.5) was associated with the highest risk for surgical complications and LS had no beneficial effect. The MIS technique however reduced the complication rate for the normal weight group (23% for OS vs. 4% for LS, p < 0.05).

CONCLUSIONS: LS can decrease established risk factors for surgical complications and improve outcomes. Although larger spleens are associated with a higher conversion rate, splenic weight is not an independent risk factor for complications, and not a contraindication to the laparoscopic approach.

Table 1. Patient Demographics

<table>
<thead>
<tr>
<th></th>
<th>OS</th>
<th>LS</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>25.7</td>
<td>26.3</td>
<td>NS</td>
</tr>
<tr>
<td>OR time (min)</td>
<td>108</td>
<td>147</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Blood loss (cc)</td>
<td>593</td>
<td>356</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Splenic weight</td>
<td>1270</td>
<td>296</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>LOS</td>
<td>5.7</td>
<td>3.8</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Morbidity</td>
<td>14.7</td>
<td>3.9</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Basic: Colon-Rectal

T1843

Effective Combination of mTOR-Inhibitor Rapamycin with 5-FU/Oxaliplatin in Advanced Colorectal Cancer Monitored by TIMP-1 (Tissue Inhibitor of Metalloproteinases 1)
Stephan A. Vorburger1*, Markus Wagner2,1, Alexander L. Laemmle1, Markus Trochsl1, Daniel Candinas1
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Anti-tumor activity of mTOR-inhibitor rapamycin has been shown in various tumors. Based on observations on a transplanted patient, receiving rapamycin, we wanted to evaluate the potential of rapamycin for the treatment of colorectal peritoneal carcinomatosis alone or in combination with surgery. We established syngenic, orthotopic animal models with CT26 peritoneal tumors in Balb/C mice and orthotopic xenograft models with SW620 in nude mice. Rapamycin was administered intraperitoneally or per gavage, alone or combined with 5-FU and oxaliplatin. Tumor growth was analyzed and expression of tissue inhibitor of matrix-metalloproteinases 1 (TIMP-1) in the tumor and serum was determined by ELISA. Rapamycin downregulated TIMP-1 in vitro. In-vivo, rapamycin markedly suppressed growth of established syngenic and xenografted peritoneal tumors (P < 0.01). This anti-tumor effect was comparable after intraperitoneal or oral administration. Tumor suppression was further increased when rapamycin was combined with 5-FU and/or oxaliplatin.

Tuesday, June 2, 2009
12:00 PM – 2:00 PM
South Hall
SSAT POSTER SESSION II
OBJECTIVE: To appraise the genomic instability caused by isocyanates on human colon epithelial cells.

MATERIALS & METHODS: We performed our varied experiments on the cultured human colon epithelial-FHC cell line using N-succinimidyl N-methyl carbamate, a surrogate chemical to methyl isocyanate. Evaluation of DNA damage kinetics was done through Qualitative and quantitative assessment of extent of phosphorylation states of γH2AX, ATM, ATR and p53. Quantification of secreted nucleosomes pre and post treatment and annexin-V FITC/PI assay, active caspase 3 assay, TUNEL, apoptotic DNA laddering, were done to infer the apoptotic index and the apoptotic DNA fragmentation respectively. Cytometric bead array provided the means of assaying secreted inflammatory cytokines in culture supernatant previous to and following exposure. Abnormalities at chromosomal and microsatellite level of the genome following exposure were measured through cytogenetic analysis and inter simple sequence repeat PCR respectively.

RESULTS: All the DNA damage responsive parameters displayed an increasing trend along with significant higher apoptotic index and elevated inflammatory cytokine levels in isocyanate treated cells in contrast to their control counterparts. Interestingly, cytogenetic analyses revealed varied chromosomal anomalies and also the analyses through inter simple sequence repeat PCR presented a greater instability at the microsatellite level thus giving the credence as the endpoints of genomic instability.

CONCLUSION: Together these results imply that the isocyanates are potent enough to cause genomic instability under both occupational and accidental exposures. The loss of genomic stability seems to be crucial molecular and patho-physiologic stride that lead to the transformation of normal colonic epithelium to colon adenocarcinoma. We anticipate our findings would invoke better approaches in risk assessment and management of future industrial disasters.
mean of 35.6 intratumor TAMS versus early staged anal cancers (stage 1–2) with a mean of 20.5 intratumor TAMS at 40X magnification, although this approached but did not reach statistical significance (p = 0.121).

CONCLUSION: Anal carcinomas contain a higher number of intratumor TAMS when compared to the surrounding peritumoral and normal tissue. We observed a trend towards higher numbers of TAMS in advanced cases of anal cancer when compared to early staged cases. The presence of macrophages within the tumors may be important in the progression of disease and pathogenesis, and this should be evaluated in a larger cohort.

Basic: Esophageal

T1846
Dihydropyrimidine Dehydrogenase and Thymidylate Synthase Gene Expressions in Blood as Predictive Parameters for the Response to Neoadjuvant Radiochemotherapy in Esophageal Cancer
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1Department of Surgery, University of Cologne, Cologne, Germany; 2University of Zuerich, Zuerich, Switzerland

BACKGROUND: Neoadjuvant multimodality treatment is frequently applied to improve the poor prognosis associated with locally advanced esophageal cancer. However, only patients with a major histopathologic response benefit from this therapy. Predictive markers to allow individualization of multimodality treatment could be very helpful. No non-invasive molecular marker exists that can reliably predict response to neoadjuvant therapy in esophageal cancer. The goal of this study was to determine the value of TS and DPD RNA expression in peripheral blood of patients with locally advanced cancer of the esophagus as a non-invasive molecular predictor of response to neoadjuvant radiochemotherapy.

MATERIAL AND METHODS: A total of 29 patients with locally advanced cancer of the esophagus were included in this study. Blood samples from each patient were drawn prior to neoadjuvant radiochemotherapy. After extraction of cellular tumor-RNA from blood samples, quantitative expression analysis of TS and DPD and the internal reference gene β-actin was done by real-time RT-PCR (Taqman®). Histomorphological regression was defined as major response when resected specimen contained <10% of residual vital tumor cells, and minor response with >10% of vital residual tumor cells.

RESULTS: Twenty of 29 (68%) of patients showed a minor histopathological response and 9 of 29 (32%) showed a major-response to neoadjuvant radiochemotherapy. RNA expression in blood of patients was detectable for TS in 86.2%, for DPD in 96.5%, and in 100% for β-actin. The median TS and DPD expression was not significantly different between minor- and major-responders to therapy. No significant associations were detected between TS and DPD expression levels and patients clinical variables. A high expression level for TS was significantly associated with a minor-response to neoadjuvant treatment (p = 0.046), while there was no significant association between DPD and response to therapy. Combined analysis of TS and DPD expression increased the specificity for the prediction of response to 100%. No major responder to therapy had high expression levels for both genes in their peripheral blood.

CONCLUSION: The applied method is technically feasible for the analysis of TS and DPD RNA expression in peripheral blood of patients with locally advanced cancer of the esophagus. Quantitation of TS and DPD in peripheral blood appears to be highly specific to identify a subset of patients non-responding to neoadjuvant radiochemotherapy, and could be applied to prevent expensive, noneffective, and potentially harmful therapies in a substantial number of patients with esophageal cancer.

T1847
Optical Fiber Spectroscopy: A Novel Application to Measure Tissue Oxygenation and Blood Content in the At-Risk Gastrointestinal Anastomosis
C. Kristian Enestvedt1, Kyle A. Perry1, Luke Hosack1, Brian S. Diggs1, Frederic Truffer2, James Gladish2, Blair A. Jobe3, Steven L. Jacques2, John G. Hunter1
1Surgery, Oregon Health and Science University, Portland, OR; 2Biomedical Engineering, Oregon Health and Science University, Portland, OR; 3Thoracic and Foregut Surgery, University of Pittsburgh Medical Center, Pittsburgh, PA

BACKGROUND: High rates of ischemia related morbidity are seen in esophageal surgery where adequate monitoring of gut perfusion is needed, but a reliable method for measuring real-time tissue perfusion is not available. The aim of this study was to develop an optical fiber spectroscopy (OFS) system to provide an accurate assessment of the critical components of tissue viability in an animal model of esophageal surgery.

METHODS: An opossum model was used with creation of an ischemic gastric conduit for esophageal replacement (n = 14). The tissue blood content and oxygen saturation in the gastro-esophageal anastomosis was measured by optical spectroscopy (590–850 nm). Measurements at the anastomotic site were made prior to the procedure (Base), immediately after creation of the neoesophagus (Immediate), 10 minutes after anastomosis (Nadir), and at 10 days post operatively (10 Day). Two optical fibers separated by 4 mm contacted the tissue intraoperatively. White light transmission from the 1st fiber to the 2nd fiber versus wavelength was analyzed by diffusion theory for light transport, yielding values for blood content (volume fraction whole blood) and oxygen saturation (hemoglobin in mixed arteriovenous vasculature). The averages of five measurements at each time point were compared using the paired t-test.
RESULTS: The OFS system demonstrated a 25% increase in blood content between baseline and 10 Day values (p = 0.005). There was no difference between blood content at baseline (0.99% ± 0.24%) and either immediate (0.93% ± 0.44%) or nadir (0.88% ± 0.43%) time points (p = 0.572 and p = 0.369, respectively). Tissue oxygen saturation was significantly decreased at both immediate (67.9% decrease, p = 0.001) and nadir (71.1% decrease, p = 0.001) points when compared to baseline. There was not a statistically significant difference between baseline (50.8% ± 22.4%) and 10 days (32.3% ± 27.4%) with respect to tissue oxygen saturation (p = 0.109).

DISCUSSION: Utilizing a robust model for gastrointestinal ischemia, this study demonstrated that OFS can accurately and repeatedly analyze critical components of perfusion. The OFS system determined objective levels of tissue oxygenation that precede the complications related to ischemia. The ability to directly assess tissue oxygenation in real time using OFS will provide clinicians with data by which to guide post-operative care and may lead to significant reductions in post-operative morbidity and mortality in esophageal and gastrointestinal surgery.

T1848

Dendritic Cell-Associated Disturbance of E-Cadherin Expression in Barrett’s Esophagus

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BACKGROUND: Dysplasia in specialized intestinal type epithelium in Barrett’s esophagus involves changes in cell-cell interactions. It has been reported that the loss of E-cadherin occurs during dysplastic alterations of Barrett’s mucosa, reflecting a disturbance of the integrity of the epithelium. Associations between dendritic cells and E-cadherin expression have been reported in other tissue types. In the present study we assessed whether dendritic cells that infiltrate Barrett’s esophagus might affect E-cadherin expression.

METHODS: Endoscopic biopsy specimens obtained from 23 patients with Barrett’s esophagus were assessed by immunohistochemistry and electron microscopy. Double immunostaining was used to examine the spatial association between E-cadherin expression and the distribution of dendritic cells. Dendritic cells were identified using anti-CD83 and anti-DC-SIGN.

RESULTS: In all specimens, E-cadherin expression was displayed by epithelial cells but the pattern of distribution of E-cadherin expression varied markedly between mucosal glands. The connective tissue matrix around glands contained dendritic cells, some of which were located in close apposition to the glandular basal membrane as well as between epithelial cells. Double immunostaining revealed that glands with dendritic cells incorporated between epithelial cells displayed aberrant E-cadherin expression.

CONCLUSION: These findings indicate that the intrusion of dendritic cells between epithelial cells affects the integrity of the epithelium and E-cadherin expression in Barrett’s esophagus. The intrusion of dendritic cells between epithelial cells might contribute to the development of dysplasia in Barrett’s esophagus.

Basic: Hepatic

Hypertonic Saline and Pentoxifylline Reduce Liver and Pulmonary Damages Secondary to Ischemia/Reperfusion Injury in Rats

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Previous studies have demonstrated that resuscitation with hypertonic saline and pentoxifylline (HSPTX) attenuates hemorrhagic shock-induced injury when compared with Ringer’s lactate. Liver ischemia/reperfusion (I/R) process can trigger a systemic inflammatory syndrome producing remote organ damage and occurs in major liver resections and transplantation.

AIM: To evaluate the effect of the combination of hypertonic saline (7.5% NaCl) and pentoxifylline (PTX) on local and systemic injury during partial liver ischemia/reperfusion.

METHODS: Wistar male rats underwent partial liver ischemia performed by clamping the pedicle from medium and left anterior lateral segments during an hour under mechanical ventilation. They were divided in to 3 groups: group NS (n = 20): rats received 0.9% NaCl (34 ml/Kg); group HS (n = 20) rats received 7.5% NaCl (0.4 ml/Kg) and group HSPTX (n = 20): rats received 7.5% NaCl (0.4 ml/Kg) + PTX (25 mg/Kg). Four and twelve hours after reperfusion blood were collected for determinations of AST, ALT, TNF-α, IL-6, and IL-10. Liver and pulmonary tissues were assembled for liver histology and for liver mitochondrial oxidation and phosphorylation, pulmonary vascular permeability and myeloperoxidase (MPO) analyses.

RESULTS: Four hours after reperfusion HS and HSPTX groups presented elevation of AST and ALT serum levels significantly lower than NS group (p < 0.05). A significant reduction on mitochondrial dysfunction was observed in HS and HSPTX groups compared with NS group (p < 0.05). Elevation in serum TNF-α, IL-6, and IL-10 was similar among three groups (NS, HS, and SHPTX). Pulmonary vascular permeability was significantly lower in groups HS and HSPTX compared with NS group (p < 0.05). No differences in pulmonary MPO activity were observed among these three groups. Twelve hours after reperfusion a significant reduction in pulmonary vascular permeability in group HSPTX was observed when compared to groups HS and NS (p < 0.05). HS and HSPTX groups showed a reduction in serum IL-6 when compared to NS group (p < 0.05).

CONCLUSION: Addition of pentoxifylline to hypertonic saline solution reduces not only the liver damage but also the pulmonary vascular permeability associated to hepatic ischemia reperfusion.
Molecular Identification & Clinical Immune Characterization of Occult HBV Infections

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Research, Bhopal Memorial Hospital & Research Centre, Bhopal, India

INTRODUCTION: Hepatitis is one of the major diseases of mankind and is a serious global public health problem. The diagnosis of the disease is not only imperative but also complex because of different viral antigens, which bring about varying serological profiles during different stages of the disease. Recently, new forms of infection such as occult infections of HBV are being reported. Occult HBV infections are defined as the presence of low-level of HBV DNA in blood in patients negative for markers of hepatitis B. The diagnosis of the disease is not only imperative but also complex because of different viral antigens, which bring about varying serological profiles during different stages of the disease. Recently, new forms of infection such as occult infections of HBV are being reported. Occult HBV infections are defined as the presence of low-level of HBV DNA in blood in patients negative for markers of hepatitis B.

OBJECTIVE: The aim of the present study was the molecular identification and clinical immune characterization of occult HBV infections in the routine health workers and blood donors at Bhopal Memorial Hospital & Research Centre.

MATERIALS & METHODS: A total of 1000 samples of blood donors and 100 healthy health care workers were undertaken for the study. Qualitative screening for HBV was done through ELISA while the nucleic acid analysis was performed through COBAS Amplicor Analyzer (minimum detection limit 300 copies/ml) and the negative samples were further confirmed with the Light Cycler 2.0 (minimum detection limit 10 copies/ml). In addition, Th1/Th2 cytokine profiling was done for immune characterization of these infections.

RESULTS: It was observed that all the samples were negative for the HBV in qualitative screening through standard ELISA. Further nucleic acid analysis through COBAS Amplicor Analyzer showed that 22 cases of blood donors were positive for HBV DNA which was previously reported negative in ELISA while no healthcare worker reported positive. All the samples reported negative by COBAS Amplicor were again confirmed by real time PCR and the similar results were obtained. Additionally, a significant increase in the mean levels of Th2 cytokines IL-4, IL-6 and IL-10 in occult cases was observed in comparison to controls.

CONCLUSION: In conclusion it is a unique attempt to determine the frequency and importance of this occult phenomenon. Results of such investigations should provide and improve the basic knowledge necessary to specifically understand on the grounds of occult HBV infections. This background provides the scientific basis for the wide range of investigations. It would not only create health awareness, but would also evoke a perpetual social consciousness about the upcoming infectious states of these diseases.

Changes in Liver Mitochondrial Function Induced by a High-Fat Diet Enriched with ω-3 PUFA Are Associated with Reduction of Hepatic Lesions Secondary to Ischemia/Reperfusion

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2Physiology and Biophysics, University of Sao Paulo, Sao Paulo, Brazil

Previous studies have demonstrated that a high-fat diet enriched with polyunsaturated fatty acids (ω-3 PUFA) has a protective effect on the liver. Lipid emulsion increases hepatocyte uncoupling protein 2 (UCP2) production that seems to have a protective effect by inhibiting mitochondrial ROS production. We hypothesized that a high-fat diet enriched with ω-3 PUFA could modify mitochondrial functions and therefore protect the liver from ischemia/reperfusion injury.

AIM: To evaluate the effect of a high-fat diet enriched with ω-3 PUFA (cold fish oil) on hepatic mitochondrial functions and hepatic disturbances associate with hepatic ischemia/reperfusion (I/R) injury.

METHODS: Wistar male rats were divided in 2 groups: Group I (n = 2): rats with fatty liver as induced by high-fat diet enriched with ω-3 PUFA given for 4 weeks and Group II (n = 20) that received standard diet. Ten animals of each group were killed and their livers were collected for determination of oxidation and phosphorylation of liver mitochondria and liver histological analysis. Activities of AST and ALT were also determined. Ten animals of each group were submitted to a partial liver ischemia performed by clamping the pedicle from medium and left anterior lateral liver segments during an hour. After 2 hours of reperfusion, liver mitochondrial oxidation and phosphorylation were analyzed. Serum levels of TNF-α, IL-6, IL-10, and AST, ALT activities were also determined.

RESULTS: Mild liver steatosis was observed in the group I in comparison to group II. The group I showed a significant liver mitochondrial uncoupling: respiration state 4 (23.6 ± 1.97 vs. 15.5 ± 1.35 nmol O2 mgprot/min) and RCR (3.09 ± 0.22 vs. 3.73 ± 0.14) in relation to the group II (p < 0.05). AST and ALT activities were not changed. After I/R, there was an increase in state 3 (79.1 ± 5.42 vs. 30.8 ± 2.97) and state 4 (26.5 ± 2.45 vs. 15.5 ± 1.01) respiration, and in the respiration control rate (3.06 ± 0.11 vs. 1.98 ± 0.29) and state 4 (26.5 ± 2.45 vs. 15.5 ± 1.01) respiration.

CONCLUSION: High-fat diet enriched with ω-3 PUFA protected the liver from ischemia/reperfusion injury probably by a mechanism associated to changes mitochondrial function.
Basic: Pancreas

T1852

Taurolidine in Pancreatic Cancer
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BACKGROUND: The aminosulfoacid derivative taurolidine was originally developed as an antibacterial substance. Recently, taurolidine was shown to exhibit antineoplastic effects both in vitro and in animal models via inhibition of protein synthesis, induction of apoptosis, and prevention of neoangiogenesis. In contrast to other antineoplastic agents, it has a strikingly favorable toxicity profile: It impairs neither liver and kidney function nor hematopoiesis. We investigated the effect of taurolidine in pancreatic cancer, a disease where therapeutic options are scarce.

METHODS: Two moderately differentiated ductal pancreatic adenocarcinoma cell lines were investigated: DSL-6A (murine) and HPAF-2 (human). Cells were incubated for 72 hours with increasing concentrations of taurolidine (0–2000 µmol/L), gemcitabine (0–100 µmol/L), or a combination of taurolidine (100 µmol/L) and gemcitabine in either high or low concentration. Cell proliferation and viability were assessed using a hemocytometer for direct cell counting and an MTT assay.

RESULTS: Both taurolidine and gemcitabine monotherapy inhibited cell growth and viability in a dose-dependent way. The highest concentrations analyzed inhibited cell proliferation by more than 98%. Taurolidine was no less effective than gemcitabine. In combination therapy, taurolidine was able to enhance efficacy of even high dose gemcitabine (Table). Similar results were achieved for cell viability.

Table 1. Number of Cells (×10^6/mL ± SEM) Under Therapy as Indicated

<table>
<thead>
<tr>
<th>Gemcitabine Concentration</th>
<th>Taurolidine Concentration/µmol/L</th>
<th>DSL/10^6/mL</th>
<th>HPAF/10^6/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>15.9 ± 4.5</td>
<td>33.4 ± 5.1</td>
</tr>
<tr>
<td>0</td>
<td>100</td>
<td>7.8 ± 1.8*</td>
<td>15.4 ± 2.9*</td>
</tr>
<tr>
<td>low dose</td>
<td>0</td>
<td>11.6 ± 3.8</td>
<td>27.1 ± 4.5</td>
</tr>
<tr>
<td>low dose</td>
<td>100</td>
<td>6.6 ± 1.4*</td>
<td>12.2 ± 2.5*</td>
</tr>
<tr>
<td>high dose</td>
<td>0</td>
<td>2.7 ± 1.8*</td>
<td>16.2 ± 3.1*</td>
</tr>
<tr>
<td>high dose</td>
<td>100</td>
<td>1.2 ± 1.7*#</td>
<td>2.3 ± 1.1*#</td>
</tr>
</tbody>
</table>

Gemcitabine concentration: Low dose: 0.01 µmol/L for DSL, 1 µmol/L for HPAF
High dose: 10 µmol/L for DSL, 100 µmol/L for HPAF
* p < 0.05 compared with control
# p < 0.05 compared with taurolidine monotherapy
- p < 0.05 compared with high dose gemcitabine monotherapy

CONCLUSION: In pancreatic cancer cells, taurolidine appears to be as effective as gemcitabine, the current gold standard of cytotoxic therapy. The combination of both agents acts synergistically as compared with either monotherapy. Taurolidine has little side effects in vivo, so its use both in monotherapy and in combination with gemcitabine warrants further investigations. Studies using an orthotopic tumor model of ductal pancreatic adenocarcinoma are necessary to confirm whether this promising new drug is of relevance in a preclinical therapeutic setting.

T1853

Pterostilbene Disrupts Pancreatic Cancer Mitochondrial Membrane Potential In Vitro
David W. Mcfadden, Julie A. Aloisi, John Schneider
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BACKGROUND: Diets rich in fruits and vegetables have been linked to reduced rates of several cancers. Pterostilbene, a stilbenoid related to resveratrol, is a potent antioxidant derived from blueberries. We have shown that pterostilbene inhibits pancreatic cancer cell growth in vitro by inducing apoptosis. Apoptotic pathways may involve disruption of mitochondrial membrane integrity. We investigated the effect of pterostilbene on the mitochondrial membrane integrity of two pancreatic cancer cell lines, MIA PaCa-2 and PANC-1.

METHODS: JC-1 is a cationic dye that exhibits potential-dependent accumulation in cells with healthy mitochondria. This accumulation leads to the formation of red fluorescent aggregates and a fluorescence emission shift from green to red. Mitochondrial depolarization causes JC-1 leakage and decreased mitochondrial dye aggregation. Mitochondrial depolarization is indicated by a decrease in the red/green fluorescence intensity ratio. Pancreatic cancer cells (3 × 10^5) were cultured using standard techniques. After 24 hours, 1 × 10^6 cells were loaded with 2 micrograms of JC-1 for 20 minutes. Cells were then treated with pterostilbene or DMSO control for an additional 20 minutes. Cells were trypsinized, resuspended in PBS and evaluated by flow cytometry.

RESULTS: MIA PaCa-2 red/green fluorescence intensity ratio changed from 2.45 with DMSO control to 0.18 with 75 micrograms of pterostilbene treatment. Similarly, this ratio decreased in the PANC-1 cell line from 2.03 in DMSO control to 0.41 with the same pterostilbene treatment. Ratios from treated cells were similar to positive CCCP controls, 0.28 and 0.67, in MIA PaCa-2 and PANC-1 respectively. Thus, pancreatic cancer cells show significant mitochondrial depolarization in response to pterostilbene treatment (p < 0.02).

CONCLUSIONS: Herein we have demonstrated for the first time that pterostilbene induces mitochondrial membrane depolarization in pancreatic cancer cells in vitro. This provides an initial mechanism for the previously observed growth inhibition and increased apoptosis when pancreatic cancer cells are treated with pterostilbene. Further in vitro mechanistic studies and in vivo experiments are warranted and planned to determine the potential role for pterostilbene in pancreatic cancer treatment.
Basic: Small Bowel

T1854
TNFα and Soluble MD-2 (sMD2) Increase LPS Response in Caco2 Cells
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Intestinal mucosa responds to acute inflammation with increased cytokine production and mucosal barrier breakdown. This process may involve the TLR4 pathway. While intestinal mucosa is resistant to the LPS-induced signaling at baseline, it may become sensitive to LPS during acute inflammation. The mechanisms underlying this phenomenon are not fully understood. We hypothesized that treatment of intestinal epithelial cells with the pro-inflammatory cytokine TNFα would alter LPS mediated TLR4 pathway signaling.

METHODS: Caco2 cells, a human intestinal epithelial cell line unresponsive to LPS at baseline, were grown to confluence and treated with serum free media for 24 h prior to treatment with TNFα (100 ng/mL). TLR4 expression was analyzed by Western blot. In LPS response experiments, cells were pretreated for 24 h with TNFα, then media was changed to include a second 24 h treatment with TNFα alone, TNFα and LPS, or TNFα, LPS, and sMD-2 (0.1 nM), an important TLR4 cofactor. Supernatant IL8 content was measured by ELISA.

RESULTS: TLR4 expression was markedly increased after 24 h and 48 h of TNFα treatment. LPS treatment alone did not induce IL8. After TNFα pretreatment, addition of LPS resulted in increased IL8 production. Treatment with a combination of TNFα, LPS, and low dose sMD-2 resulted in a maximal IL8 production (Figure).

CONCLUSION: In the present study, Caco2 cells stimulated with TNFα demonstrate increased TLR4 protein expression and increased LPS responsiveness, especially in the presence of sMD-2. These findings are important because they indicate that pro-inflammatory cytokines such as TNFα may increase enterocyte response to LPS during acute inflammation.

T1855
Changes in Plasma Amino Acid Levels: A Minimally Invasive Innovative Way to Diagnose Intestinal Rejection in Pigs
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OBJECTIVE: To determine whether plasma amino acids may be used as markers of intestinal acute cellular rejection (ACR) using a model of segmental allogenic small bowel transplantation (SBT) in pigs.

SUMMARY BACKGROUND DATA: To date, there is no noninvasive or relatively non invasive biomarker for the diagnosis of ACR which remains a major barrier to improving the clinical results of SBT. As the small intestine is one of the main organ involved in metabolism of amino acids, our working hypothesis was that ACR could be associated with significant changes of plasma amino acids levels.

MATERIAL AND METHODS: Sixteen female pigs were divided into 2 groups: group 1 (n = 8), controls, segmental autotransplantation; group 2 (n = 8), allotransplantation, nonimmunosuppressed recipients. Intestinal specimens for histological studies were obtained at the end of cold flushing (T0), and on postoperative day 8 (T1). Plasma amino acids levels were measured on samples harvested at T0 and T1.

RESULTS: In group 1, intestinal histology revealed no significant changes between T0 and T1 specimens. In contrast, in group 2, graft histology revealed moderate to severe rejection on T1 specimens in all cases. Four plasma amino acids were significantly correlated with the occurrence of acute intestinal rejection: phenylalanine, aspartate, citrulline, and taurine. The threshold of each plasma amino acid variation that best discriminated absence from presence of acute intestinal rejection was determined for each marker with its sensitivity and specificity. A score was determined. An ACR was found in 100% of cases when this score was equal or over 2.

CONCLUSION: Our study suggests for the first time that four plasma amino acid levels may be used in combination as markers of intestinal rejection.
**T1856**

**Intestinal Alkaline Phosphatase Protects Against Mucosal Injury by Commensal Bacteria: Elucidation of Mechanism**

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**PURPOSE:** Intestinal alkaline phosphatase (IAP), an intestinal brush border enzyme, is a newly recognized gut mucosal defense factor. We have shown that IAP confers protection from luminal bacteria, with inhibition of bacterial translocation into mesenteric nodes in a remote ischemia mouse model. However, the specific mechanism by which IAP exerts its effects has yet to be fully elucidated. Here we seek to define more precisely how IAP protects the host against bacterial injury.

**MATERIALS AND METHODS:** Escherichia coli, Salmonella typhimurium and Staphylococcus aureus bacteria were incubated ± calf intestinal alkaline phosphatase (CIP), and bacterial viability estimated by enumeration of colony forming units (CFUs) by plating at various time points. Free phosphate from whole E. coli or free lipopolysaccharide (LPS) ± CIP was measured by the malachite green assay; the bacteria or LPS ± CIP were also applied to HT29 cells and IL-8 response measured by ELISA. HT29 cells were previously stably transfected with an IAP expression plasmid; enzyme activity was confirmed biochemically. Parent and IAP cells were incubated with E. coli and S. typhimurium at varying incubation times and bacteria/cell ratios. Extracellular bacteria were killed by gentamicin application, intracellular bacteria enumerated by cell lysis and plating, and IL-8 secretion measured in the media.

**RESULTS:** CIP had no effect on the viability of E. coli, S. typhimurium or S. aureus. CIP did not liberate free phosphate from whole E. coli, but was able to dephosphorylate free LPS; furthermore, CIP did not inhibit the IL-8 response to E. coli, but did inhibit the IL-8 response to free LPS. E. coli preferentially invaded parent cells compared to IAP cells, and concordantly, IL-8 secretion was repressed in IAP cells. Interestingly, although S. typhimurium exhibited greater invasiveness in IAP cells compared to parent cells, the IAP cells continued to inhibit IL-8 secretion.

**CONCLUSIONS:** The free IAP enzyme is able to directly dephosphorylate and confer protection from LPS, but does not directly affect the growth or viability of bacteria, nor does it attenuate the induced inflammatory response in target cells. In contrast, cells that over-express membrane bound IAP were able to specifically inhibit E. coli invasion and attenuate the IL-8 response induced by both E. coli and S. typhimurium. Taken together, it seems unlikely that IAP is, in itself, a bactericidal agent, but inhibits injury specific to commensal bacteria related to inflammatory signal transduction.

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**Clinical: Biliary**

**T1541**

**Further Advances in the Alternative EUS-Guided Translumenal Drainage of Bile and Pancreatic Duct Obstructions: A Progression Report**

Uwe Will1, Frank Meyer2

1Department of Gastroenterology, Municipal Hospital, Gera, Germany; 2Department of Surgery, University Hospital, Magdeburg, Germany

ERCP-guided stent implantation into the bile or pancreatic duct is considered an established treatment for obstructions. However, there are cases with not introducible catheter into the papilla or not reachable papilla because of both pyloric/duodenal stenosis or previous GI surgery. The aim of the study was to investigate feasibility & outcome of the EUS-guided translumenal drainage of the i) bile duct in cases with failure of PTCD or in patients who decline it & ii) pancreatic duct.

**METHODS:** All consecutive patients were enrolled in this ongoing prospective observational uncenter study (case series) through a 6-year time period. Patient- & intervention-related specifics were documented. Feasibility was characterized by success rate (e.g., regressive cholestasis, improv of clinical symptoms) & outcome by complication rate (frequency of bleeding or perforation), mortality & short-term follow-up.

**RESULTS:** From 2002–2008, 67 patients underwent endoscopic interventions (n = 78) for translumenal drainage into the i) bile duct (main indication, cholestasis because of advanced tumor growth), n = 32 (47.8%; interventions, n = 33); ii) pancreatic duct (chronic pancreatitis), n = 35 (52.2%; interventions, n = 45). After translumenal ductal puncture, cholangio- & pancreaticography were successful in each case (100%). While cholangiodrainage was achieved in 25/32 subjects (technical success rate, 78%; plastic prosthesis, n = 6; metallic stent, n = 19), drain into the pancreatic duct was placed in 21/35 individuals (60%; not required, n = 1) using this novel translumenal route: Transgastric drainage, n = 7/35 (20%); transpapillary drainage with ERCP-based rendezvous, n = 14/35 (40%). Though slight postinterventional pain was observed in each case, only cholangitis (n = 3/33; 9.1%) & hemobilia (n = 1/33; 3%) occurred after cholangiodrainage (major complication, n = 1 resulting in mortality of 3%) whereas after translumenal drainage of the pancreatic duct, bleeding (n = 3/45; 6.7%), perforation (n = 1/45; 2.2%), pancreatitis (n = 2/45; 4.4%) & pseudocysts (n = 4/45; 8.9% – no deaths but following surgery, n = 9) were documented resulting in a perinterventional morbidity of 15.2% (n = 5/33) & 22.2% (n = 10/45), resp. Endoscopic reintervention rate was 21.2% (n = 7/33) & 17.8% (n = 8/45), resp. (main cause, stent dislocation).
CONCLUSION: In selected patients, EUS-guided transmural drainage of the bile & pancreatic duct is a reasonable, feasible & promising endoscopic approach, with an acceptable periinterventional risk. It broadens the spectrum of therapeutic options but still needs further evaluation on the indication & the advantageous impact as well as long-term follow-up investigation.

T1542

Bacterial Flora in the Bile of Patients Undergoing Cholecystectomy
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BACKGROUND: In order to survey the bacterial flora in patients with uncomplicated gallstone disease and cholecystitis, we have taken bacterial cultures from the bile of all patients undergoing cholecystectomy at one surgical unit.

METHODS: Cultures were taken according to standardised routines from the bile during all cholecystectomies performed at the department of surgery, Enköping hospital, Sweden, April 2007 to February 2008. Use of antibiotics within 3 months prior to surgery, indication for surgery, prophylactic antibiotics and postoperative complications were registered prospectively.

RESULTS: Altogether 136 procedures were performed during the period of study, including 83 (61%) in women. Mean age was 51 years, standard deviation 16 years. Bacterial growth in the bile is more common in elderly, even in the absence of cholecystitis. Positivity was associated with an increased risk of postoperative infectious complications.

CONCLUSION: Bacterial growth in the bile is more common in elderly, even in the absence of cholecystitis. Positive culture was seen in one third of the patients undergoing surgery for cholecystitis. No individual factor was associated with an increased risk of postoperative infectious complications.
T1544

Gallbladder Cancer Found After Laparoscopic Cholecystectomy: Is Port Site Excision Necessary?

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BACKGROUND: The aim of this retrospective study is to review our institutional experience with gallbladder cancer (GC). Specifically, the experience with incidental GC found on pathologic evaluation of laparoscopic cholecystectomy (LC) specimens and need for port site excision on definitive exploration.

METHODS: Patients diagnosed with gallbladder cancer (GC) from January 2005 to November 2008 were identified by diagnosis code in the hospital database and a case review was performed. Presentation, operative data, and pathology results were of particular interest in this review.

RESULTS: 24 cases were reviewed, 18 female and 6 male, with a mean age of 61 years (Range 29–87). The diagnosis of GC was established preoperatively in 1 case (palliative procedure), intra-operatively in 11, incidentally following pathologic examination of cholecystectomy (LC) specimens in 11 (45%), and liver explant in 1 (OTL). Of the cases of GC found post LC, 9 underwent exploration and radical resection (re-exploration with bile duct resection, segment 4b/5 liver resection, and lymphadenectomy) with intent to cure (81%), and 2 were explored and found unresectable (18%). Residual GC was found in 10 (91%). Port sites were excised in 9/11 explored patients (81%), all without evidence of carcinoma. 7/9 (78%) achieved negative margins with radical resection. 1/9 (11%) developed wound complications following port site excision, necessitating reoperation.

CONCLUSIONS: GC is often found to be advanced and unresectable. The subgroup found on LC offer a higher potential for R0 resection with aggressive surgery (77% vs. overall 37% in our experience), especially as 10/11 (91%) patients in this group had residual disease. None of the patients in this study had evidence of GC on port site excision, questioning the need for the procedure in the absence of gross disease.

Clinical: Colon-Rectal

T1545

Appendicitis in the Elderly: Why They Present with More Advanced Disease

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INTRODUCTION: Acute appendicitis in the elderly commonly presents at a more advanced stage as manifested by higher incidences of perforation and sepsis. The factors responsible for this delayed presentation are not clearly elucidated. This study was conducted to ascertain what factors may account for this phenomenon.

METHODS: A five-year retrospective chart review from 1999–2004 was conducted at a tertiary referral center in which 375 consecutive records were identified for appendectomy. After excluding incidental, interval or pathologically negative appendectomies, 276 patients were identified and stratified into two groups: patients 60 years old or less (243 patients) and patients 70 years old or greater (33 patients). Clinical parameters studied included the Alvarado criteria (RLQ pain, pain migration, anorexia, nausea/vomiting, rebound pain, fever, leukocytosis, left shift), interval from symptom onset to ED presentation, interval from ED presentation to surgery, length of hospital stay (LOS), laboratory profile, CT findings, operative procedure and findings, pathology, and postoperative complications. T-test and Chi square were used for statistical comparisons.

RESULTS: Time from symptom onset to ED presentation was significantly longer in the elderly (66.1 hrs vs. 41.8 hrs, p < 0.045) but time from triage to surgery was not (13.3 hrs vs. 13.6 hrs, p = 0.94). The elderly had significantly decreased pain migration to the RLQ (27% vs. 60%), decreased nausea/vomiting (64% vs. 81%), and anorexia (45% vs. 65%); however, rates of localized tenderness were the same (100% vs. 94%). There was no difference in WBC elevation (79% vs. 78%, p = 0.45) between the two groups, but the elderly more commonly had a left shift (96% vs. 80%). Older patients had a significantly higher rate of suppurative (72% vs. 49%, p < 0.023) and perforated appendicitis (73% vs. 25%, p < 0.001) and a significantly longer LOS (7.3 hrs vs. 3.6 days, p < 0.001). They were more likely to have open rather than laparoscopic appendectomy (82% vs. 60%, p < 0.02). Overall complication rates were higher in the older group (36% vs. 20%).
CONCLUSION: Factors which appear to be associated with the advanced disease state of appendicitis in the elderly include delay in coming into the ED as well as more subtle and atypical pain presentation. Reasons for delayed ED presentation are unclear but may be related to blunting of abdominal pain in the elderly, the diffuse nature of their pain, a poor family support system, and/or poor body awareness. Shortening the pre-ED admission interval appears to be the most important factor in lowering the higher perforation and complication rate in elderly appendicitis.

T1546
Laparoscopy: A Safe Approach to Appendicitis in Pregnant Patients
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OBJECTIVE: Appendectomy is the most common non-gynecological surgery performed during pregnancy. Despite this fact, few studies have evaluated laparoscopy in the pregnant patient. The purpose of this study was to evaluate the safety, feasibility and efficacy of laparoscopic versus open surgery for treatment of suspected appendicitis during pregnancy.

METHODS: A retrospective review of 65 consecutive pregnant patients undergoing surgery with a working diagnosis of acute appendicitis from 1999–2008 was performed. Preterm delivery was defined as delivery at less than 38 weeks of gestation. Significance was determined by unpaired t-test and Chi-square test.

RESULTS: Of the 65 patients, 48 cases were laparoscopic and 17 open. Of the 48 laparoscopic cases, 27% were performed in the 1st, 54% in the 2nd, and 19% in the 3rd trimester, up to the 32nd week of gestation. For the 17 open cases, none were performed in the 1st, 29% in the 2nd, and 71% in the 3rd trimester. Significance was demonstrated between laparoscopic and open group in mean gestational age at time of surgery (18.1 vs. 24.3 weeks, p < 0.05) respectively. The negative appendectomy rate was 21.5%, no difference existed between groups. In 5 laparoscopic cases the appendix was not removed secondary to a grossly normal appearance. There were no maternal mortalities. No statistical difference was demonstrated in maternal patient demographics, clinical presentation, time to presentation, appendix pathology, type of delivery (cesarean section vs. vaginal), length of hospital stay, and surgical site infection rate. Follow-up of fetal outcome was achieved in 86% (83% laparoscopic, 94% open) of patients and no significance was demonstrated in fetal loss (1 in laparoscopic group), Apgar score, birth weight, and gestational age at delivery. Independent risk factors for preterm delivery were onset of symptoms >48 hours prior to emergency room (ER) arrival and admission leukocyte count >17 x10^9/L. (p < 0.05). Time to operative intervention was prolonged by use of computed tomography scan or magnetic resonance imaging for diagnosis (19 vs. 9 hours, p < 0.001).

CONCLUSIONS: Laparoscopy is a safe, feasible and efficacious modality in pregnant patients with suspected appendicitis in the first and second trimester. Maternal and fetal outcome were equivalent in both groups. Preterm delivery is associated with prolonged time to ER presentation after onset of symptoms and/or elevated leukocyte count, making prompt recognition and intervention in these patients imperative. “Fast-track” protocols should be developed to rapidly identify this subset of patients and hasten time to surgical consult.

T1547
Colonic Inertia Has No Adverse Impact on the Short-Term Functional Results of Laparoscopic Anterior Rectopexy for Internal Rectal Prolapse Causing Obstructed Defaecation
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PURPOSE: Colonic inertia (CI) may co-exist with obstructed defaecation (OD). It is unclear if it adversely influences the results of surgery for OD. We aimed to compare the functional results of laparoscopic anterior rectopexy (LAR) for OD secondary to high-grade internal rectal prolapse (IRP) in those with normal colonic transit (NCT) and CI.

METHODS: Patients with high-grade (recto-anal) IRP were evaluated with defaecating proctography and colonic transit study. Colonic transit time (CTT) (hours) was calculated by the number of pellets remaining in the colon and rectum at 7 days × 2.4. Patients were offered surgery for significant symptoms if they failed a program of conservative management. Constipation was prospectively assessed pre-op and at 3 months using Wexner constipation scores.

RESULTS: 80 patients (93% female) underwent LAR for OD and IRP. Patients with NCT gave less history of stool infrequency currently (10% versus 32%) and in their 20's (17% versus 71%). 61 patients had normal colonic transit (CTT median 17, range 0–48 hours) and 19 had CI (CTT median 79, range 50–154 hours, p < 0.0001). Overall symptom improvement at 3 months was similar for NCT and CI (84% versus 84%, p = 0.97). Rates of total (50% versus 68%, p = 0.19) and partial (34% versus 16%, p = 0.16) symptom improvement were similar. Improvement in Wexner constipation score was similar for NCT (mean pre-op 13 to post-op 5) and CI (14 to 5), (p = 0.34).

CONCLUSIONS: In the short term, colonic inertia has no adverse impact and may be disregarded when considering laparoscopic anterior rectopexy for obstructed defaecation and high-grade internal rectal prolapse.
INTRODUCTION: Although commonly associated with rectal bleeding, hemorrhoids may thrombose and cause intense anal pain and swelling. Previous studies of hemorrhoids have been limited by retrospective design and lack of diagnosis by experienced colorectal surgeons. Even less well studied are risk factors associated with thrombosed hemorrhoids. In this study, we prospectively assessed risk factors for thrombosed hemorrhoids in a cohort of patients evaluated by colorectal surgeons.

METHODS: Based on a comprehensive review of prior published risk factors, we compiled a questionnaire encompassing over 80 factors potentially related to the development of hemorrhoids. This questionnaire was completed by patients presenting with hemorrhoidal symptoms to the offices of five board-certified colorectal surgeons in an urban setting. The incidence of these factors in patients with thrombosed hemorrhoids was compared to patients with nonthrombosed hemorrhoids. Univariate analysis using chi square for discrete variables and Student’s t-test for continuous variables was performed. Variables with a p value <0.1 were then tested by multiple stepwise logistic regression.

RESULTS: The entire study cohort consisted of 212 patients (56% male; 86% Caucasian). Forty patients (19%) had thrombosed hemorrhoids and 172 patients (81%) had other forms of hemorrhoid disease. There was a significantly (p = 0.02) higher incidence of swelling in patients with thrombosed hemorrhoids (90%) compared to patients with nonthrombosed hemorrhoids (50%). Univariate analysis revealed differences between the thrombosed hemorrhoid and nonthrombosed hemorrhoid patient groups in percentage of individuals under 40 years of age (42% vs. 24%, p = 0.01), proportion of patients spending longer than ten minutes on the toilet during defecation (6% vs. 13%, p = 0.04), anal sex (15% vs. 6%, p = 0.06), and the presence of frequent abdominal bloating (20% vs. 34%, p = 0.07). On multivariate analysis, age younger than 40 years (p = 0.02; odds ratio = 2.4) and anal sex (p = 0.047; odds ratio = 3.1) independently predicted thrombosed hemorrhoids.

CONCLUSIONS: This first reported prospective study of patients examined by a group of experienced colorectal surgeons revealed swelling as the primary complaint of patients with thrombosed hemorrhoids. Independent risk factors for thrombosed hemorrhoids include age younger than 40 and a history of anal sex.
T1550
Hand-Assisted Laparoscopic Colectomy (HALC): The Learning Curve Is for Operative Speed, Not for Quality
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PURPOSE: Previous attempts to define the learning curve for HALC have used a method in which the operative experience is partitioned into groups of cases and then operative (OR) time and morbidity are compared. This simple method may not accurately describe the learning curve for HALC. We hypothesized that there are non-linear relationships between operative experience, OR time, and quality-related short-term outcomes for HALC. We used a validated statistical tool, the Sigmoid Emax model, to evaluate these relationships. The results of this model were compared to those of a simple partition of the HALC experience into groups based on operative experience.

METHODS: A prospective HALC database was used to analyze consecutive segmental and total HALC performed by a single surgeon with no prior HALC experience. Using sigmoid Emax models, the relationship between the HALC case number, OR time, conversion rate, morbidity, length of hospital stay (LOS), readmission, and reoperation were demonstrated. Total improvement capability (TIC), defined as significant improvement between the initial and final average values of the measured variables, were calculated. The number of HALC cases required to achieve 90% of the TIC was accepted as the learning curve. A separate comparison of the same variables in consecutive groups of 25 or 50 HALC, was also performed.

RESULTS: From December 2005 to August 2008, 187 HALC were performed, including 61 right, 61 sigmoid, and 65 total colectomies. The indication for HALC was neoplasia, diverticulitis, and IBD in 56%, 25%, and 18%, respectively. 90% TIC was achieved for OR time only and occurred at 32 cases. OR time decreased from a mean of 191 ± 73 to 165 ± 57 minutes before and after 90% TIC was achieved. Sigmoid Emax models for conversion (6%), operative, and postoperative morbidity (8 and 30%), median LOS 4 (2–32) days, readmission (7%), and reoperation (5%) produced plateau-like curves and 90% TIC was not achieved which indicates that these measures remained similar throughout the HALC experience. Comparison of the same measures in HALC groups of 25 or 50 cases was notable only for a significant decrease in operative time (190 to 169 min) after 50 HALC were performed.

CONCLUSIONS: The learning curve for HALC is 32–50 cases when operative time is the measure of learning. For quality-related measures, we found no learning curve for HALC. Our results indicate that a novice can perform HALC with good quality-related outcomes and that only operative speed will improve with experience.

T1551
Emergent Colorectal Surgery Is Associated with an Increased Incidence of Venous Thromboembolic Events
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PURPOSE: Venous thromboembolic (VTE) conditions such as deep venous thrombosis (DVT) and pulmonary embolism (PE) can be a major source of morbidity and mortality in colorectal surgical patients. Risk stratification tools which aid in the choice of mechanical and pharmacologic prophylaxis include many risk factors; however, emergent surgery has not been identified as a specific risk factor for the development of VTE. The purpose of this study was to utilize the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) Participant Use Data File (PUF) to evaluate the association between emergent colorectal surgery and the incidence of VTE.

METHODS: The 2007 ACS-NSQIP PUF (consisting of 152,490 locked and de-identified cases from 2005–6) was queried by ICD-9 code for cases of colon (153) or rectal (154) cancer, diverticulosis/diverticulitis (562), regional enteritis (555) or ulcerative colitis (556). The 30-day incidence of DVT and/or PE was compared between emergent versus non-emergent cases using multinomial logistic regression. This analysis was repeated to control for known risk factors for VTE such as age, immobility, malignancy, chemotherapy, radiation therapy, smoking, pregnancy, thrombophilia, etc.

RESULTS: A total of 5,342 cancer and 3,418 diverticulitis and inflammatory bowel disease cases were identified. Age was statistically higher (p < 0.001) in emergent versus non-emergent cases for both malignant: 70 ± 14.4 years vs. 66 ± 13.8 and benign: 60 ± 17.3 vs. 53 ± 15.8. Sex was not statistically different between groups. When controlled for weighted risk factors commonly used to stratify patients for VTE prophylaxis, patients who underwent emergent surgery were at increased risk for DVT and/or PE for both malignant and benign cases (table).

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<thead>
<tr>
<th></th>
<th>Emergent Total</th>
<th>Non-Emergent Total</th>
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<tr>
<td></td>
<td>VTE (%)</td>
<td>VTE (%)</td>
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<tr>
<td>Malignant</td>
<td>11 (4.03%)</td>
<td>88 (1.74%)</td>
</tr>
<tr>
<td>Benign</td>
<td>20 (4.27%)</td>
<td>55 (1.96%)</td>
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*Odds Ratio per one unit weighted increase in risk factors

CONCLUSION: Patients undergoing emergent colorectal surgery for both benign and malignant disease are at significantly higher risk for VTE. Unless contraindicated, VTE prophylaxis should be administered in the perioperative period in patients undergoing emergent colorectal surgery.
Racial Disparities in Complicated Colorectal Cancer
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OBJECTIVE: Increased incidence and mortality of colorectal cancer in African Americans (AA) is well documented and has led to targeted education and screening programs within this population. Complicated colorectal cancers (CCC), defined as obstructing or perforating lesions, have worse prognosis and are preventable with colorectal cancer screening. The purpose of this study is to assess whether racial disparities, despite initiatives in education and screening, remain within a cohort of patients presenting with CCC.

METHODS: A retrospective study of 522 patients undergoing surgery for colorectal cancer of which 72 (13.8%) were CCC was performed. Exclusion criteria included age less than 18, diagnosis of inflammatory bowel disease, familial adenomatous polyposis, hereditary nonpolyposis colorectal cancer, and diagnosis of colorectal cancer greater than one-year prior to presentation. Four patients were excluded based on these criteria. Significance was determined by unpaired t-test, chi-square and ANOVA analysis.

RESULTS: Of the 522 patients, 319 were Caucasian (CA), 51 AA, and 152 “other” (Hispanic, Asian or race not identified) of which 72 (13.8%) were CCC. Of the 68 patients who qualified for the study, 11 were AA, 38 CA and 17 other. 4.4% of patients had been screened in the past for colorectal cancer, no difference between AA and CA. AA were twice as likely as CA to present with CCC (22.2% vs. 11.9%, p > 0.05), however significance was not met. Significance was demonstrated in socioeconomic parameters and gender. AA with CCC were more likely in lower income brackets (36.4% vs. 0%, p < 0.001) and insured solely through Medicaid or Medicare (54.5% vs. 15.8%, p < 0.012) than CA. AA women had increased incidence of CCC as compared to CA women (90.9 vs. 36.8%, p < 0.002). Tumor stage, location, postoperative outcome, and mortality rate was equivalent in all patient populations.

CONCLUSION: Despite measures to improve education and screening, disparity in preventable CCC still exists. AA in low-income brackets with government subsidized insurance are more likely to present with CCC. AA women have increased incidence of complicated cancer when compared to CA women. Increased colorectal cancer screening and education should be targeted to AA women and AA in low-income neighborhoods.

Access Related Complications After Open and Laparoscopic Colorectal Surgery: A Prospective Study
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BACKGROUND: Open colorectal surgery (CRS) leads to high rates of adhesive small bowel obstruction (SBO) and incisional hernia development with large clinical impact and financial burden. In this study we evaluated the cumulative incidence of access related complications in a cohort of patients who underwent open and laparoscopic CRS.

METHODS: We reviewed cases of elective or emergency CRS patients kept prospectively on a database and examined annually. Case notes were studied for adhesive SBO episodes requiring admission or reintervention. Development of incisonal hernia with or without repair was also recorded. The diagnosis of SBO was defined by a combination of clinical criteria and imaging. Time interval of SBO, surgery type and setting, readmission length and findings at reintervention were recorded. Patients undergoing CRS for inflammatory bowel disease, patients with peritoneal carcinosis, or patients with SBO secondary to local or peritoneal recurrence during the follow-up were excluded. Patients who underwent other abdominal surgery during the follow-up were also excluded. Data were analysed using Mann-Whitney U test and chi-square test. The Kaplan Meier method was used for cumulative probability of developing SBO.

RESULTS: from 1/03 to 11/08, 527 patients satisfied our criteria and underwent elective (84.8%) or emergency (15.2%) CRS (83.3% open and 16.7% laparoscopic). Median follow-up was 27 months (range 0.2–71.8). Thirty-two patients (6.1%) experienced 54 SBO episodes and 8 required surgery (1.5%). There was a large variation in the time of first SBO occurrence, 56.3% occurred within 3 months, 21.9% between 3 and 12 months and 21.8% after 1 year. The risk of surgery at first admission for SBO was 25% and the number of readmissions predicted the need of surgery. The risk of reoperation was greatest during the first year after CRS and steadily rised every year thereafter. SBO was higher after pelvic surgery or extensive resections compared to minor procedures (6.6% vs. 2.9%). Likewise, SBO risk was higher after emergency compared to elective surgery (1.3% vs. 6.9%), but similar after open compared to laparoscopic surgery (6.2% vs. 5.7%). Any previous or additional surgery raised the overall risk of SBO from 5.3% to 12.3%. Incisional hernia development was similar between open and laparoscopic surgery (3.4% vs. 1.6%).

CONCLUSIONS: Colorectal surgery results in significant ongoing risk of SBO according to the colorectal procedure. This risk seems to be similar between laparoscopic and open approach, higher after emergency surgery and for patients with previous surgery. The number of readmissions for SBO predicts the need of surgery.
INTRODUCTION:
Although a slight increase in colorectal cancer (CRC) has been reported post solid organ transplantation when compared to the general population, early and long term outcomes after surgery have not been well investigated.

METHODS: Solid organ transplant patients with CRC were identified from a prospective CRC and solid organ transplantation database. Early and long term outcomes for such patients undergoing surgery were compared with a control group of patients matched 1:2 for age (±5 yr), gender, tumor site, year (±2 yr), ASA score and chemoradiotherapy.

RESULTS: 14 solid organ transplantation patients (6 kidney, 5 heart, 1 kidney and pancreas, 1 liver and 1 lung transplantation) developed CRC. Age at diagnosis was 57.1 ± 14.6 yrs. One patient was asymptomatic at diagnosis, although 25% of the patients were under colonoscopic surveillance. Stage at presentation was I or II (n = 10), III (one patient) and IV (n = 3). Tumor site included right colon (n = 6), transverse (n = 2), sigmoid (n = 3) and rectum and anal canal (n = 3). Median time from transplantation to CRC diagnosis was 10 yrs. Cause of death was CRC in 7 out of 11 deceased patients and overall 3 years recurrence rate and disease free survival (DFS) were 35% and 29%, respectively. When compared to the control group, the DFS and overall survival rates were significantly lower in the transplanted patients (29% vs. 71%, p = 0.02, and 29% vs. 75%, p = 0.001, respectively). Overall postoperative morbidity rate was slightly increased in post transplant group (21.4% vs. 14.3%, p = 0.6).

CONCLUSIONS: Surgery for CRC in post solid organ transplantation patients is safe. CRC occurring in solid organ transplantation patients is associated with worse outcomes when compared to the general population.

T1556
The Role of Genotype and Phenotype in Patients with Perianal Crohn's Disease
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PURPOSE: Perianal manifestations of Crohn's Disease (CD) are common and have a significant effect on disease morbidity and patient quality of life. Recent studies suggest that perianal CD may be a distinct phenotype and as such may be associated with specific susceptibility genes and environmental factors. The objective of this study was to examine the relationship between genotype and phenotype in perianal CD.

METHODS: Review of a prospectively maintained, IRB-approved institutional database of patients with CD was performed for phenotypic data on patients with and without perianal CD. Genotype data was available for disease associated risk alleles for NOD2, IBD5, ATG16L1, IRGM, and IL23R. Univariate analysis was performed to evaluate differences in genotype and phenotype frequencies between patients with and without perianal CD. Statistical analysis was performed using chi square analysis with significance set at p < 0.05.

RESULTS: Of 710 patients, 236 (33%) were identified as having perianal CD. There was no difference between patients with and without perianal CD with respect to gender, race, age at diagnosis, family history of IBD, and current or past smoking. Patients with perianal CD were significantly more likely to have received anti-TNF therapy than patients without perianal CD (OR 2.28, 95% CI 1.42-3.68, p = 0.0002). There was no significant difference in genotype frequencies between patients with and without perianal CD.
CONCLUSIONS: In patients with CD, there is a significant association between rectal involvement and the presence of perianal disease. There is a trend toward association of perianal CD and the presence of IBD5 risk alleles. Anti-TNF therapy is associated with a reduced need for fecal diversion in perianal CD.

T1558
Circulating Tumor Cells in Portal Venous Blood of Patients with Non-Metastatic Colorectal Cancer: Preliminary Results
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BACKGROUND AND AIM: Circulating tumor cells (CTCs) have been detected with the Celltrack Autoprep System in peripheral venous blood of patients with colorectal cancer. A cut-off of ≥2 CTCs has been considered abnormal. However, there is no information on the presence of CTCs in the portal venous blood perioperatively. Therefore, this study was designed to investigate whether CTCs can be isolated from the portal venous blood of patients undergoing curative surgery for non-metastatic colorectal cancer.

PATIENTS AND METHODS: Patients undergoing curative open surgery for non-metastatic colorectal cancer (Stage I-III) were included in the study. The control group comprised patients undergoing a colorectal resection for benign diseases. Peripheral venous blood samples (7.5 ml) were drawn after inducing anesthesia and after skin closure. Portal venous blood samples (7.5 ml) were drawn by direct puncture of the portal vein upon entering the abdomen and then after removing the specimen. All samples were processed in a standard fashion and CTCs were detected using the Celltrack Autoprep System. Qualitative data are presented as percentage. Quantitative data are presented as mean ± standard deviation. Student’s t and Chi square tests were used for statistical analysis. The study was approved by the institutional ethics committee.

RESULTS: Five patients, one man and four women with a mean age of 63.6 ± 20.8 yrs. were included in the control group. Two control patients that were discarded because of confounding diseases (penetrating active CD and large villous adenoma) had slightly elevated CTCs. Twenty five patients with colorectal cancer, 13 men (52%) and 12 women (48%) with a mean age of 71.4 ± 10.9 yrs. were studied. All patients in the control group had two or fewer CTCs in 7.5 ml of portal blood either before or after intestinal
resection. In patients with colorectal cancer, 32% had >2 CTCs in peripheral blood before resection and 8% after resection. In contrast, twelve out of the 25 patients (48%) had >2 cells before removing the tumor. Considering the group as a whole, no difference between the preresection and postresection CTC count was seen (32.3 ± 100 vs. 25.4 ± 86.7 cells; p = NS). When only patients with elevated CTCs were analyzed, twelve had high CTC counts prior to resection (66.5 ± 139 cells) and 7 after resecting the tumor (89 ± 153 cells; p = NS).

CONCLUSION: to the best of our knowledge, this is the first study reporting elevated circulating epithelial cells in portal venous blood of patients undergoing surgery using the Celltracks Autoprep System. The prognostic implications of our findings merit further investigation.

T1559
Risk Factors for Postoperative Ileus After Laparoscopic Partial Colectomy
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INTRODUCTION: Postoperative ileus (POI) after laparoscopic colorectal surgery leads to increased anxiety for patients and caregivers, and is associated with prolonged hospital stay and increased costs. The aim of this study is to investigate pre-, intra- and postoperative risk factors associated with the development of POI in patients undergoing laparoscopic partial colectomy.

MATERIAL AND METHODS: Patients undergoing laparoscopic segmental colectomy from 2004–2008 were identified from a prospectively maintained laparoscopic database. Clinical, metabolic and pharmacologic data obtained retrospectively by reviewing the clinical charts. Patients with total colectomy or rectal resection were excluded. POI was defined as absence of bowel function for 5 or more days, or the need for reinserterion of a nasogastric tube after starting oral diet in the absence of mechanical obstruction. Factors associated with POI were analyzed using Chi-square or Fisher’s exact test for categorical variables, logistic regression for quantitative and ordinal variables. P-values < 0.05 were considered statistically significant and Odds Ratios were calculated with a 95% confidence interval.

RESULTS: Of 425 patients (mean age 58 years, 52.9% female) undergoing segmental colectomy, 46 patients developed POI (10.8%). Patients who developed POI were significantly older (63.5 vs. 57.2 years, P = 0.0001, OR 1.23), more of them had previous abdominal surgery (65.2% vs. 48.9%, P = 0.03, OR 2.01), greater preoperative narcotic use (22.7% vs. 9.4% P = 0.02, OR 2.84), more postoperative anastomotic leaks (8.7% vs. 1.9%, P = 0.02, OR 5.22), more postoperative DVT (6.5% vs. 1.3%, P = 0.045, OR 5.22), lower postoperative hemoglobin concentration (9.6 vs. 10.4 g/dL, P = 0.006, OR 0.77), lower mean serum potassium level (3.4 vs. 3.7 mmol/L, P < 0.001, OR 0.81), and lower mean calcium level (7.5 vs. 7.9 mmol/L, P = 0.004, OR 0.92). ASA class, BMI, preoperative steroid use, operative time, estimated intraoperative blood loss, the use of a hand assisted technique or the occurrence of a postoperative abscess were not associated with POI.

CONCLUSION: POI after laparoscopic segmental colectomy is associated with specific preoperative, intraoperative and postoperative factors. Minimizing or addressing these factors may be expected to reduce the incidence of this common complication.

T1560
Advantages of the Hand-Assisted Approach to Elective Laparoscopic Colectomies
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INTRODUCTION: Hand-assisted laparoscopic colectomy has been introduced as an alternative to the standard laparoscopic technique. However, it has not yet been established whether intra-abdominal placement of a hand abrogates the benefits of minimally invasive techniques. We hypothesized that the hand-assisted approach confers advantages of minimal access surgery over traditional open colectomy.

METHODS: We performed a retrospective review of consecutive patients undergoing elective open (O) and hand-assisted (HA) colon resections at a tertiary care hospital. Open colectomies performed by the laparoscopic surgeons were excluded. Outcome measures included patient demographics, operative time, perioperative complications, operative and total hospital charges, and length of stay. Statistical analysis was performed using Wilcoxon Rank Sum, Fisher’s Exact, and Student’s t-test with p < 0.05 considered significant.

RESULTS: Three hundred twenty-two O and 66 HA consecutive colectomies were identified and reviewed. Of these, 185 (57.4%) O and 42 (63.6%) HA were left-sided. The two groups were similar in age (60.4 vs. 59.1 years), sex (62.6% vs. 67.1% females), and body mass index (29.9 vs. 33.1 kg/m2). The mean operative time was longer in the HA group (202 vs. 160 minutes, p = 0.002). There were no major intraoperative complications in either group and no conversions form HA to O colectomy. Postoperatively, no patient in the HA group and 14 (3.8%) patients in the O group required blood transfusion. Anastomotic leak rate was significantly higher in the O vs. the HA group (2.8% vs. 1.5%; p = 0.04). The rate of wound infections was also higher in the in the O [11 (3.4%)] vs. the HA [1 (1.5%)] group (p = 0.04). All 7 (2.3%) mortalities occurred in the O group. The length of hospitalization was significantly shorter in the HA group (5.1 vs. 11.5 days, p < 0.001). Total hospital charges were significantly lower in the HA group ($24,132 vs. $33,150; p < 0.0001)

CONCLUSION: Hand-assisted laparoscopic colectomy is a safe alternative to traditional open colonic resections. In this series, it was associated with a decreased postoperative morbidity and mortality. Despite longer operative times, the use of the hand-assisted techniques resulted in a significant reduction of the duration of hospitalization and decreased total hospital charges. Overall, in the elective setting, hand-assisted laparoscopic colectomies are clearly advantageous over the traditional open colectomies.
Health Related Quality of Life After Minimally Invasive Surgery for Diverticular Disease

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BACKGROUND AND AIMS: Colonic resection is mandatory in complicated colonic diverticular disease (DD). The impact of video assisted surgery is still unclear. The aim of this study was to evaluate the clinical outcome and quality of life in patients affected by DD submitted to open colonic resection compared to those who had video assisted colonic resection.

PATIENTS AND METHODS: All the consecutive patients who were admitted in the departments of surgery of Padova (1999–2008) and Arzignano (2004–2008) Hospitals for left iliac pain and endoscopic or radiological diagnosis of diverticular disease, after a minimum follow up of 3 months after hospital discharge, were contacted for an outpatient visit. Fifty-eight accepted to be enrolled: 25 of them were treated with medical therapy while 18 and 15 of them underwent video assisted and open colonic resection, respectively. Disease severity at admission was assessed with Hinchey scale and details about surgical procedures and complications were retrieved. The interview included the Padova Inflammatory Bowel Disease Quality of Life (PIBDQL) and the Cleveland Global Quality of Life (CGQL) questionnaires, the Visual Analogue Scale (VAS) for quality of life, the Body Image Questionnaire, the Bristol Fecal score and an ad hoc symptoms score. Eighty-one healthy subjects were enrolled as control group. Non parametric tests were used.

RESULTS: Either PIBDQL or CGQL scores were worse in all patients with DD compared to those obtained by healthy subjects (p < 0.01). In fact, these scores were significantly worse in patients with DD treated with medical therapy and in those who had open surgery than in healthy subjects (p < 0.01). On the contrary CGQL scores were similar in patients who had video assisted surgery compared to controls. PIBDQL scores correlated with the symptoms score (r = 0.60, p < 0.01). CGQL scores and VAS at follow up correlated with Hinchey disease activity at presentation (r = -0.31, p = 0.02). Body Image Questionnaire scores correlated inversely with the presence of a stoma (r = -0.37, p = 0.04).

CONCLUSIONS: Our study showed that DD has an important impact on quality of life. Video assisted surgery seems to improve generic quality of life of patients while disease specific quality of life seemed only to depend on current disease activity. The presence of a stoma affected the body image of patients.

Scopeguide® Reduces Pain During Colonoscopy

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BACKGROUND: The ultimate goal of a successful colonoscopy is an accurate examination without causing discomfort or pain to the patient. ScopeGuide® (Olympus, Japan) is a product which displays the position and shape of the colonoscope and thereby is believed to shorten insertion time, facilitate loop elimination and increase patient comfort. This prospective study was designed to evaluate if ScopeGuide affected the outcome of colonoscopy.

METHODS: A total of 37 colonoscopies (23 women and 14 men; 53 ± 2.4 years) were performed by four experienced endoscopists and three residents in gastroenterology. In 13 of the examinations biopsies were taken and excluded from the evaluation. ScopeGuide® was used in 14/24 colonoscopies. Patient discomfort, pain and general experience of the examinations were assessed using a VAS-scale. The technical difficulty and general experience of the examination were estimated by the endoscopists in a similar manner. Cecal intubation time was registered.

RESULTS: The patients where ScopeGuide was used experienced significantly less pain (4.3 ± 0.8 vs. 6.7 ± 0.6; P = 0.042). In the colonoscopies without ScopeGuide there was a positive correlation between the technical difficulty, as estimated by the doctor, and the pain experienced by the patients (R² = 0.65; P = 0.009). This correlation was abolished with ScopeGuide. There were no differences between the two groups regarding patient discomfort and general experience. The time to reach cecum in female patients was longer than in males (26 ± 3.5 vs. 10 ± 2.6 min).

CONCLUSION: This prospective study demonstrates that using the additional help of ScopeGuide®, which facilitates the elimination of loops, reduces the pain as experienced by patients during colonoscopy.

Experience with an Alternate Wipe Guaiac Fecal Occult Blood Test in a National Bowel Screening Program

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BACKGROUND: The format of the traditional guaiac fecal occult blood test [gFOBT], particularly the collection technique, might lead to difficulties for some potential participants, particularly the visually impaired and those with poor manual dexterity.
METHODS: Four tests with different fecal collection approaches were investigated. Moreover, a focus group informed the decision to investigate further a wipe test. Randomly selected fecal samples [100] were tested with EZ-Wipe [three wipes for each] and hema-screen gFOBT [all six windows], both obtained from Immunostics Inc., Ocean, NJ 07712. This wipe test was then made available in the Scottish Bowel Screening Programme as from June 2007. SOPs were generated for the Centre staff to respond to requests for the wipe test.

RESULTS: Identical results were attained with both gFOBT techniques: the analytical detection limit found for the wipe test was 0.6 mg hemoglobin/g feces. To the end of August 2008, 334 requests were made for the wipe test. Overall, 433 wipe test packs were issued: this number includes replacement and follow-up packs. 236 wipe kit sets were analysed in the Centre Laboratory to the end of August 2008: 17 were positive, 118 negative, 71 weak positive, and 30 spoiled. Expressed as percentages, these are 7.2, 50.0, 30.1, and 12.7% respectively. The comparison, although not absolutely direct, is with gFOBT and the relevant percentages for this test were: 0.4, 90.7, 7.6 and 1.3%.

With the wipe test, participants can be referred for colonoscopy either on first finding that all three wipes are positive or on finding that at least one of the three tests in each of two successfully completed wipe test sets are positive. The total number of participants referred through these routes was 33. The colonoscopy outcomes were requested from the appropriate NHS Boards. To the end of September 2008, outcome data were available on 26 participants: 6 declined colonoscopy, 1 was judged unsuitable, 1 was already in follow-up, 2 did not attend, 7 had normal colonoscopy, 3 had low risk adenoma, 2 had a metaplastic polyp, 3 had diverticular disease, and 1 had a high risk adenoma. No participant had cancer.

CONCLUSIONS: The analytical performance of the wipe test was satisfactory. However, a high percentage of participants were invited for colonoscopy. Moreover, a large number of participants spoiled the test and required a further set of tests. In addition, a high percentage referred declined colonoscopy and the pick up of significant neoplasia was small. The clinical performance characteristics of the wipe test are such that it cannot be recommended as a screening test for bowel cancer.

Clinical: Esophageal

T1565
Prediction of Lymph Node Metastases in Early Esophageal Cancer
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INTRODUCTION: Whereas in mucosal carcinoma of the esophagus endoscopic local treatment is undisputably the recommended treatment, submucosal esophageal carcinoma reveals a higher percentage of lymph node metastases and consequently oncologic esophageal resection with systematic lymph node dissection is indicated. Increasingly, these carcinomas are treated by means of endoscopic submucosal dissection (ESD), although the diagnostic methods for the detection of potential lymph node metastases (endoscopic ultrasound, computed tomography and PET) are marked by an insufficient sensitivity and specificity. It was the aim of our study to produce a model for the prediction of lymph node metastases in early esophageal carcinoma.

METHODS: We analyzed the clinical and histopathological data of 68 consecutive patients with a pT1-esophageal carcinoma in whom an oncological resection was performed in the Department of General and Abdominal Surgery, Mainz, Germany. Submucosal carcinomas (pT1b) were classified according to sm level I-III. In a first step we made a univariate analysis (one-way ANOVA) to test the predictive value of the following potential parameters with regard to the lymph node status (positive/negative): age, sex, histologic tumor type, tumor size, grading, mucosa-/submucosa-type, R-classification, pL, pV, localization of the tumor, and surgical technique (transhiatal/transabdominal approach). All significant variables of the univariate analysis were included in the multivariate analysis. For this purpose we used a general discrimination analysis (forward stepwise). In a third step, the Kruscal-Wallis test with post-hoc comparisons was applied to define the cut-off value of the parameter tested as significant which displays the risk category of a lymph node positivity.

RESULTS: In the univariate analysis, tumor size (p = 0.004), grading (p = 0.034), pL (p = 0.008), pV (p = 0.05) and sm-type (p = 0.035) proved to be statistically significant. The variables which attained significance in the multivariate analysis were tumor size (p = 0.02) and pV (p = 0.034). In the Kruscal-Wallis test with post-hoc comparisons, the cut-off value of the tumor size was 1 cm (model p = 0.014 and between the categories p = 0.05).

CONCLUSION: The risk category of lymph node positivity in early esophageal cancer exists according to the prediction model on the basis of the tumor size of >1 cm and a venous infiltration. The hitherto usual sm-level I-III classification of submucosal carcinomas of the esophagus plays a minor role with regard to the prediction of potential lymph node metastases and consequently the indication for endoscopic or surgical therapy.

T1566
Comparison of the Conventional Manometry and High Resolution Manometry in the Assessment of the Resting Characteristics of the Lower Esophageal Sphincter: The Enemy of Good Is Better
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INTRODUCTION: High resolution manometry (HRM) has been widely accepted as an easier and more reproducible
method to assess the esophageal body. Its usefulness in evaluating the lower esophageal sphincter (LES) has not been well studied. The goal of this study was to compare HRM to the standard pull-through technique in assessment of the resting characteristics of the LES.

**METHODS:** Conventional manometry (CM) using the station pull-through technique and HRM with a solid state catheter were performed in 66 patients with foregut symptoms. HRM was performed in the supine position 30 minutes after CM. All patients had a videosophagogagram to identify the presence of a hiatal hernia. The LES was assessed in the spatiotemporal mode of HRM, with the boundaries of the LES defined as 1) distinct color change (blue to green) on the image based analysis, 2) using an isobaric contour of 2 mmHg and 3) a rise from gastric baseline in the diagram mode. In the tracing mode of HRM, the lower border of the LES was defined as in conventional manometry as a 2 mmHg rise above gastric baseline and the upper border as a drop below gastric baseline. The resting characteristics of the LES by HRM and CM were compared.

**RESULTS:** HRM consistently overestimated both overall and abdominal lengths of the LES and had poor correlation with the lengths measured by CM (table). The variability in LES length by HRM was greatest in patients with a hiatal hernia (1.8 vs. 0.9 cm, p = 0.027). Bland-Altman analysis showed weak agreement between LES length determined by HRM and CM (95% limits of agreement –1.4 to 4.4 cm). CM identified 22 patients (33%) with a defective LES. Using the image based analysis of HRM, 7/22 patients (32%) with a defective valve on CM would be considered normal. The upper border of the LES varied up to 6 cm compared to CM. There was no significant difference in the resting pressure of the LES between CM and HRM (13.5 vs. 11.5 mmHg, p = 0.15).

**CONCLUSION:** HRM is less accurate in determining LES length with nearly one third of patients with a defective valve on CM considered normal. Discrepancies of more than 4 cm may occur, and are greatest in the presence of a hiatal hernia. There was significant variability in the location of the upper border of the LES which compromises accurate placement of a pH probe.

<table>
<thead>
<tr>
<th></th>
<th>Conventional Manometry (CM)</th>
<th>Image-Based Analysis</th>
<th>SpatioTemporal (Isobaric Contour = 2 mmHg)</th>
<th>Diagram</th>
<th>Line Tracing (2 mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall length</td>
<td>3 (2.3,3.5)</td>
<td>3.4* (2.7,4.1)</td>
<td>4.4* (3.5,5.1)</td>
<td>4.7* (3.3,5.4)</td>
<td>3* (2,4)</td>
</tr>
<tr>
<td>Spearman R coefficient (95% CI)</td>
<td>0.08 (-0.18,0.32)</td>
<td>0.21 (-0.23,0.27)</td>
<td>0.06 (-0.19,0.3)</td>
<td>0.18 (-0.07,0.41)</td>
<td></td>
</tr>
<tr>
<td>Abdominal length</td>
<td>1.8 (1.1,2.2)</td>
<td>3 (2.2,3.5)</td>
<td>3.7 (2.8,4.5)</td>
<td>3.7 (2.6,4.8)</td>
<td>3 (2.4)</td>
</tr>
<tr>
<td>Spearman R coefficient (95% CI)</td>
<td>0.44 (0.21,0.62)</td>
<td>0.23 (-0.03,0.45)</td>
<td>0.37 (0.13,0.56)</td>
<td>0.26 (0.1,0.48)</td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.005 for comparison to CM, †p = 0.74 for comparison to CM, †p < 0.0001 for comparison to CM

T1567

**Laparoscopic Ischemic Pre-Conditioning of Gastric Conduit: Reducing Anastomotic Complications of Minimally Invasive Esophagectomy**

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**INTRODUCTION:** Gastric pull-up reconstruction is the most common approach to esophageal replacement after resection for malignant or end stage benign esophageal disease. Despite technical improvements, the incidence of anastomotic leak and stricture remain high. Gastric devascularization followed by delayed gastric conduit creation and esophageal resection has been proposed to minimize anastomotic complications. The aim of this study was to review the experience and outcomes of the delay technique applied in a high-risk esophagectomy cohort at a single institution.

**METHODS:** Between July 2005 and June 2008, 32 patients underwent minimally invasive esophagectomy (MIE) by the combined thoracoscopic-laparoscopic approach. Seven patients deemed high risk for esophagectomy due to cardiopulmonary comorbidities were selected for laparoscopic ischemic pre-conditioning (LIP). Laparoscopic devascularization was performed either 1 week (n = 5) or 12 weeks (n = 2) before esophageal resection with gastric conduit reconstruction and included complete gastric mobilization with division of the short gastric vessels, left gastric artery, and coronary vein. Outcome measures included anastomotic leak measured by clinical and radiographic findings and the presence of symptomatic anastomotic stricture requiring endoscopic therapy.

**RESULTS:** Each patient in the LIP group underwent successful laparoscopic devascularization and subsequent MIE. LIP required an average of 134 minutes to complete, and there was not a significant difference in mean operative time for MIE (494 min) compared to MIE with immediate reconstruction (545 min, p = 0.141). There were no complications following LIP nor directly attributable to delay. None of the LIP patients developed an anastomotic leak postoperatively, compared to 17% of patients who underwent immediate reconstruction (p = 0.237). One patient (14.3%) developed an anastomotic stricture that required endoscopic dilatation within the first year after surgery, compared to 6.4% of immediate reconstruction patients.

**CONCLUSION:** In this series of high risk patients undergoing MIE for cancer, all of those chosen for LIP underwent successful delayed reconstruction following gastric devascularization without clinically or radiographically evident anastomotic leak. Despite the small sample size, the absence of anastomotic leak in the delay group suggests that delayed conduit preparation can be accomplished safely while potentially reducing the substantial morbidity associated with esophagectomy. Larger prospective studies are required to identify the patients who may benefit most from this approach.
Intrathoracic Manifestations of Cervical Anastomotic Leaks: Transhiatal Versus Transthoracic Oesophagectomy

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OBJECTIVE: To investigate whether intrathoracic manifestations of cervical anastomotic leakage are encountered more frequently after transthoracic oesophagectomy compared with transhiatal oesophagectomy.

BACKGROUND DATA: A cervical anastomosis is required for reconstruction after transhiatal oesophagectomy and seems to reduce the intrathoracic consequences of anastomotic leakage. It is questioned whether a cervical anastomosis after transthoracic oesophagectomy harbours this advantage too. In the present study, we investigated incidence and risk factors of intrathoracic manifestations after cervical anastomotic leakage in a prospectively collected consecutive series of patients with potentially curable oesophageal carcinoma.

METHODS: From 1993 to 2007, all patients in the prospective database undergoing transhiatal or transthoracic oesophagectomy with a cervical anastomosis were included. All patients developing either radiological or clinical signs of anastomotic leakage were evaluated. Occurrence and outcome of intrathoracic manifestations after cervical anastomotic leakage were compared after transhiatal and transthoracic oesophagectomy. Multivariate logistic regression analysis was used to identify potential risk factors for intrathoracic manifestations including age, body mass index, tumour histology, use of neoadjuvant therapy and surgical approach.

RESULTS: In the study period, 847 patients underwent potentially curative oesophagectomy. 79/516 (15%) patients developed anastomotic leakage after transhiatal oesophagectomy versus 50/331 (15%) patients after transthoracic oesophagectomy (p = N.S.) However, significantly (p = 0.041) more intrathoracic manifestations of cervical anastomotic leakage were seen after transthoracic oesophagectomy than after transhiatal oesophagectomy (22/50 (44%) versus 21/79 (27%). Total hospital stay (p < 0.001), ICU stay (p < 0.001) and mortality (p = 0.035) were significantly higher in patients with intrathoracic manifestations compared to patients without intrathoracic manifestations of cervical leakage. Transthoracic approach was the only independent predictive factor for development of intrathoracic manifestations in patients with cervical leakage (p = 0.014, Odds Ratio 2.859).

CONCLUSION: Intrathoracic manifestations of cervical anastomotic leakage after oesophagectomy result in longer hospital stay and higher mortality. Intrathoracic manifestations occur significantly more after a transthoracic approach than after a transhiatal approach.
Endoscopic Therapy for Benign and Malignant Esophageal Lesions

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OBJECTIVE: New endoscopic techniques allow diagnosis, staging and therapy of benign and malignant esophageal lesions. The aim of this study was to review our experience with endoscopic therapy (ET) in the esophagus.

METHODS: Retrospective review of the records of all patients who had endoscopic resection (ER) and/or ablation in the esophagus or gastroesophageal junction.

RESULTS: In 71 patients (56 M/15 F) with a median age of 64 years (IQR 56–74) 171 endoscopic procedures (112 ER, 59 ablations) were performed (median of 2 procedures per patient). ER was performed in 54 patients with a visible lesion. In 26 of these patients the ER was done as a staging procedure prior to an esophagectomy. In 7 patients a benign lesion was diagnosed and required no further intervention. In 21 patients either high-grade dysplasia (HGD) or intramucosal cancer (IMC) was diagnosed. There were 17 patients without a visible lesion that had ablation: six with no prior ER for non-dysplastic Barrett’s, four with low-grade dysplasia, and seven with HGD. The most recent histology following intervention is shown in Table 1. Median length of Barrett’s esophagus in patients with complete eradication or persistent metaplasia/dysplasia was not significantly different (2 vs. 2.5, p = 0.1860). In 7 patients an esophagectomy was performed for persistent HGD. There was no significant bleeding after ER, and the single perforation was successfully treated with a stent. There has been no cancer recurrence after a median follow-up of 29 months (IQR 11–38).

Table 1. Pathologic Diagnosis of Most Recent Biopsy After ET*

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Nr of Treatments</th>
<th>Histology at Time of Last Biopsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER/ablation</td>
<td>IMC</td>
<td>HGD</td>
</tr>
<tr>
<td>IMC</td>
<td>9</td>
<td>35/12</td>
</tr>
<tr>
<td>HGD</td>
<td>18</td>
<td>26/23</td>
</tr>
<tr>
<td>Others (LGD, IM,...)</td>
<td>17</td>
<td>12/22</td>
</tr>
</tbody>
</table>

IMC (intramucosal cancer), HGD (high-grade dysplasia), LGD (low-grade dysplasia), IM (intestinal metaplasia)

*p,patients with no biopsy since initial ET were excluded

CONCLUSION: ER is an effective technique to stage superficial esophageal lesions and aids selection of patients for esophagectomy or esophageal preservation. HGD and IMC can be successfully treated in selected patients with ER and/or ablation. Complete elimination of long segments of Barrett’s is difficult, but no patient treated with endoscopic therapy has died from esophageal cancer.

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The Utilization of Endoscopic Circumferential and Focal Ablation of Barrett’s Esophagus in a Surgical Foregut Practice

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BACKGROUND: The optimal management of patients with metaplastic and dysplastic lesions limited to the esophageal mucosa is controversial. BARRX ablation of Barrett’s esophagus is becoming increasingly used for lesions with evidence of dysplasia. The goal of this study was to review the utilization of BARRX ablation in patients being considered for anti-reflux surgery.

METHODS: This is a single center retrospective study analyzing the utilization of BARRX ablation in a busy surgical foregut practice. 20 patients underwent BARRX ablation of the esophagus from Jan 2006 until June 2008. Data collected included indications for procedure, number of ablations required to achieve complete ablation of Barrett’s esophagus, associated anti-reflux surgery performed, and short term follow up results.

RESULTS: Indication for ablation was intramucosal adenocarcinoma in 4 patients, high grade dysplasia in 8 patients, low grade dysplasia in 5 patients and long segment Barrett’s with no dysplasia in 3 patients. 5 patients had an associated nodule for which they underwent EMR prior to BARRX ablation (including the 4 patients with adenocarcinoma). 12/20 patients underwent anti-reflux surgery as a component of the treatment of their disease along with ablation of the Barrett’s esophagus. Of the remaining 8 patients, 5 were not surgical candidates due to medical comorbidities and the remaining 3 patients have anti-reflux surgery planned in the near future. 7 patients have undergone 1 treatment; 5 have undergone 2 ablations; 7 have had three ablations; and 1 patient has undergone 4 ablations. At a mean f/u of 1.2 years, 5 patients have completed therapy requiring a mean of 2.4 ablations (range 1–4) with no evidence of residual Barrett’s esophagus. 8 patients have undergone 3 or more ablations and 6/8 still have evidence of residual Barrett’s esophagus. 9 patients have undergone 1–2 ablation treatments and 7/9 need further treatments for persistent Barrett’s esophagus.

CONCLUSIONS: BARRX ablation of Barrett’s esophagus with evidence of dysplasia is becoming an important adjunct to anti-reflux surgery. Treatment requires multiple ablative attempts as the majority of patients treated with 1 or 2 ablations still have evidence of Barrett’s esophagus. Longer term follow up is needed to determine the benefit of ablation.
The lower thoracic (Lt) esophageal squamous cell carcinoma (ESCC) mainly metastasizes to abdominal lymph nodes. Although abdominal paraaortic lymph node (PAN) metastasis is often seen in patients with Lt ESCC, clinicopathological significance of PAN metastasis remains unknown. The purpose of this study was as follows: 1) to retrospectively analyze the frequency and extent of the lymph node metastasis in patients with Lt ESCC and 2) to clarify the clinicopathological characteristics of PAN (+) patients. A total of 283 patients with Lt ESCC underwent esophagectomy with lymphadenectomy at our hospital between April 1984 and March 2007. Of these 283 patients, 70 patients who underwent abdominal paraaortic lymph node dissection (PAND) (N = 55) or PAN sampling (N = 15) were retrospectively analyzed. Twenty-four patients had pathological PAN metastasis and the remaining 46 did not. Clinicopathological characteristics were compared between patients with PAN (+) and those with PAN (−). As compared with PAN (−) patients, PAN (+) patients had significantly more total number of metastatic nodes (25.2 ± 26.4 vs. 2.9 ± 3.2, p < 0.0001) and more venous invasion (20/24 vs. 26/46, p = 0.036). Overall survival of the PAN (+) patients was significantly poorer than PAN (−) patients (34.8% vs. 73.1% at 1 year, 7.6% vs. 52.7% at 3 years, p < 0.0001). As regard with the recurrence patterns, PAN (+) patients had a significantly higher lymphatic (p < 0.0001) and hematogeneous (p = 0.0278) recurrences. Among the 24 PAN (+) patients, prognostic factor(s) was analyzed from several clinicopathological parameters. Venous invasion (v− vs. v+) and the number of metastatic nodes (7 vs. 8) were found to be prognostic factors. In conclusions, Lt ESCC with PAN (+) are considered to be a systemic disease and thus long term survival cannot be expected by surgical treatment.
Laparoscopic and Open Gastroplasty in Transthoracic Esophagectomy Have Similar Outcomes
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Aim of this prospective study was to compare perioperative and oncologic outcome of patients submitted to open transthoracic esophagectomy (TTE) with either laparoscopic (LG) (Group A) or open mobilization of the stomach (OG) (Group B). Minimally invasive (MI) surgery has acquired increasing role in the treatment of cancer of the esophagus. In our institution LG combined to TTE with extended mediastinal lymphadenectomy, has been our preferred MI approach for cancer of the esophagus. In the period maj-2001 jul-2008, 168 patients (M 133) were included in this study (91 group A–77 to group B). Assignment to either group based on the personal choice of the surgeon. The groups were similar for mean age, BMI, tumor site and histology, and neoadjuvant therapy. In group A there were more female.In group A, there were 6 conversions to open surgery (7,1%) and two intraoperative complications (1 splenic and 1 vascular lesion). In group B there were 7 major intraoperative abdominal complications (5 splenic and 2 vascular lesions). Mean total surgical duration was similar (257 vs. 235 min). Overall morbidity rate was similar. Anastomotic and respiratory complications were similar (p = n.s.). Mortality was 1.2% in Group A and 2.6% in Group B. Late anastomotic complications were similar in the 2 groups (11,7% vs. 10%). In group A two patients had to be reoperated on for a massive hiatal hernia; one patient in group B was reoperated on for bowel obstruction due to adhesion. Three and 5 year actuarial survival rate was similar (58 vs. 47%). The laparoscopic approach for LG during esophagectomy reduces intraoperative major complications. Anastomotic complications are similar. Respiratory morbidity is not influenced by laparoscopic approach. Acute late major complications may be influenced by the surgical approach. Oncologic outcome is unrelated to the MI part of the procedure.

Laparoscopic Adjustable Gastric Banding Resolves Gastroesophageal Reflux Disease
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A relative contraindication to laparoscopic adjustable gastric banding (LAGB) has been gastroesophageal reflex disease (GERD). GERD is a common pre-operative co-morbidity in the morbidly obese patient seeking weight loss surgery. We examined all patients who have had GERD pre-operatively and followed them after LAGB. All patients who have symptoms of GERD underwent helicobacter pylori testing and upper gastrointestinal endoscopy if warranted. Asymptomatic ulcers and patients with h. pylori were treated with medications before initiation of surgery. All patients received a laparoscopic anterolateral fundoplication as part of their LAGB surgery. All hiatal hernias encountered were repaired at the time of surgery.

RESULTS: Out of 128 patients who had pre-operative GERD underwent LAGB surgery without any complications, 126 patients had an immediate resolution of their symptoms. These patients were able to wean off of their pre-operative proton pump inhibitors. Long term results greater than one year revealed that 5 patients developed recurrent symptoms. Three of the 5 patients had recurrent h. pylori infection and two patients had concentric dilatation of the pouch requiring removal of the LAGB device.

CONCLUSION: GERD in the morbidly obese patient can be treated adequately with the LAGB procedure. When long term recurrence of symptoms occur, h. pylori needs to be tested. Concentric dilatation of the proximal pouch has been observed in patients with massive weight loss (greater than 100 lbs.) and a thick fibrous scar has been observed during removal of LAGB suggesting a foreign body reaction.

Sentinel Node Detection in Esophageal and Gastric Cancer by Blue Dye Only
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INTRODUCTION: Sentinel node detection has become an integral part in the lymph node involvement diagnosis of several cancer entities. In esophageal and gastric carcinomas a combination of radionucleotid markers and blue dye detection has been used in the past. It would be much more easy to detect sentinel nodes by blue dye only which is the aim of this study.

PATIENTS AND METHODS: Forty patients with early or locally advanced carcinomas of the esophagus or stomach received a peritumoral injection endoscopically of patent blue during the operation. The visible blue node was harvested seperately and send for pathohistology.

RESULTS: In all 40 cases a blue stained node could be identified. In patients with adenocarcinoma of the esophagus or stomach the staining corresponded to the overall lymph node involvement in all cases of early disease (T1 tumors) and in 65% of the locally advanced tumors. This was in contrast to squamous cell carcinoma of the esophagus where sentinel node detection was possible in only 40% of the cases.

CONCLUSION: Sentinel node detection by blue dye only is feasible and results in a similar accuracy as compared to combined detection (nucleotid and blue dye) reported in the literature. In squamous cell cancer skip metastases seem to be frequent.
Clinical: Hepatic

T1577
Local Ablative Therapies for Hepatocellular Carcinoma: Does Immediate Contrast Enhanced Ultrasonography (CEUS) Predict Complete Necrosis at CT Follow Up?
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BACKGROUND AND OBJECTIVE: The role of CT in follow up of hepatocellular carcinoma (HCC) after local ablative therapy have been demonstrated in many clinical experience, whereas the role of contrast enhanced ultrasonography (CEUS) is still under evaluation. The aim of this study is to evaluate the role of immediate CEUS in prediction 30-days CT follow up after single local ablative therapy with radiofrequency ablation (RFA) or percutaneous ethanol injection (PEI).

METHODS: 100 consecutive patients with HCC treated 2006 to 2007 were prospectively included into the study. All the patients were treated with single session of PEI or RFA. After each single percutaneous procedure CEUS was performed in order to identify residual disease (persistence of contrast enhanced pattern). Three different CEUS patterns were identified: 1-isovascular-hypervascular pattern, 2-ipovascular pattern, 3-avascular pattern. After 30 days complete necrosis of HCC was evaluated with contrast-enhanced CT scan in all cases.

RESULTS: Patients included into the study were submitted to RFA (43 patients) or PEI (57 patients) for HCCs with a mean diameter of 2.7 cm (range 1.5–5 cm). After RFA, isovascular pattern was found in 2% (1/43) of patients resulting in incomplete necrosis at CT; ipovascular pattern was found in 12% (5/43) patients that resulted in incomplete necrosis in 3/5 (60%); in 86% (37/43) avascular pattern was found with complete necrosis at CT in 28/37 (76%) cases. Among the PEI group, isovascular pattern was found in 5% (3/57) of patients case resulting incomplete necrosis in 1/3 (33%) case; ipovascular pattern was found in 44% (25/57) of patients that resulted CT incomplete necrosis in 17/25(68%); in 19% (11/57) of patients avascular pattern was found with complete necrosis at CT in 2/11 (18%) cases. Sensitivity, specificity, positive and negative predictive values for complete necrosis at CT of the CEUS avascular pattern after RFA were 93%, 31%, 76% and 67%, respectively, while the positive predictive value after PEI treatments was 18%.

CONCLUSIONS: Immediate CEUS control after percutaneous treatment of HCC have high predictive value after RFA where the avascular pattern is highly related with complete necrosis at 30 day CT. On the contrary predictive value of immediate CEUS after PEI is limited

T1579
Bile Duct Hamartomas: Results of Surgical Treatment on Symptomatic Patients
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INTRODUCTION: Bile duct hamartomas (BDH) are benign liver lesions that have been attributed to malformations of the bile duct plate, leading to focal areas of hepatic tissue containing multiple, malformed and dilated bile ducts which are set in the background of fibrous stroma. BDH are considered a spectrum of fibropolycystic liver disease, which includes congenital hepatic fibrosis, autosomal dominant polycystic disease, and Caroli disease.

METHODS: We reviewed all patients who had an MRI suggestive of BDH located in the last 2 years (2007–2008); for inclusion in the study, patients needed confirmatory histologic evidence of this diagnosis. Every patient was offered an operation based on symptoms; unresected patients were excluded. Patients with florid Polycystic disease of the liver were also excluded. Whenever feasible, the laparoscopic approach (fenestration) was preferred; however, segmental resections were done to avoid recurrence of the BDH. Follow-up was achieved through clinic outpatient visit.

RESULTS: Twenty patients met the inclusion criteria (M:F 15:5). Average age was 61.3 yr (SD 12.5). Symptoms prompting the operation were abdominal pain (n = 18), jaundice (n = 1), hepatic abscess (n = 1); the last 2 complications were related to previous interventional manipulation of the cyst. 7 patients had history and histologic evidence of previous bleeding (presently or immediately past). 8 patients received a laparoscopic approach, 4 were started laparoscopically and converted to open (3 for hemostasis, 1 for bile duct exploration) and 8 received an open approach due to the complexity of the cyst, its location or the complication related to it (jaundice, infection). LOS was 2.4 d (SD 1.8) for the laparoscopic approach, 4 d (SD 1) for the conversion and 9.2 d (SD 4.6) for the open procedures. Complications included wound infection, biloma, intraoperative hypotension, renal failure, abdominal abscess (1 each one), all patients with open approaches. Of 18 patients available for follow-up (the other 2 have less than 4 wk FUP), all patients resolved the symptom that prompted the operation. Postoperative imaging ruled out recurrence of the BDH.

CONCLUSIONS: BDH are benign conditions occurring in the liver that respond very well to operative treatment. Whenever possible, laparoscopic fenestration and/or resection are the preferable choice. Intensive interventional manipulation of the cyst results in complications, both for the approach and postoperative period.
INTRODUCTION: Resection of colorectal hepatic metastasis (CHM) is the gold standard, but its timing is controversial; particularly for synchronous disease. Simultaneous resection of CHM can add time and morbidity to lary colorectal procedure. MONOPOLAR radiofrequency ablation (RFA) is lengthy and cumbersome. Staged hepatic resection following systemic chemotherapy has been associated with chemotherapy associated steatohepatitis (CASH). In this feasibility study, a strategy of simultaneous laparoscopic colectomy (LAP/COL), laparoscopic BIPOLAR RFA followed by 4 cycles chemotherapy prior to staged CHM resection was evaluated.

METHODS: Using a prospectively maintained hepatobiliary database, patients undergoing the above regimen were identified. Duration of LAP. COL-RFA procedure, RFA-procedure added time, liver treatment associated morbidity (LTAM) and treatment interval disease progression (TIDP) were assessed. Pathological evaluation of the resected liver specimens was reviewed for viable tumor in previously ablated areas and CASH.

RESULTS: Eight synchronous CHM were ablated at same setting LAP/COL in five high risk patients [age >65, ASA 3, rectal cancer (n = 4)]. Mean RFA time/lesion was 7 min. ± 3. Thus far, 3/8 patients have completed treatment algorithm inclusive of staged CHM resection without evidence of TIDP. There was no LTAM identified after ablation (n = 5) or after staged resection (n = 3). Pathologically, no evidence of CASH was identified in the resected specimens, and there was NO active tumor in previously ablated areas.

CONCLUSION: This feasibility study supports the above strategy as a bridge to resection in high risk patients; with minimal impact on the length of procedure and without TIDP or LTAM. These observations support proceeding to a formal study with the intent to evaluate impact of diminished/abolished hepatic tumor load treated by initial ablation on the duration of subsequent systemic therapy, the potential impact on the duration of post-resection chemotherapy and evaluating post therapy sustained response.

T1581
Adult Mesenchymal Hamartoma of the Liver: A Rare Tumor with Malignant Potential?
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INTRODUCTION: Mesenchymal hamartoma of the liver (MHL) is an uncommon, benign lesion occurring primarily in the pediatric population. While the exact pathogenesis of the tumor is not certain, the most common theory relates to aberrant primitive mesenchyme development of the portal tract likely pertaining to the bile ducts. As rare as MHL is in children, there have only been 30 adult cases reported in the literature. Recent cytogenetic studies have shown that genetic rearrangements at chromosome 19q13.4 are linked to the development of hamartomatous tissue, as well as potentially linking MHL to malignant undifferentiated embryonal sarcoma (UES).

METHODS: A 53-year-old white female was evaluated for a liver mass that was found incidentally during an evaluation for ureteral stones. Initial CT scan showed a cystic lesion in the right lobe of the liver and a laboratory evaluation was unremarkable. Follow up imaging revealed an increase in the size of the mass with changes in its characteristic—solid and cystic components. Percutaneous biopsy was nondiagnostic. In view of the recent change of the lesion and a nondiagnostic biopsy, the decision was made to extirpate the lesion.

RESULTS: The patient underwent a right trisegmentectomy and cholecystectomy. The pathological report was a 9 cm × 9 cm × 7.5 cm, well-circumscribed, pink-yellow-tan, gelatinous mass, with a 1 cm clear surgical margin. The mass was cystic in the central portion and contained 30 mL of clear, yellowish fluid. Histologically, the mass consisted of rare benign dilated bile ducts corresponding to the cystic areas noted grossly, as well as myxoid stroma with spindle cells showing smooth muscle differentiation confirmed by positive staining for vimentin, smooth muscle actin and desmin. CD34 and hormone receptor studies were negative, thus excluding solitary fibrous tumor and angiomyxoma. The patient's hospital course was uneventful and was discharged home on postoperative day five.

CONCLUSION: MHL of the liver in adults is a rare and potentially premalignant lesion that presents as a solid/cystic neoplasm. Symptoms are typically nonspecific, though abdominal pain predominates. Laboratory results are non-contributory and radiographic imaging is variable and inconclusive. Needle biopsy is rarely diagnostic and surgical excision of symptomatic or enlarging lesions is recommended to exclude the possibility of malignancy and establish a further diagnosis. The emerging literature supports a relationship between MHL and UES in regards to cytogenetic analysis, as well as histological similarities supporting a recommendation of aggressive surgical management when feasible.
Clinical: Pancreas

T1582

Pancreatic Neuroendocrine Tumors: Direct Comparison of EUS FNA to Helical CT for Tumor Detection and Impact on Patient Care
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BACKGROUND: Currently, the role of EUS FNA in pancreatic neuroendocrine tumors (pNETs) is primarily for tumor detection and tissue diagnosis. However, few data exist regarding the comparative features of CT to EUS FNA.

AIMS: In patients undergoing evaluation of a suspected pNET, to compare EUS FNA to pancreatic protocol CT in terms of: 1) tumor detection, and 2) disease extent as it potentially impacts the surgical approach and extent of resection.

METHODS: From a prospectively maintained EUS database, all patients undergoing pNET staging FNA from 01/01/99 to 10/01/08 were identified. Clinical, radiologic, EUS, cytologic, and surgical data were abstracted and analyzed.

RESULTS: EUS FNA was performed to confirm and stage 108 patients (56.8 ± 13.9 years, 52.8% female) with suspected pNETs, n = 96 (88.9%) of which had a CT within 30 days of the EUS exam. CT identified a pNET in only 47 (49%) patients. In the remaining patients, CT was interpreted as normal in 15 (15.6%), inconclusive in 14 (14.6%), non-specific pancreatic cystic disease in 11 (11.5%), and misinterpreted the findings as adenocarcinoma in 9 (9.4%) patients, respectively. EUS more often identified multiple lesions, (p = 0.008) and EUS and CT findings were similar in terms of lesion size, the presence of a cystic component and in the determination of locally advanced or metastatic disease. EUS detected multiple lesions in 19/108 (17.6%) patients among whom CT detected only one lesion. Among this group, the additional lesion(s) identified by EUS were located remote from the lesions, thereby potentially altering the surgical approach and extent of resection.

CONCLUSION: Our data suggest helical CT identifies fewer than 50% of patients who have a pNET that is detected with EUS and confirmed with FNA. A subgroup of patients may be misdiagnosed by CT as having a ductal carcinoma. Additionally, the findings of EUS FNA may alter the clinical care of approximately 25% of patients through the identification of otherwise undetected lesions by CT and/or through the visualization of multiple remote lesions, thereby potentially altering the surgical approach or extent of resection.

T1583

A Matched Case-Control Study of Preoperative Biliary Drainage (PDB) in Patients with Pancreatic Adenocarcinoma: Routine PBD Is Not Justified
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INTRODUCTION: Previous studies of PBD in patients with pancreatic malignancy and jaundice suggest an increase in perioperative complications. Due to the conflicting results of prior studies, PBD remains controversial.

METHODS: Patients who underwent pancreaticoduodenectomy (n = 340) without neoadjuvant therapy or prior biliary bypass for pancreatic adenocarcinoma between 2000 and 2005 were included. Perioperative complication data were obtained from a prospectively maintained database. To perform a matched case-control analysis, 94 PBD and 94 non-stented (no PBD) patients were matched for age, gender, preoperative albumin, and bilirubin levels (PBD group: pre-stent bilirubin; no PBD group: preoperative bilirubin).

RESULTS: Overall, PBD was performed in 201 patients (60%), 178 patients (89%) had internal drainage and the remaining internal/external stents. Indications for stenting were obstructive jaundice (96%) and cholangitis (3%). Stent-related complications including pancreatitis, duodenal perforation, and cholangitis or blockage requiring stent revision occurred in 47 patients (23% of PBD group). Median time from PBD to resection was 27 days (range 4–157). After matching, there was no statistically significant
difference in operative time, perioperative blood loss or transfusions, postoperative INR, or hospital stay. Intraoperative bile cultures were positive in 83% of PBD patients vs. 79% no PBD (p = 0.001). The postoperative morbidity rate was 44.1% and the mortality rate, 3%. There was a significant increase in infectious complications in the PBD group (23.4%) vs. no PBD (9.6%, p = 0.009). Intraabdominal abscess occurred in 12% of PBD patients compared to 2% of no PBD (p = 0.01). Wound infections occurred in 21% of the PBD group vs. 7% of no PBD (p = 0.007). There was no difference in the number of anastomotic leaks or fistulas (p = 0.53).

CONCLUSIONS: PBD does not improve outcome, is associated with a stent-related complication rate of 23%, and resulted in a two-fold increase in post-pancreatectomy infectious complications. The routine use of PBD is not justified.

T1584

Chronic Obstructive Pancreatitis Associated with Serous Cystic Tumors of the Pancreas: A New Issue to Be Explored
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Serous cystic tumors (SCTs) of the pancreas are benign lesions often incidentally diagnosed (1,2). Their association with chronic obstructive pancreatitis (COP) has not been investigated so far, and it is unclear whether this aspect may be relevant for their management. In the present study we evaluated the prevalence of COP in patients resected for SCTs and its association with tumor size, postoperative complications and long-term pancreatic exocrine/endocrine function. Specimens of pancreatic resection margins from 65 consecutive patients were analyzed by an experienced pathologist. COP was classified in 4 stages (focal, mild, moderate and severe) according to the degree of fibrosis, atrophy and main pancreatic duct diameter. Clinical data were retrieved from our electronic database. Furthermore, quality of life (EORTC QLQ-C30), exocrine and endocrine pancreatic function were evaluated. COP was found in 11 out of 65 (17%) patients resected for SCTs and classified as focal in 2 cases (18.2%), mild in 2 (18.2%), moderate in 3 (22.3%) and severe in 4 cases (36.3%). It was mainly associated with lesions located in the head (8 [72.7%] vs. 3 lesions [27.3%] in the body/tail). Median age was significantly higher in patients with COP (59 yrs vs. 49 years, p = 0.05). Also, tumor size was significantly greater in COP group (median diameter 5.1 cm vs. 3.7 cm, p = 0.026). No significant difference in main pancreatic duct diameter was found. There were no postoperative deaths. The rate of postoperative complications, and in particular of pancreatic fistula, was not significantly different in the two groups. Median follow-up was 55 months (range 14–187). There were no differences in terms of quality of life. However, the rate of both exocrine and endocrine insufficiency was significantly higher in patients with COP (steatorrhea 20% versus 11.1%, p = 0.05; postoperative diabetes 10% versus 4.6%, p = 0.02). SCTs of the pancreas are frequently associated with COP, especially when maximum tumor diameter is >5 cm. Once signs of COP have developed, long-term impairment of exocrine and endocrine functions following pancreatic surgery is significantly higher. Accordingly, direct/indirect evidence of COP at presentation or during follow-up may represent an additional parameter for recommending surgical resection.

REFERENCES:

T1585

Morbidity and Mortality After Pancreatic Head Resections: Experience of a High-Volume Pancreatic Surgeon in a Non-Academic Community Hospital Setting
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Hospital volume and surgeon’s case load have been intensively discussed as predictors for perioperative mortality after pancreatic resection. Few data are known regarding perioperative data of a single surgeon in two different hospital settings. We, therefore, analyzed data after pancreatic head resections (PHR) performed by a high-volume pancreatic surgeon in a high volume university hospital and in a community hospital with low prior experience with pancreatic resections.

METHODS: The perioperative outcome data after PHR performed by a single surgeon were evaluated. In 11/2006 this surgeon changed from a University department specialized in pancreatic surgery (DeptA; personal caseload for pancreatic resections 11/2006 > 300 PHR) to a community hospital with almost no institutional experience with pancreatic resections (DeptB) and initiated a new pancreatic surgery program. In DeptB 58 elective PHR were then performed from 11/2006 to 10/2008. We compared the perioperative outcomes of those 58 patients with the outcome of the last 58 patients undergoing PHR by this surgeon in DeptA. The same surgical and perioperative techniques were applied in both series (anastomosis, abdominal drains, no octreotide prophylaxis, early enteral feeding, retrocolic pylorojjunostomy in PPPD). The data of both series were prospectively recorded in (identical) SPSS-databases.

RESULTS: The median age of the patients was lower in DeptA (63 years vs. 68 years in DeptB; p < 0.01). Indications for PHR were (DeptA/DeptB) pancreatic or peripancreatic
cancer (64%/62%), chronic pancreatitis (26%/19%) and various others (10%/19%). Types of surgery performed were a PPPD in 72%/74%, classical Whipple in 9%/9%, duodenum-preserving PHR in 14%/10% and total pancra-
etectomy in 5%/7%. Superior mesenteric-portal vein resec-
tions were performed in 19%/17% of the cases (in 27%/26% of malignancy as indication). Median duration of sur-
gery was comparable (415 vs. 390 mins; n.s.). Mortality rate was 1/58 (1.7%) in DeptA and 2/58 (3.4%) in DeptB (n.s.). Complication rates were (DeptA/DeptB): 48%/38% (any complication), 22%/24% (surgical complication) and 7%/12% (pancreatic leak grade B or C), all not significantly different. Reoperation rate was 7%/10% in each series.

CONCLUSIONS: Ensuring a sufficient caseload an experi-
cenced pancreatic surgeon can establish a new program in a hospital with low prior experience in PHR without increasing morbidity and mortality. The results could be achieved despite acceptance of locally advanced tumors (i.e., rate of vein resection) and elderly patients for resection.

T1586
Tumor Grading Strongly Influences Prognosis After Pancreatectoduodenectomy for Periampullary (Non-Pancreatic) Cancer
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In contrast to the more frequent cancers of the pancreatic head prognostic factors after resection of non-pancreatic periampullary cancers are less well established. In pancreatic cancer lymphatic involvement (evaluation of nodal disease per se, lymph node-ratio, number of examined nodes or microinvolvement) is a strong prognostic factor. We, therefore, evaluated the outcome after resection of more than 100 periampullary cancers with analyses of different parameters defining lymphatic spread.

METHODS: We could analyze the outcome of 106 patients who underwent pancreatectoduodenectomy for ampullary (51%), distal bile duct (37%) or duodenal cancer (12%). Median age at time of surgery was 66 years (63% male). Evaluation was performed by retrospective analysis of our prospective pancreatic database. Survival analyses were done by the Kaplan-Meier- and by the Cox-regressions-methods.

RESULTS: In the 106 patients free resection margins were achieved in 81%. Tumor grading was G1/2 in 62% and G3/4 in 38%. Sixty-one percent of the tumors were node-positive. The median number of examined lymph nodes was 17 (range 4-44), the median number of involved nodes one (0-14). The median lymph node-ratio was 0.07 (0-0.83). Actuarial five-year survival (5-ySurv) of the entire group was 31% and almost identical in the three tumor entities (p = 0.89). By univariate analysis positive nodes (5-ySurv 19% vs. 45% in node negative patients; p < 0.03), a positive margin (5-ySurv 13% vs. 37% with negative margins; p < 0.01) and poor grading (5-ySurv in G3/4 10% vs. 41% in G1/2; p < 0.001) were identified as negative prognostic factors. The lymph node-ratio (after classification into groups with cut-off of 0.1 or 0.2) showed the same univariate influence as nodal disease alone. The number of examined nodes, gender and age did not influence survival. In multi-
variate survival analysis, however, only poor tumor grading was an independent prognostic factor (p < 0.001; relative risk 2.5). Compared to patients with G1- or G2-grading patients with poor tumor grading had a significantly higher rate of nodal disease, a higher lymph node-ratio and a higher frequency of positive margins (31% vs. 10% in G1/2 tumors; p < 0.01) although median tumor diame-
ters were not different (22 vs. 20 mm).

CONCLUSIONS: Prognosis after resection of non-pancreatic periampullary cancers is better than in pancreatic cancer. Prognosis is strongly influenced by tumor grading and therefore tumor biology which also correlates with further parameters like nodal disease and resection margins. Tumor grading, therefore, should be considered in further therapy studies in patients with periampullary cancers.

T1587
Does the Mechanism of Lymph Node Invasion Affect Survival in Patients with Pancreatic Cancer?
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BACKGROUND: Lymph node (LN) metastasis is a significant prognostic factor in patients with pancreatic ductal adeno-
carcinoma (PDAC). However, little is known about the signif-
icance of direct LN invasion by the tumor

AIM: Our aim is to investigate whether direct LN invasion has the same prognostic significance as regional LN involvement

METHODS: Retrospective review of clinicopathologic data of patients with PDAC between 1/1993 and 7/2008. “Direct” is defined as LNs involved through direct extension of the tumor and “regional” as all other LNs in the resected specimen

RESULTS: Overall 533 patients were resected for PDAC of whom 173 had 0 + LNs, 91 had 1 + LN (direct: 25, regional: 66), 79 had 2 + LNs (direct: 6, regional: 68, both patterns: 5) and 190 had >2 + LNs. The sex and age distribution of patients with directly invaded LNs, +regional LNs and –LNs were similar (females: 58%, 46% and 52% (p = 0.3), age: 67 yrs, 67 yrs and 68 yrs (p = 0.9) respectively). Negative LN disease was a significant predictor of survival (N0: 28 mo, N1: 18 mo; p = 0.003). Overall survival of patients with directly invaded LNs was not significa-
tantly different from patients with +regional LNs (direct: 15 mo, regional: 22 mo; p = 0.6 for patients with 1 +LN and direct: 18 mo, regional: 12 mo; p = 0.5 for patients with 2 + LNs). Patients with 1 + LN had better survival relative to patients with 2 + LNs and patients with >2 + LNs (21.4 mo, 13.9 mo and 13.4 mo respectively; p = 0.001)
CONCLUSIONS: For patients with PDAC node positivity is a significant predictor of overall survival. Node positivity rather than the mechanism of node involvement is significant. Prognosis is worse when more than one LN is involved.

T1588
National Complication Rates After Pancreatectomy: Beyond Mere Mortality
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INTRODUCTION: National studies on in-hospital pancreatic outcomes have focused on mortality. Non-fatal morbidity might affect a substantially greater proportion of patients.

METHODS: The Nationwide Inpatient Sample 1998–2006 was queried for discharges after pancreatectomy. Rates of major complications, defined as myocardial infarction, aspiration pneumonia, pulmonary compromise, procedure-related perforation or laceration, infection (other than wound/pneumonia), DVT/PE, gastrointestinal hemorrhage, or reopening of laparotomy, were assessed. Age, sex, Charlson score, hospital procedure volume, indication for operation, and procedure type were evaluated for association with complication(s) using logistic regression. The independent effect of complications on in-hospital mortality, prolonged length of stay, and discharge disposition was also assessed.

RESULTS: Of 102,417 patient-discharges, 22.7% experienced a complication. Complication rates did not decline significantly over time, while mortality rates did (p < 0.0001). On crude analysis, hospital resection volume was inversely correlated with complication rate and in-hospital death (p < 0.0001). On multivariable analysis, predictors of complications included age ≥75 (referent, 19–39; adjusted odds ratio [OR] 1.3, 95% confidence interval [CI] 1.2–1.5, p < 0.0001), Charlson of 4–7 (vs. 0–1; OR 1.3, 95% CI 1.1–1.6, p = 0.0006), total pancreatectomy (vs proximal, OR 1.3, 95% CI 1.1–1.5, p = 0.0025), and low hospital volume (vs. high, OR 1.6, 95% CI 1.4–1.8, p < 0.0001) or medium (OR 1.4, 95% CI 1.2–1.5, p < 0.0001). Complications were also a significant independent predictor of death (OR 7.8, 95% CI 6.7–8.8, p < 0.0001), LOS (OR 6.9, 95% CI 6.2–7.7, p < 0.0001), and discharge to another facility (OR 0.28, 95% CI 0.26–0.31, p < 0.0001).

CONCLUSIONS: Despite improvements in in-hospital mortality, major complication rates remain largely unchanged and represent a significant burden. Complications strongly predict in-hospital mortality, LOS, and delayed return to home. The impact on health care costs, quality of life, and long-term survival deserves further study.

T1589
Optimal Technical Management of Stump Closure Following Distal Pancreatectomy: A Retrospective Review of 214 Cases
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BACKGROUND: Pancreatic fistula is a major source of morbidity following distal pancreatectomy. The risk factors for pancreatic fistula are poorly recognized, and the optimal method of stump closure is still controversial. Our aim is to identify risk factors related to pancreatic fistula and to determine the impact of the technique of transection and stump closure on the formation of pancreatic fistula.

METHODS: An IRB approved retrospective review of 214 consecutive patients who underwent distal pancreatectomy at a single institution from January 1996 to July 2008 was performed. Perioperative and postoperative data were collected and analyzed with particular attention to pancreatic fistula as defined by the International Study Group of Pancreatic Fistula guidelines.
RESULTS: The average age was 59 years old; there were more females than males (n = 124 vs. n = 90). Distal pancreatectomy with splenectomy was performed in 89%. Laparoscopic resection was completed in 13 patients (7%). Pancreatic fistula developed in 30 patients (14%); fistulas were classified as Grade A in 13 patients (45%), Grade B in 15 (52%), and Grade C in 2 patients (7%). The pancreas was transected via stapler in 138 patients, cautery in 68 patients and scalpel in 3 patients (n/a in 5 patients). Of the 138 patients who were transected with stapler, the pancreatic stump was oversewn in 90 patients and not sewn in 47 patients. Pancreatic fistula developed in 11.1% of those remnants which were stapled and oversewn and 12.5% that were stapled alone. Of the 67 pancreatic remnants that were transected with cautery and oversewn, a fistula developed in 4.5% of patients of these patients (p = 0.02 compared to stapled and oversewn). In the laparoscopic group (n = 13), there was a 38.5% fistula rate. Median length of stay was significantly increased in patients who developed pancreatic fistula compared to those that did not (8.5 days vs. 6 days, p = 0.04).

CONCLUSION: The method of transection and management of the pancreatic remnant play a critical role in the formation of pancreatic fistula following distal pancreatectomy. This series suggests that transection using electrocautery followed by oversewing of the pancreatic remnant minimizes the formation of pancreatic fistula. The fistula rate for laparoscopic distal pancreatectomy remains high; this will need to be improved as this technique becomes more prevalent.

T1590
Isolated Peripancreatic Necrosis: Are Outcomes Different?
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BACKGROUND: Necrotizing pancreatitis (NP) can involve the pancreatic parenchyma and/or the surrounding peripancreatic tissues. Parenchymal injury often results in pancreatic duct leak resulting in amylase-rich fluid collections, pseudocysts, and pancreatic fistula. Isolated peripancreatic necrosis involves the retroperitoneal and mesenteric fat without pancreatic ductal involvement. Operative débridement and drainage can be complicated by the need to externally control a pancreatic duct leak or fistula. These patients have prolonged hospital stays and often require multiple re-interventions. We hypothesized that patients with isolated peripancreatic necrosis (PERI) have improved outcomes compared to patients with pancreatic parenchymal necrosis (PANC) following operative débridement.

METHODS: Records of patients with NP based on contrast-enhance dual phase helical CT treated at our institution between January 2004 and December 2007 were reviewed retrospectively. Of 215 patients with NP, 138 (64%) required operative débridement. Preoperative CT scans were reviewed to classify the necrosis as isolated to peripancreatic tissues (PERI) or involving the pancreatic parenchyma (PANC). Outcome variables examined included demographics, perioperative morbidity (organ failure, infectious complications, pancreatic and GI fistula), length of hospital stay, need for reoperation, and subsequent re-admissions. Data are expressed as Means + S.E.M. Data were analyzed with Student t-test or Chi square test. P value of less than 0.05 was considered statistically significant.

RESULTS: Fifty-two patients (38%) had PERI and 86 patients (62%) had PANC. The groups did not differ in age, gender, etiology of pancreatitis, or time to initial debridement. Preoperative in-hospital mortality was similar (5.8% PERI vs. 4.7% PANC). Patient with PERI had a lower pancreatic fistula rate after initial debridement (36.5% PERI vs. 50% PANC). Other outcome variables are shown in the table.

<table>
<thead>
<tr>
<th></th>
<th>Initial Loss</th>
<th>Readmissions</th>
<th>Reoperations</th>
<th>Total LOS</th>
<th>Morbidity</th>
</tr>
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<tbody>
<tr>
<td>PERI</td>
<td>23.4 ± 1.9</td>
<td>1.3 ± 0.2</td>
<td>0.09 ± 0.02</td>
<td>28.2 ± 3.1</td>
<td>77</td>
</tr>
<tr>
<td>PANC</td>
<td>24.0 ± 2.4</td>
<td>2.2 ± 0.2</td>
<td>0.58 ± 0.17</td>
<td>45.0 ± 3.7</td>
<td>90</td>
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*p < 0.05 vs. PERI

CONCLUSIONS: These data suggest that patients with peripancreatic necrosis have less complicated postoperative courses and lower perioperative morbidity rates than patients with pancreatic parenchymal necrosis. Patients with isolated peripancreatic necrosis also have fewer readmissions and subsequent reoperations. We conclude that patients with isolated peripancreatic necrosis have a better overall prognosis than those with pancreatic parenchymal necrosis.

T1591
Duct-to-Mucosa Pancreaticogastrostomy with Internal Stent Following Pancreatoduodenectomy Is a Safe Anastomosis: Diagnosed by the International Study Group Pancreatic Fistula (ISGPF) Definition
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BACKGROUND AND OBJECTIVES: Postoperative pancreatic fistula following pancreatoduodenectomy is relatively common, and remains a major cause of severe complication and surgical mortality. The aim of this study was to evaluate the results of two-layered duct to mucosa pancreaticogastrostomy with internal stent as a method for restoring pancreaticoenteric continuity.

METHODS: From Dec. 2003 to Oct. 2008, prospectively collected data from 100 consecutive patients who underwent pancreatoduodenectomy were evaluated. Postoperative pancreatic fistula was assessed using the criteria of International Study Group Pancreatic Fistula (ISGPF).

RESULTS: Median drain amylase on day 1 after surgery was 611 IU/L, on day 2 it was 255 IU/L, on day 3 it was 80 IU/L, and on day 5 it was 27 IU/L. Of 100 patients, 13 developed pancreatic fistula; grade A in 11 patients, grade B
in 1, and grade C in 1. One re-do operations, but no post-operative percutaneous drainage, and no surgical mortality occurred. By univariate analysis, texture of the remnant pancreas was found to be significantly associated with ISGPF. However, all grade A pancreatic fistula occurred in the patient with soft remnant pancreas and the incidence of clinically significant PF (grade B, C) was 2% (one in soft and one in hard remnant pancreas), there was no significant clinical factor associated with clinically significant pancreatic fistula (ISGPF grade B, C).

CONCLUSIONS: Two layered duct to mucosa pancreaticogastrostomy with internal stent for restoration of pancreaticoenteric continuity after pancreaticoduodenectomy is associated with a low incidence of clinically significant pancreatic fistula.

T1592
Clinicopathologic Features of Actual 5-Year Survivors After Macroscopic Curative Resection for Invasive Ductal Carcinoma of the Pancreas
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BACKGROUND: Surgical resection for invasive ductal carcinoma of the pancreas is the only chance of cure, although the long-term prognosis might be poor with very few 5-year survivors. The current study aims to clarify the clinicopathologic features of actual 5-year survivors after macroscopic curative resection for invasive ductal carcinoma of the pancreas.

METHODS: Between January 1990 and December 2003, 242 patients, who underwent macroscopic curative pancreatectomy for invasive ductal carcinoma of the pancreas and have been observed for more than 5 years from the time of resection, were enrolled in this study. All patients were histologically confirmed as a common type of pancreatic ductal adenocarcinoma. Invasive carcinoma originating in an intraductal papillary-mucinous tumor was included, because it has been classified as a subtype of invasive ductal carcinoma and clinically treated as the same entity. Data of patients who survived more than 5 years were analyzed retrospectively, and compared with those who died within 5 years.

RESULTS: There were 45 5-year survivors (18.6%), including 10 patients (4.1%) who survived greater than ten years. The median age of the patients (25 men and 20 women) was 63 years (range, 27–80 years). The distribution of the tumor stages according to the TNM classification (UICC 6th) was as follows: stage I (n = 4: 22%), II (n = 1: 6%), III (n = 5: 28%), IVA (n = 4: 22%), and IVB (n = 4: 22%). By multivariate analysis, pathological tumor category and lymph node status were the significant factor associated with 5-year survivors, with a hazard ratio (95% confidence interval) of 0.093 (0.016–0.540: p = 0.008) and of 0.218 (0.085–0.561: p = 0.002), respectively. Among the 45 5 year survivors, recurrence occurred in 9 patients (20%) from 0.4 to 5.3 years (median: 3.5 years) after operation. Seven patients died of disease from 5.0 to 7.3 (median: 5.8 years), while two patients are alive without disease 5.2 and 12.6 years after operation, respectively.

CONCLUSIONS: Limited cancer extension with negative lymph node metastases significantly contributes a chance of surviving more than 5 years. However, macroscopic curative resection could provide a possibility of unpredictable long-term survivors even with advanced stage. Five years survival does not always mean a cure of disease, but all of the recurrences occurred within 5.3 years after surgical resection.

T1593
Simultaneous Portal Venous Resection During Pancreatoduodenectomy for Locally Advanced Pancreas Head Cancer
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BACKGROUND: Pancreatoduodenectomy (PD) provides only chance for cure in patients with pancreas head cancer (PHC). However, owing to tumor aggressive nature and its anatomical proximity we often encounter portal venous involvement at the time of diagnosis. It is still not clear how far we can go with surgery, i.e., the clinical impact of simultaneous portal venous resection (PVR) for PHC remains controversial.

METHODS: We reviewed our pancreas database of 108 patients with PHC who underwent PD during 2001–2007. Of 108 patients 62 (57%) underwent PVR. We compared the short and long-term outcome between patients with PVR (Group A) and those without PVR (Group B).
RESULTS: Age, gender and type of procedure (standard or pylorus-preserving PD) were not different between the groups. Tumor factor (T) was more advanced in Group A by JPS classification but not different by UICC classification because of definition. Nodal involvement was not different between the groups (75% vs. 63%). Of 62 patients with PVR 42 (68%) patients had pathologically-proven portal vein involvement. Mortality (30-day and all hospital death) was 2.7% and 6.5% respectively, and notably all mortality were seen in Group A. Morbidity were commonly seen in Group A but not statistically different (47% vs. 39%). Postoperative adjuvant chemotherapy was used in 82% and 83%, respectively. R0 resection was achieved in 65% in Group A and 74% in Group B (NS). Median survival time (MST) was 15.8 months in Group A and 21.5 months in Group B (P = .06). If mortality cases were excluded MST was 18.0 months in Group A (Figure).

CONCLUSION: Simultaneous PVR during PD for patients with PHC provides similar clinical benefit as compared with those patients without having a PVR if surgical mortality is minimal. Further refinement of surgical technique is necessary but further improvement of survival cannot be achieved without more effective adjuvant therapy.

T1594
An Aggressive Approach to Pancreaticoduodenectomy (PD)—Surgeon’s Clinical Suspicion Matters
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BACKGROUND: Despite advances in preoperative imaging and Histopathological techniques, the ability to accurately diagnose periampullary malignancy prior to PD remains a challenge. This paper examines the outcomes ability to accurately define malignancy in patients undergoing PD at a non university tertiary care center (NUTCC).

METHODS: Medical records of 122 patients, who underwent PD by a single surgeon between September 2005 to August 2008 at a high volume NUTCC, were analyzed. An attempt to establish preoperative diagnosis with endoscopy and or endoscopic ultrasound was made in all patients with a final malignant diagnosis. The patients were managed by a multidisciplinary team consisting of a gastroenterologist, surgeon, hepatobiliary fellow, general surgery residents, ICU nursing staff, operating room team, and a surgery floor nursing staff. The records were reviewed with respect to preoperative and postoperative data, thirty-day mortality, morbidity and histopathology data.

RESULTS: Of the total 120 patients who underwent PD for resection of periampullary masses, 63% patients were found to have a diagnosis of periampullary carcinoma on final histopathology. Of these, 9% (7 patients) had a negative preoperative diagnosis for malignancy. All seven of these patients had significant comorbidities with 5 patients (70%) and 2 patients (30%) with ASA Class III and ASA class IV respectively. All seven of these patients were taken for PD based on the clinical suspicion. Diagnosis of periampullary malignancy was confirmed intraoperatively, and on subsequent final histopathology. There was no mortality in any of the patients. Significant morbidity was seen in 2 patients. On final histopathology, all patients had negative margins, and 2 patients were node positive. 6 patients with suspicious preoperative histopathology, who had no evidence of malignancy on final histopathology, underwent PD. There was no mortality in any of these patients. Only one patient had significant comorbidity in the post operative period. The positive predictive value of preoperative histopathology was 0.92 whereas the negative predictive value was 0.84.

CONCLUSIONS: PD is justified even in the presence of a negative preoperative histopathology at a NUTCC, with results that meet reported outcomes and benchmarks. The evaluation of patients with potential periampullary masses requires a dedicated multidisciplinary team and aggressive surgery.

T1595
Cystogastrostomy, Retroperitoneal Drainage and G-J Enteral Alimentation for Complex Pancreatitis-Associated Pseudocyst: 19 Patients with No Recurrence
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INTRODUCTION: Various techniques have been described to achieve resolution without recurrence of complex acute pancreatitis associated pseudocysts (PAC). Many strategies, inclusive of open, minimally invasive and radiological procedures are hampered by high recurrence or failed resolution, particularly for PAC near the pancreatic head. The present series describes a multimodal strategy combining open anterior gastrostomy for the creation of a stapled posterior cystogastrostomy, placement of an 8 french secured silastic tube for intentional formation of a cystogastric fistula tract in combination with gastric drainage and post duodenal enteral alimentation.
MATERIAL AND METHODS: Using a prospectively maintained hepatobiliary database, patients with complex PAC undergoing the above management were identified. PAC location, postoperative length of stay (LOS), time to enteral diet, 3/19 required additional month for complete resolution of the PAC on CT scan and were started on oral diet, 16/19 (84%) of patients showed complete resolution of the PAC on CT scan and were started oral diet. At one month 16/19 (84%) of patients showed complete resolution of the PAC on CT scan and were started oral diet. Median postoperative LOS was 7 days (4–13). At one month 16/19 (84%) of patients showed complete resolution of the PAC on CT scan and were started on oral diet. Median postoperative LOS was 7 days (4–13). One month 16/19 (84%) of patients showed complete resolution of the PAC on CT scan and were started on oral diet. Median postoperative LOS was 7 days (4–13).

RESULTS: Over the interval 2003–2008, 19 patients were managed with the stated strategy. PACs were located at the pancreatic body/tail in 12 patients and 7 patients had PAC at the level of the pancreatic head/neck area. 17/19 had undergone ERCP with decompression stent placement and 13/19 had a failed percutaneous drainage. There was no perioperative mortality after open surgical drainage. All patients started on jejunal tube feeding 24 hrs after surgical procedure. Median postoperative LOS was 7 days (4–13). At one month 16/19 (84%) of patients showed complete resolution of the PAC on CT scan and were started on oral diet, 3/19 required additional month for complete resolution. There were no PAC recurrences in any of these patients demonstrated on follow up.

CONCLUSION: The described strategy is safe, efficient and allows early restoration of enteral feeding with early hospital discharge. High resolution rates and absence of PAC recurrences in this series support this approach for complex PAC.

T1596
Heads or Tails: Is There a Difference in Pancreatic Cancer Location?
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INTRODUCTION: The treatment of pancreatic cancer remains a challenge for oncologists. While malignancies of the body or tail of the pancreas are generally larger than pancreatic head lesions at the time of diagnosis, it is unknown if this location represents a worse prognosis. We hypothesized that pancreatic body or tail cancers have a poorer survival compared to pancreatic head tumors.

METHODS: The Surveillance, Epidemiology, and End Results (SEER) registry was used to compare patients with pancreatic head adenocarcinoma to those with body or tail cancers from 1988 through 2005. Data on patient demographics and overall survival were collected and analyzed using Kaplan-Meier method. A Cox proportional hazards model was used to study the effect of location of lesion adjusted for age at diagnosis, gender, race and year of diagnosis. The Wilcoxon Test was used to test the association between staging and lesion location in patients diagnosed in 2004 and 2005.

RESULTS: 22,293 patients with pancreatic adenocarcinoma were identified. 17096 were pancreatic head lesions with the remaining 5197 in the body or tail. The median overall survival was 6 months for all patients included. The median survival for lesions located in the head was 6 months compared to 4 months for body/tail pancreatic cancer. (p < 0.0001) On multivariate analysis, body/tail lesions, older age, male gender and African-Americans were associated with poorer survival. Surgery was performed on 5374 (34%) pancreatic head lesions and 1059 (20%) body and tail lesions. Overall median survival was 13 and 11 months, respectively with no statistical difference. (p = .4637) For the years 2004 and 2005, the median overall survival for all patients was 8 months. The median survival of head lesions remained statistically different (p = 0.001) from body/tail lesions for the years 2004 and 2005. For years 2004/2005, there was a significant association between stage of disease and lesion location. (p < 0.0001) Approximately 60% of body/tail lesions presented at Stage IV, whereas almost 60% of head lesions presented at Stage II or less.

CONCLUSION: While the overall survival for all pancreatic cancer is dismal, lesions in the body and tail of pancreas have a statistically poorer survival compared to head lesions. Body and tail lesions were also significantly associated with a more advanced stage of disease. With almost 60% of body/tail lesion presenting at Stage IV, pancreatic cancers of the body/tail requires careful selection of those who will benefit from surgical intervention. Neoadjuvant chemotherapy may aid in selecting those patients with favorable tumor biology.
in patients with PA. These patients lacked development of the body and tail segments of the pancreas. A pylorus preserving total pancreatectomy was performed in both cases. Patients were managed postoperatively with intravenous insulin infusion and discharged home on insulin. In the two cases of malrotation, the colon was noted to be on the left side of the abdomen and the small intestine on the right. One patient underwent extrahepatic bile duct resection for hilar cholangiocarcinoma. The second patient was found to have locally advanced PA encasing the superior mesenteric artery and underwent palliative bypass. In both cases, Roux en Y hepaticojejunostomies were performed in a right paracolic position. Mean operative time, blood loss, length of postoperative hospital stay, and complications were not significantly different from patients undergoing standard PD and liver resection. The four patients who underwent resection of their malignancies had negative surgical margins and are currently all alive at a mean followup of 12.4 months.

CONCLUSION: In experienced hands, rarely encountered congenital anatomic abnormalities found in association with HPB malignancy do not preclude safe surgical resection.

Clinical: Small Bowel

T1598

Long-Term Quality of Life in Ileostomy Patients

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INTRODUCTION: Permanent ileostomy is required at times in patients suffering from chronic inflammatory bowel disease or following complications after treatment of colorectal cancer. While a stoma may adversely affect patients’ quality of life (QOL), little is known about the fate of these patients in the long-term. The aim of this study was to characterize long-term QOL in ileostomy patients and identify factors associated with deteriorated QOL.

PATIENTS AND METHODS: 1434 ileostomy patients (40% male) were identified in the database of a German self-help organization for stoma patients (ILCO e.V.). A standardized questionnaire including the Short Form 36 (SF-36), the Cleveland Global Quality of Life Instrument (CGQL), and the Gastrointestinal Quality of Life Index (GIQLI) were mailed to these patients. 783 patients (55%) responded to the survey (age 57 years [24–94 y] (median [range]): 41% male). Subgroup analysis for patients with/without small bowel resection or stoma-related problems was performed. QOL data are expressed as % of maximum score with 100 being best QOL (mean ± SEM).

RESULTS: Median follow-up after diversion was 14 years [1–51 y]. Underlying disease was ulcerative colitis in 344 patients (44%), Crohn’s disease in 300 patients (38%), malignancy in 51 patients (7%), familial adenomatous polyposis in 48 patients (6%), and others in 40 patients (5%). 238 patients (30%) reported to have undergone resection of small intestine which did not have any effect on QOL on the different subscales of the applied QOL instruments. 138 patients reported on daily stoma output which was 1347 ± 71 ml (mean ± SEM) and 80 patients (10%) stated to suffer from short bowel syndrome. 492 patients (63%) indicated a total of 857 stoma-related problems: skin irritation 34%, intermittent blockade of feces 16%, hernia 13%, stenosis 11%, retraction 10%, prolapse 8%, others 8%. Presence of stoma-related problems was associated with deteriorated QOL on all subscales (p < 0.003) except on the subscale social functioning of the SF-36 (problem: 47 ± 1% vs. no problem: 46 ± 1%; p = 0.7) with a mean difference in QOL of 9 ± 1%. The type of ileostomy also affected QOL with end-ileostomy and Kock-Pouch showing a better QOL compared to loop-ileostomy on most subscales.

CONCLUSIONS: While small bowel resection appears not to have any effect on QOL, stoma-related problems which were frequently reported seem to deteriorate QOL substantially. It, therefore, appears of paramount importance to avoid stoma related problems in order to achieve good QOL when permanent ileostomy is necessary.
T1599

The Influence of Subclinical Intestinal Inflammation on the Systemic Inflammatory Status in Crohn’s Disease: A Fire Burning Under Ashes

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INTRODUCTION: Fecal lactoferrin is the direct expression of intestinal inflammation in Crohn’s disease. The aim of this study was to analyze the in vivo intimate correlation between intestinal inflammation and systemic inflammation in patients without clinically active disease.

PATIENTS AND METHODS: 27 patients who had undergone ileo-colic resection for Crohn’s disease were enrolled. A complete check up with an assessment of the Crohn’s disease activity index was performed as well as blood tests and fecal lactoferrin levels assessment and serum cytokine (IL-1beta, IL-6, IL-12, TNFalpha and TGF-beta1) levels were dosed.

RESULTS: After a median follow up of 41 (17–87) months, the patients were in remission: CDAI 71.5 (56.9–112.7). The median level of lactoferrin were 11.53 (3.8–51.0) ug/g. Fecal lactoferrin levels significantly correlated directly with IL-6 (R = 0.431, p = 0.025) and CRP (R = 0.507, p = 0.007). No correlation between lactoferrin and IL-1beta, IL-12, TNFalpha or TGF-beta1 was observed.

CONCLUSIONS: Subclinical intestinal inflammation in CD, expressed by fecal lactoferrin, seems to keep the systemic inflammation burning under the ashes through the IL-6-CRP cascade. The role of IL-1beta, IL-12, TNF-alpha and TGF-beta1 is probably more complex and less directly related to mucosal neutrophil infiltration.

T1600

Ventral Hernias: A Six Year Outcome Analysis from a Rural Teaching Hospital

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BACKGROUND: In the paucity of large studies comparing treatment outcomes for ventral hernias, surgical technique still largely remains a matter of personal preference and expertise. We carried out a large analytical study of current practice in the setting of a large community hospital with the aim to assess treatment strategies and determine factors influencing outcomes.

METHOD: Electronic medical records of all patients who had a ventral hernia repair from January 2001 to October 2006 at our hospital were retrospectively analyzed. The time of follow-up ranged from 7.5 years to 18 months (median of 4.5 years).

RESULTS: A total of 223 ventral hernia repairs were performed during the study period of which 73 (32.7%) were done laparoscopically and 150 (67.3%) were open procedures. Of the 223 procedures, 144 (64.6%) were primary hernias and 79 (35.4%) were recurrent hernias. Significantly more, 32 of 79 (40.5%) patients with a recurrent hernia were found to have a Swiss-cheese defect as opposed to only 33 of 144 (22.9%) who had a primary hernia (chi-squared p = 0.006). A recurrence occurred in 54 of 223 (24.2%) patients. Co-morbid conditions and hernia size did not have a significant association with hernia recurrence. Significantly, a recurrence occurred in only 10 of 73 (13.6%) patients who had a laparoscopic repair compared to 44 of 150 (29.3%) patients who had an open repair (chi-square p = 0.011). A recurrent hernia was noted in 22 of 68 (32.3%) patients in whom repair was carried out without use of a mesh, as compared to 32 of 152 (21.1%) patients in whom a mesh repair was done, however this was not statistically significant (p = 0.072). Post-operative short term complications occurred in 31.4% of patients including recurrences in 11.7%, wound infections in 5.4%, and symptomatic seromas in 4.5% patients.

CONCLUSION: A significantly higher percentage of patients who had a recurrent hernia repair were noted to have a Swiss cheese defect. This finding suggests either an inherent weakness of the abdominal wall predisposing to recurrence or that a defect in the fascia was missed during previous repair. Our recurrence rate was significantly lower after laparoscopic repair as compared to an open repair. This again supports the hypothesis that laparoscopic repair improves visualization and enables wider coverage of the anterior abdominal wall with mesh and hence may result in repair or prevention of additional defects in the abdominal wall musculature. We conclude that even in the setting of a community hospital there seems to be more justification for carrying out laparoscopic repair of ventral hernias in order to reduce recurrence rates.

Clinical: Stomach

T1601

Prognostic Impact of ERCC1 Gene Polymorphisms in Gastric Cancer

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PURPOSE: ERCC1 is a key enzyme of the nucleotide excision and repair (NER) complex to prevent DNA inter- and intrastrand crosslinks. Genetic alterations of ERCC1 gene are involved in the development and progression of gastrointestinal tumors. We analyzed the prognostic impact of ERCC1 gene polymorphisms in gastric cancer.
PATIENTS AND METHODS: There were 112 patients (m:71, f:41) with locally advanced gastric cancer; median age was 66 years (min:31, max:87). All patients underwent standardized gastrectomy with D2 lymphadenectomy. R0 resection rate was 92%; the median number of resected Lymph nodes was 36. For analysis of single nucleotide polymorphisms (SNPs) genomic DNA was extracted from paraffin-embedded tissues. Allelic discrimination was performed by quantitative real-time PCR. Two allele-specific TaqMan probes in competition were used for amplification of ERCC1 (rs11615). Allelic genotyping was correlated with survival.

RESULTS: ERCC1 gene polymorphisms for all patients showed the following expression pattern: ERCC1 polymorphism (rs11615) CC: n = 41 (36.6%), TT: n = 23 (20.5%), CT: n = 48 (42.9%). There was no correlation of ERCC1 gene polymorphisms with pT- and pN-category. 5-year survival rate (5-YSR) for all patients was 46%. Gender specific analysis of ERCC1 polymorphisms identified CC genotype for male patients as a significant predictor of a worse survival. Whereas patients with CT- and TT-genotype had a 5-YSR of 53% and 64% respectively, male patients with CC genotype had a 5-YSR of 18% (p = 0.015).

CONCLUSION: Analysis of ERCC1 gene polymorphisms in gastric cancer reveals for male patients with CC genotypa a significant decline of survival. Whereas the 5-YSR of all patients was 46%, male patients with CC genotype had a 5-YSR of 18% only (p = 0.015). There was no correlation with pT- and pN-category. Single nucleotide polymorphisms of ERCC1 (rs11615) could be applied to further estimate prognosis in male patients with gastric cancer.

T1602
Multi-Center Report of the Use of Polypropylene Mesh for Laparoscopic Adjustable Gastric Banding (LAGB) Allows for Minimum Post-Op Pain, Less Use of Narcotics, and Less Pain During Adjustments
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INTRODUCTION: Outpatient bariatric surgery is a viable option for patients thinking about weight loss surgery. We describe our technique of 2066 patients who have undergone Laparoscopic Adjustable Gastric Banding (LAGB) without using fixation sutures at the port in three different centers. The implantation of polypropylene mesh allows for very little post-op pain and the lack of narcotic use post-operatively. Patients who had LAGB and mesh implantation experienced minimal pain without the need for admission to a hospital inpatient setting.

METHODS: All patients undergoing LAGB underwent implantation of mesh sewn to the posterior aspect of the port device. Polypropylene mesh was placed over the 15 mm trocar site with coverage of the fascial defect. Prolene sutures were used to sew the hernia mesh to the port device. The port was placed in a superficial subcutaneous pocket (n = 1158) or on top of the fascia (n = 908) to allow for easier access of port.

RESULTS: Two patients out of 2066 had a peri-port infection requiring re-siting of port. One port has flipped with the mesh technique. All other patients did not require narcotic pain medications to control post-op pain. Patients tolerated liquid acetaminophen for pain control in the post-op period. Pain scores are zero to 1 out of 10 with the mesh technique, and 4 out of 10 for the fascial suture technique.

CONCLUSION: Implantation of mesh at the port site allows for removal of all post-op pain and the ability to remove all post-op narcotics as reported by three surgeons at different institutions. The use of non-narcotic pain medication decreases nausea and dysphoria after surgery. Patients also had all lap band adjustments under local anesthesia in a clinic setting as the port was easier to palpate in the more stable position. The mesh prevents rotation of the port which has been reported as a common problem with LAGB.

T1603
Long-Term Outcomes of Combined Endoscopic/ Laparoscopic Intragastric Excision of Gastric Stromal Tumors
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BACKGROUND: Treatment of myogenic neoplasms of the stomach consists of surgical resection, the extent of which is controversial given their variable malignant potential. Previous reports on the technique and results of a combined endoscopic/laparoscopic intragastric excision of these tumors showed excellent perioperative recovery and short-term outcomes. We present here our long-term outcomes of this minimally invasive approach.

METHODS: Using a prospective registry of gastric stromal tumor resections, we identified all patients who underwent surgery from 1999–2008. Data collected included patient demographics, presenting symptoms and diagnostic work-up, operative and perioperative course, and long term follow-up.

RESULTS: Sixteen gastric lesions were resected from 15 patients over a ten year period using combined endoscopic/laparoscopic intragastric excision. Mean age was 61.5 years (range 36–85) and seven patients were female. All patients underwent preoperative endoscopy for a variety of symptoms and signs including abdominal pain (n = 4), dyspepsia (n = 5), and anemia (n = 6). Endoscopic ultrasound (EUS) was performed on 11 patients (73.3%) to further evaluate tumor size and depth of involvement. Five lesions were located at the gastroesophageal junction, seven in the proximal body, two at the mid-body/greater curvature, and two at the incisura. Eleven tumors were biopsied endoscopically, all of which were negative for malignancy. A standard endolaparoscopic approach was performed on all patients. Complete submucosal enucleation was achieved on eight (50%) lesions while the remaining required transmural excision. There were no major operative or post-operative complications or deaths. Average length of stay was 4.3 days (range 1–11). Mean tumor size was 3.5 cm (range 1.5–7.0), and all were benign.
on final pathology. Follow-up studies included EGD, EUS, and capsule endoscopy. At a mean follow-up of 32 months (range 0.5–90), there have been no recurrences. Fourteen patients (93.3%) are alive to date, with one death secondary to cardiovascular causes.

CONCLUSIONS: Initial reports describing the combined endoscopic/ laparoscopic intragastric technique showed promising short-term outcomes. This study represents one the largest series of myogenic tumor excision using this combined technique. Our experience indicates that this is a safe and effective approach for small-to-moderate size tumors with excellent long-term oncologic results.

T1604
Laparoscopic Biliopancreatic Diversion with Duodenal Switch for Medically Complicated Obesity: Learning Curve and Perioperative Outcomes in a Single Institution
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BACKGROUND: Laparoscopic biliopancreatic diversion with duodenal switch (LBPD-DS) is an established, effective operation for treatment of obesity, especially in patients with super obesity (BMI > 50). The limits of the procedure are the technical demands and operative time which exceed other bariatric procedures.

AIM: To define the initial experience with LBPD-DS with regard to operative time and perioperative outcome at a single institution.

METHODS: Review of a prospectively collected database for all patients undergoing LBPD-DS from 2004 through 2008. Patients were separated into groups: group 1 included the first 25 patients; group 2 included from patients 26 to 50; group 3 from patients 51 to 75; group 4 from patients 76 to 97.

RESULTS: For the 97 patients, 64 were female (66%) and the mean age was 45.5 years (range, 22–70). Mean preoperative weight was 167 kg (range, 110–311); mean preoperative BMI was 56.7 kg/m(2) (range, 37–83), with 78 (80%) of the patients being super obese (BMI > or = 50 kg/m2). All cases were completed laparoscopically, except for case no. 4, that required conversion to an open procedure due to intraabdominal adhesions. Mean operating room time was 248 minutes (range, 124–546), with a mean of 326 minutes in Group 1, 246 minutes in Group 2, 214 minutes in Group 3 and 199 minutes in Group 4. Mean hospitalization time was 3.4 days (range, 2–17), 4.36 days in Group 1, 3.4 days in Group 2, and 2.9 days in Groups 3 and 4. Mortality occurred in 1 patient (1%), due to a cardiac arrhythmia (patient 19). Perioperative complications occurred in 13 patients (13%). The rate of complications was similar the four groups: it was 16% in groups 1, 2 and 4 and 4% in group 3. However, serious complications were more common in the first cases, including 2 leaks (2%), both of which presented in Group 1 (patient 2 and 19), 1 intraabdominal abscess (1%), prolonged ventilation (1%), acute renal failure (1%), anastomotic ulceration (1%). No complications related to GI bleeding, stomal obstruction, pneumonia, PE or DVT were identified.

CONCLUSION: LBPD-DS is a technically complex procedure, however significant reduction in operative times and complication rates are observed with experience. After an initial 20 procedures, operative times continue to decrease and anastomotic leak rate and mortality were zero.

T1605
Inaccuracy of Endoscopic Anastomotic Measuring Techniques
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INTRODUCTION: One of the major reasons identified for failure to lose weight in gastric bypass surgery is size of the anastomosis at the gastrojejunostomy. There is no standard technique for measurement of this anastomosis by endoscopy. Therefore, many treatment regimens may lead to ineffective intervention. This study was performed to identify the most accurate method to endoscopically measure the lumen diameter at the anastomosis to allow better management of these patients.

METHOD: Subjects were asked to endoscopically measure a ring of known diameter in a standardized plastic model of the esophagus and gastric pouch using 4 commonly used endoscopic measuring techniques and a double channel endoscope. Subjects used visual estimation (VE), instrument reference (IR) to a biopsy forceps, an 18 mm esophageal dilating balloon (DB) as reference, and a 30 mm endoscopic ruler (ER) made from an ERCP guide wire tip. The 5 models (33, 27, 24, 18, and 13 mm) were presented in random order. Data was collected and maintained in a database.

RESULTS: Ten (9 surgeons, 1 gastroentrologist) subjects participated. Endoscopic experience was >1000 scopes for 4 subjects; 250–500 for 3; <100 for 3. The VE was the least accurate with an average diversion (AD) from the actual diameter of 6.25 ± 4.95 mm (24.20%); followed by IR, 3.89 ± 3.05 mm (14.80%); then the ER, 2.4 ± 1.9 mm (9.20%). The DB was the most accurate with AD of 1.46 ± 0.9 mm (7.20%). Of the 200 total measurements, only 8 (4%) were accurate, 142 (71%) underestimated the size, and 50 (25%) overestimated. Underestimation was noted in 82.5% (33/40) of VE and IR measurements; ER had only 60% (24/40) underestimation; DB underestimated only 40% (16/40) of the time. Overestimation was highest using DB 55% (22/40), followed by ER method 45% (14/40), then IR 15% (6/40); and lowest in VE 12.5% (5/40). Measurements of the largest model diameter (33 mm) were underestimated 98% of the time. In the smallest diameter model (13 mm), 16% of the measurements were underestimated; 2% were accurate; and 82% were overestimated.

CONCLUSION: Endoscopic measurement of lumen diameter is very inaccurate. Underestimation is the most likely error in measurement. The larger the diameter the more likely it will be underestimated; and the smaller the diameter the more likely it will be overestimated. Endoscopists should avoid visual estimation and use a standard reference tool (dilating balloon) to measure anastomotic diameter. This will allow more effective intervention for clinical problems related to anastomotic size.
T1606

Trends and Outcomes of Hospitalizations for Peptic Ulcer Disease in the United States, 1993–2006

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OBJECTIVES: Despite progress in diagnosis and treatment, peptic ulcer disease (PUD) remains a common reason for hospitalization. The purpose of this study was to quantify the time trends of hospitalizations for PUD in the United States (U.S.) since 1993.

DATA AND METHODS: The Healthcare Cost and Utilization Project Nationwide Inpatient Sample is a 20% stratified sample of all hospitalizations in the U.S. It was used to study hospitalizations with PUD as the principal diagnosis during 1993–2006, including details on ulcer site, complications, procedures, and mortality. Statistical methods included the chi-square test and multivariate logistic regression.

RESULTS: The national estimate of hospitalizations for PUD decreased significantly from 222,601 in 1993 to 156,108 in 2006 (–29.9%), with a larger reduction in duodenal ulcers (95,552 in 1993 vs. 60,029 in 2006, –37.2%) than gastric ulcers (106,987 in 1993 vs. 86,064 in 2006, –19.6%). The inpatient mortality rate of PUD decreased from 3.8% to 2.7% during 1993–2006 (p < 0.001). Hemorrhage remained the most common complication (71.6% in 1993; 73.3% in 2006) but perforation had the highest mortality (15.1% in 1993; 10.6% in 2006). In comparison to 1993, patients hospitalized for PUD in 2006 had more use of endoscopy to control bleeding (22.2% vs. 12.9%, p < 0.001), similar use of oversewing of ulcer (7.4% vs. 7.6%), less use of gastrectomy (2.1% vs. 4.4%, p < 0.001), and less use of vagotomy (1.7% vs. 5.7%, p < 0.001). In multivariate logistic regressions, the determinants of mortality were similar in 1993 and 2006. Neither weekend admission nor low hospital PUD volume was associated with a higher mortality rate.

CONCLUSIONS: Hospitalizations for PUD have decreased in the U.S. from 1993 to 2006, suggesting a decrease in the prevalence and/or severity of ulcer complications over this recent time period. Over this time span, there has been a significant decrease in PUD mortality, a significant increase in the use of therapeutic endoscopy for bleeding ulcer, and a significant decrease in the use of definitive surgery (vagotomy and/or resection) for ulcer complications. Further research is necessary to determine if these trends are causally related.

T1607

Reduced Surgical Revisions Associated with Placement of Subpectoral Gastric Electrical Stimulator: Six Year Experience at a Single Institution

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BACKGROUND: Gastric electrical stimulation (GES) has become an alternative for patients with gastroparesis that do not respond to medical treatment. Traditionally the GES leads have been placed in the stomach and the neurostimulator placed in a subcutaneous pocket in the abdominal wall. Our experience shows reduced incidence of surgical revision if the neurostimulator is placed in a subpectoral pocket.

METHODS: Retrospective chart review from 2001–2007 of 64 patients that had GES placement, 25 patients in the abdominal wall, 38 subpectoral and one infracavicular. Data collected included need for surgical revision. The implantation procedure was done by open and laparoscopic technique depending on patient and surgeon preference. In both cases the pylorus was identified and the leads were placed into the muscularis of the stomach at 9.5 and 10.5 cm from the pylorus. An upper endoscopy was preformed to ensure that the leads did not transgress the mucosa. The leads were anchored into the stomach, then tunneled either to a pocket in the abdominal wall or subpectoral pocket previously created.

RESULTS: Fourteen surgical revisions of the gastric stimulator were performed in 11 patients (eight abdominal and one infracavicular): two due to lead fracture, eight due to abdominal pain, one due to migration of a lead into the stomach, one due to migration of the stimulator toward the J-tube, one patient that the GES pushed up against the rib cage causing pain and one placed subcutaneous with pain at the site. No revisions were performed in the subpectoral group. The estimation of risk adjusted by sex, age and diabetes showed that abdominal pacer had a greater risk of revisions compared to subpectoral placement with hazard ratio of 7.1 CI 95%:0.86–59.5, p = 0.06.

CONCLUSIONS: This is the first report of placing the GES in the subpectoral position. We believe that 80% (12/14) of our revisions could likely have been prevented with subpectoral placement. Patients with abdominal placement of the device were more likely to have discomfort leading them to manipulate or attempt to shift the device resulting in lead failure and connection break. Abdominal placement was also found to have more pain at the site requiring device revision. Subpectoral placement in our experience may limit the amount of revisions and pain associated with the device. Longer term follow up is needed in this group of patients.
T1608
Incidence and Risk Factors for the Development of Anemia Following Roux-en-Y Gastric Bypass Surgery for Morbid Obesity
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BACKGROUND: Iron deficiency anemia is a common finding in patients who undergo Roux-en-Y gastric bypass (RYGBP) for morbid obesity. This is the result of altered absorption but may also be compounded by occult losses. The present study evaluates risk factors for the development of anemia.

METHODS: A retrospective analysis of patients undergoing Roux-en-Y gastric bypass (RGB) from January 2003 to November 2007 was performed. All patients had a pre-operative body mass index (BMI) > 40 kg/m2. A total of 200 patients were evaluated. All patients were given daily ferrous sulfate tablets supplements two weeks following operation. Hematological and metabolic indices were routinely evaluated following surgery. Patients were followed for a minimum of 80 weeks. Chi Square analysis was utilized to determine statistical significance for categorical data.

RESULTS: There were 38 males and 162 females with an average age of 40.8. 21 patients (11 percent) developed post-operative anemia and 179 patients did not. Anemia was due to iron deficiency in all cases. The groups had similar demographics, surgical procedure and co-morbidities. Menstruating females (p < .02) and those with peptic ulcer disease (p < .01) were risk factors for the development of post-operative anemia.

CONCLUSIONS: Iron deficiency anemia is a frequent problem following bariatric surgery. RGB surgery compounds occult blood loss. Increased ferrous sulfate supplementation may be necessary to prevent iron depletion in populations at increased risk for the development of anemia.

Combined Science

T2078
Chronic Mesenteric Ischemia: Defining the Role of Percutaneous Therapy
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BACKGROUND: Chronic mesenteric ischemia (CMI) is a debilitating gastrointestinal disease process associated with high morbidity and mortality. Percutaneous mesenteric revascularization (percutaneous transluminal angioplasty [PTA] and stenting) has emerged as an alternative treatment option for CMI. The purpose of this study was to evaluate patency rates and outcomes of percutaneous therapy for chronic mesenteric ischemia and define the patient population in whom percutaneous therapy is optimal.

METHODS: A retrospective analysis was performed on the records of all patients who underwent PTA/Stent for symptomatic chronic mesenteric ischemia between January 2002 and September 2008. Indications for percutaneous mesenteric arterial intervention included postprandial abdominal pain, weight loss and mesenteric arterial stenosis >70%. The endpoint of this study was defined as primary patency. Clinical variables, including patient demographics, co-morbidities and intervention details, potentially associated with the endpoint were collected and analyzed using univariate and multivariate measures, with significance assigned as p < 0.05.

RESULTS: Forty-eight mesenteric vessels were treated with PTA/Stent in 40 patients. The mean patient age was 70.4 ± 9.7 years (range 43–87 years) with 65% (n = 26) female and 35% (n = 14) male. Patient co-morbidities included hypertension (90.0%), coronary artery disease (67.5%), hyperlipidemia (65.0%), diabetes mellitus (35.0%) and smoking history (81.6%). Twenty-one percent (n = 10) of the treated vessels required secondary PTA/Stent intervention and 4% (n = 2) underwent tertiary percutaneous intervention. There were two perioperative deaths (5%) and four patients (10%) died during follow-up. Mean follow-up was 517 days (range 15–1211 days). Overall primary patency was 89.1% at 1 year and 76.3% at 2 year follow-up. Younger age was associated with a significant lower patency rate, with patients less than 70 years old (n = 19) having 1 and 2 year patency rates of 81.8% and 63.6% respectively. Older (>70 years) patients had 1 and 2 year patency rates of 100% (p = 0.017).

CONCLUSIONS: Percutaneous mesenteric intervention represents a feasible option for patients with CMI. However, the overall durability of percutaneous therapy is not as good as published open surgical standards. This study found age as the only correlate of patency in percutaneous intervention for CMI. Due to the decreased long term durability of percutaneous mesenteric intervention in patients less than 70, open surgical revascularization should remain the gold standard for CMI in younger patients, which likely represents a lower risk surgical cohort compared to older patients.
has not been evaluated. This study describes the physiologic effects of prolonged visceral followed by intraperitoneal insufflation with room air.

METHODS: Five swines underwent sequential insufflation of the stomach (60 min) and peritoneum (60 min) with room air at a pressure of 15 mmHg. Physiologic parameters were measured at 10 minute intervals and arterial blood gas measurements were taken at 0, 30, and 60 minutes during each insufflation period. Outcome variables included: heart rate (HR), mean arterial pressure (MAP), stroke volume (SV), cardiac output (CO), systemic vascular resistance (SVR), oxygen saturation (O2 sat), end-tidal carbon dioxide (EtCO2), peak airway pressures (PAP), pH, pO2, and pCO2. The mean change of each variable from baseline at each timepoint was compared using Student’s t-test.

RESULTS: Sequential intragastric and peritoneal insufflation did not produce any significant changes in HR, MAP, SV, SVR, or CO. Following 60 minutes of intragastric insufflation, the SaO2 decreased from 98.4% to 97.4% (p = 0.034). This also produced a respiratory acidosis with pH decreasing from 7.43 to 7.38 (p = 0.006) with increased ETCO2 (39.6 mmHg to 46.2 mmHg, p = 0.004) and pCO2 (47.36 mmHg to 54.8 mmHg, p = 0.005). Subsequent intraperitoneal insufflation resulted in worsening respiratory acidosis (pH 7.34, p = 0.037) with further increases in pCO2 (63.6 mmHg, p = 0.005) and ETCO2 (51.6 mmHg, p = 0.026). Peritoneal insufflation also increased PAP from 18.2 mmHg to 21.6 mmHg (p = 0.005), but SaO2 did not decrease further.

CONCLUSION: The prolonged serial insufflation of the stomach and peritoneal cavity required for NOTES procedures are well tolerated without significant hemodynamic effects. These maneuvers do, however, impact pulmonary mechanics and acid-base status. During NOTES procedures, these effects should be carefully monitored and mitigated via careful ventilator management.

Wednesday, June 3, 2009

12:00 PM – 2:00 PM
South Hall
SSAT POSTER SESSION III

Basic: Biliary

W1754

Cardiopulmonary Changes in NOTES Versus Laparoscopic Cholecystectomy
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UC San Diego, San Diego, CA

OBJECTIVE: Natural Orifice Transluminal Endoscopic Surgery (NOTES) may further already accepted benefits of minimally invasive surgery. To date, little is known regarding intra-operative cardiopulmonary risks of NOTES. The aim of this study is to compare intra-operative cardiopulmonary parameters in transvaginal versus laparoscopic cholecystectomy.

METHODS: A retrospective case-controlled comparison study was performed at a single University tertiary care institution. Ten consecutive women who had transvaginal cholecystectomy between January 2007 and July 2008 were matched by age and body mass index to ten women who underwent laparoscopic cholecystectomy during the same time period. All surgeries were performed by the same surgeon with a standardized technique. Primary outcome measures were the noninvasive cardiopulmonary parameters: mean arterial pressure, heart rate, and end tidal CO2 (ETCO2). Secondary outcome measures were operation duration and hospital length of stay.

RESULTS: All operations were successfully completed. Two patients intending to undergo transvaginal cholecystectomy instead underwent laparoscopic cholecystectomy due to significant adhesions. These patients were excluded from the study. No respiratory compromise requiring desufflation occurred in either group. Mean operative times were higher in the NOTES group (97.7 ± 21.9 min) compared to the laparoscopic group (72.3 ± 10.8 min; p = .015). All patients in both groups were discharged on postoperative day 1.

Table 1. Transvaginal Versus Laparoscopic Cholecystectomy

<table>
<thead>
<tr>
<th>Parameter</th>
<th>NOTES</th>
<th>Laparoscopy</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETCO2</td>
<td>3.55 ± 3.0 mmHg</td>
<td>6.55 ± 3.0 mmHg</td>
<td>P = 0.01</td>
</tr>
<tr>
<td>PIP</td>
<td>7.88 ± 3.48 mmHg</td>
<td>8.88 ± 3.0 mmHg</td>
<td>p = 0.43</td>
</tr>
<tr>
<td>MAP</td>
<td>15.2 ± 16.04 mmHg</td>
<td>17 ± 5.36 mmHg</td>
<td>p = 0.77</td>
</tr>
<tr>
<td>Pulse</td>
<td>-1.44 ± 6.59 mmHg</td>
<td>10.8 ± 7.8 mmHg</td>
<td>p = 0.003</td>
</tr>
</tbody>
</table>

CONCLUSION: In this study, favorable differences in pulse rate and ETCO2 were observed in transvaginal cholecystectomy compared to laparoscopic cholecystectomy. Without another explanation for these findings, we speculate...
this may be due to decreased pain and/or trauma from the NOTES approach. There was no statistically significant difference in MAP between the two groups. There were no detrimental intra-operative hemodynamic or respiratory changes identified during transvaginal cholecystectomy compared to laparoscopic cholecystectomy. Although the average operative time for a transvaginal cholecystectomy was longer than laparoscopic cholecystectomy, there was a trend toward decreasing operative times as additional transvaginal cases were performed.

**Basic: Colon-Rectal**

**W1755**

Exploring Combination Epigenetic Therapy for the Treatment of Colorectal Cancer

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**BACKGROUND:** Colorectal carcinoma (CRC) is a leading cause of cancer related deaths. Despite recent efforts to develop novel biologic therapies, most patients die of metastatic disease. Epigenetic alterations including DNA hypermethylation and histone modifications are frequent and early events in CRC. These epigenetic alterations which lead to transcriptional silencing have been found to be reversible in cultured systems eventually leading to re-expression of silenced genes. Recently FDA has approved demethylating agents for therapy and they are now successfully used in myelodysplastic syndromes. However demethylating drugs have not shown benefit in solid tumors due to issues such as bioavailability of the drug and cytotoxicity at high doses. We have previously shown that combination epigenetic therapy using demethylating drugs and histone deacetylase inhibitors (HDACi) shows synergism in reactivating genes. In the current study we explore the utility of combination epigenetic therapy in CRC cell lines using different concentrations of 5’-Azacytidine (AZA, a demethylating agent) and SNDX-275 (HDACi).

**METHODS:** Combination epigenetic therapy with different doses of AZA and SNDX-275 were tested in HCT116 and RKO. Drug treatment regimens include a) AZA alone, 4 concentrations (50 nM, 500 nM, 1 µM and 5 µM) b) SNDX-275 alone (1 µM) c) Combination of AZA and SNDX-275. DNA and RNA were extracted and analyzed for methylation and expression status of genes including TFPI2 and SFRP1.

**RESULTS:** TFPI2 and SFRP1 which are methylated and silenced in HCT116 and RKO were re-expressed and partially demethylated after the treatments with high dose AZA alone (500 nM and higher) or in combination with SNDX-275. Additionally, TFPI2 was re-expressed and partially demethylated by low dose AZA (50 nM) alone or in combination with SNDX-275. Interestingly, SFRP1 although not re-expressed by low dose AZA alone (50 nM), was re-expressed and partially demethylated when low dose AZA was combined with SNDX-275 implying synergy.

**CONCLUSIONS:** Low dose AZA (50 nM) either alone or in combination with SNDX-275 is capable of demethylating and re-expressing genes, with effect comparable to high dose AZA. Our results may have important clinical implications since higher doses cannot be achieved in patients due to instability of AZA. Combination of low dose AZA and SNDX-275 may provide a more mechanistic, epigenetically driven approach rather than cytotoxicity driven approach of high dose AZA. This may provide a new pharmacologic model for investigation in clinical treatment of solid tumors including CRC.

**W1756**

Expression of the Cancer Testis Antigens PLAC1 and MAGE3A in Colon Tumors as Potential Targets for Specific Immunotherapy for a Subset of CRC Patients

M. C. Shantha Kumara H1, Otavia L. Caballero2, Su Tao2, Aqeel Ahmed2, Keith E. Hoffman1, Vesna Cekic1, Andrew J. Simpson3, Carlos Cordon-Cardo2, Richard L. Whelan1

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**INTRODUCTION:** Genes that encode Cancer testis (CT) antigens are normally expressed only in the human germ-line. High frequencies of expression in various tumors and restricted expression in normal tissues make the CT antigens attractive cancer vaccine targets. PLAC1, MAGE3A and GAGE are genes with high expression in placenta/or testis and different cancer types with relatively restricted expression in normal tissues. The aim of this study was to evaluate PLAC1, MAGE3A and GAGE as vaccine targets in colorectal cancers.

**METHOD:** Consenting CRC patients who underwent elective resection for whom tumor samples and preoperative blood samples were available comprise the study population. Basic demographic and clinical as well as short term outcome data was prospectively collected. Tissues were paraffin embedded and also stored at –80°C. Total purified RNA was isolated and cDNA synthesized. Comparative quantitative PCR (QPCR) was performed using the SYBR Green platform. Comparative quantitative analysis was performed based on delta-delta Ct method using GAPDH as internal control. Expression levels in tumors were compared to expression levels in Tissues (MAGE and GAGE ) or levels in Placenta (PLAC1) and samples found to express 0.1% or more of the testis or placenta levels were considered positive for the expression of these genes.

**RESULTS:** 35 tumors and paired normal tissue samples were studied (83% colon, 17% rectal). Stage breakdown was as follows: stage 2, 18; stage 3, 16; and stage 4, 1 patient. Relative QPCR values of 35 malignant and paired normal samples for MAGE3 and QPCR values of 31 pairs for PLAC1 and GAGE were available for analysis. Relative expression ratio of malignant to normal tissues over one(1) was higher for PLAC1 (77%) and moderate for GAGE (35.5%) and MAGEA3 (31%). However, both expression ratio over one (1) and expression levels above 0.1% of the levels in testis or placenta were noted for MAGEA3 in 26%, PLAC1 (19%) but not for GAGE1.
CONCLUSION: In a subset of tumors, the relative expression of MAGEA3 and PLAC1 was considered above the expression in paired normal colon tissues and had more than 0.1% of the levels in testis and placenta. Serological evaluation and immunohistochemistry studies are needed to further evaluate the tumor subsets presenting MAGEA3 and PLAC1 expression. These results suggest that MAGEA3 and PLAC1 might be useful as vaccine targets for a subset of CRC patients and further studies are warranted.

Basic: Esophageal

W1757

Interstitial Cells of Cajal in Achalasia
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BACKGROUND: Interstitial cells of Cajal (ICC) are the pacemaker cells of the gastrointestinal tract. By connecting neuronal cells and smooth muscle cells, ICCs provide a continuous network responsible for the spontaneous electrical and mechanical activity of smooth muscle cells. In this study we tested the hypothesis that the absent peristalsis and impaired relaxation of the lower esophageal sphincter in achalasia are due to disappearance of ICCs in the muscular layer (muscularis externa or propria) of the esophagus.

METHODS: Representative distal esophageal tissue specimens from nine patients who underwent esophagectomy for end stage achalasia were identified from the medical records. The diagnosis of achalasia was confirmed in all patients by manometry. Normal distal esophageal tissue specimens from ten patients who underwent esophagectomy for squamous cell carcinoma of the mid- or upper esophagus were used for controls. Formalin-fixed, paraffin-embedded tissues were sectioned and stained for CD117/c-kit using standard antigen retrieval immunohistochemical techniques. CD117-positive ICCs were distinguished from CD117-positive mast cells on the basis of their stellate morphology and by the use of CD117/mast cell tryptase double immunostaining. ICCs located in the circular and longitudinal layers of the muscularis externa were counted in ten high power (x400) fields by two independent observers. Electron microscopy was performed to examine ICC ultrastructural features in achalasia.

RESULTS: ICCs were identified in the muscularis externa layer in all nine achalasia specimens and all 10 normal control specimens. The median and (range) ICC numbers per high power field in the achalasia specimens were 13.85 (7.0–23.9) for the inner circular muscle layer and 9.6 (7.8–11.5) for the outer longitudinal muscle layer, and 16.05 (6.5–26.7) and 10.9 (5.2–18.5) for the normal esophagus inner and outer muscularis externa layers. The ICC density was not significantly different in achalasia compared to normal control specimens in any layer. Electron microscopy revealed the presence of cells with typical ICC ultrastructural appearance in achalasia tissue specimens.

CONCLUSION: This study did not find a significant difference in the density of ICCs in achalasia compared to normal esophagus specimens. These results suggest that the motility defects that characterize achalasia result from insufficient neuronal input and perhaps impaired ICC activity rather than insufficient numbers of ICCs.

W1758

Laparoscopic Fundoplication: New Insights Into Neural Anatomy at the Esophagogastric Junction
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BACKGROUND: In laparoscopic fundoplication the mobilisation of the distal esophagus and the proximal stomach are mandatory in order to obtain enough intra-abdominal esophageal length and to enable a posterior fundoplication. In surgical literature and in most anatomic illustrations there are no nerves described between diaphragm and stomach. Moreover the mechanism of the so-called postfundoplication complaints is not fully understood yet. We intraoperatively observed small nerve branches penetrating the left crus of the diaphragm lateral of the hiatus, presumably going into the stomach. Their course (from lateral to medial) suggested that they could be branches of the splanchnic nerves or phrenic nerves rather than branches of the vagus. It was the aim of the study to find these nerves in cadavers and to describe their origin and their target organ.

MATERIAL AND METHODS: 53 cadavers (23 male 30 female, age range: 35–103 years) were dissected with special attention to the course of the nerves penetrating the left crus of the diaphragm. The whole course of the nerves was documented with drawings and photos.

RESULTS: In 17 out of 53 cadavers, one or two splanchnic nerves were found. Seen from below, they penetrated the left crus of the diaphragm in mean at the 4 o’clock (range: 2–5) position, in mean at a distance of 2 cm (range: 0–5) from the hiatus, all of them going into the stomach (cardia or fundus). Ten out of them had an additional branch going into the coeliac ganglion. In 14 cadavers, a branch of the phrenic nerve was found, penetrating the left crus at a 4 o’clock position, in mean at a distance of 7.3 cm (range: 3–10). These phrenic nerves mostly went into the stomach (fundus), but in two cases, additional branches going to the coeliac ganglion were found.
CONCLUSION: Branches of the splanchnic nerves and of the phrenic nerve, penetrating the left crus of the diaphragm at the 3–5 o’clock position are regularly found. Most of them go to the stomach, and some also have branches to the coeliac ganglion. The role of these nerves is not clear yet, but they all are cut regularly during a laparoscopic (posterior) fundoplication. Whether the dissection of these nerves during fundoplication contributes to postfundoplication symptoms such as postprandial bloating has to be cleared in further studies.

Basic: Hepatic

W1759
Timing-Dependent Protection of Hypertonic Saline Solution Administration in Experimental Liver Ischemia/Reperfusion Injury
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During liver ischemia, the drop in mitochondrial energy causes cellular damage, which is aggravated after reperfusion. This injury can trigger a systemic inflammation, also producing remote organ damage. Several substances have been employed to reduce this inflammatory response during liver transplantation, liver resections and hypovolemic shock.

AIM: To evaluate the effects of hypertonic saline solution and the best timing of administration to prevent organ injury during experimental liver ischemia/reperfusion.

METHODS: Animals underwent one hour of warm liver ischemia followed by reperfusion. One hundred-twenty rats were allocated into six groups (n = 20). S: sham; C: control animals submitted to partial liver ischemia; ISSpi: rats received NaCl 0.9% 0.4 mL/kg, 15 min before ischemia; HTSpi: rats received NaCl 7.5% 0.4 mL/kg, before ischemia; ISSpr: rats received NaCl 0.9% 15 min before reperfusion; HTSpr: rats received NaCl 7.5% before reperfusion. Four hours after reperfusion blood was collected for AST, ALT, IL-6 and IL-10 analyses. Evans blue dye was intravenously administered to eight animals from each group. Rats were killed for liver histology, phosphorylation of liver mitochondria, edema of liver tissue and pulmonary vascular permeability analyzes.

RESULTS: HTSpr group presented elevation of AST (1984 ± 207 IU/L) and ALT (1539 ± 208 IU/L) significantly lower than C (AST 3141 ± 303 IU/L, ALT 2903 ± 347 IU/L) and ISSpr (AST 3169 ± 218, ALT 2791 ± 245 IU/L) groups. The comparisons of HTSpi group to ISSpi or to C groups were not statistically significant. Additionally HTSpr group showed AST and ALT levels significantly lower than HTSpi group (AST 2691 ± 257 IU/mL, ALT 2484 ± 328 IU/mL). No significant differences in IL-6 and IL-10 levels were observed. A significant reduction on mitochondrial dysfunction was observed in HTSpr group compared to ISSpr and C groups (p < 0.05). Also ADP/O ratio was significantly reduced in HTSpi group (1.63 ± 0.032) compared to HTSpr (1.83 ± 0.039). Liver tissue edema was significantly lower in HTSpr group (69.8 ± 0.4%) compared to ISSpr (72 ± 1,1%) and C (73 ± 1,4%) groups. Pulmonary vascular permeability was significantly lower in HTSpr group (148 ± 17 mg EBD/g tissue) compared to ISSpr (282 ± 35 mg EBD/g tissue) and C (280 ± 52 mg EBD/g tissue) groups. No significant differences in myeloperoxidase activity were observed. The liver injury histological score was significantly lower in HTSpr group (8.1 ± 1.32) compared to HTSpi group (11.4 ± 0.93).

CONCLUSIONS: HTS ameliorated liver and lung injuries in experimental liver ischemia/reperfusion. Infusion of HTS in pre-reperfusion period is crucial to accomplish the best results. FAPESP 05/042267

Basic: Pancreas

W1760
Human Tissue Slice Model for Evaluating Conditionally Replicative Oncolytic Adenovirus Specificity to Pancreatic Cancer
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Pancreatic adenocarcinoma is the fourth leading cause of cancer-related deaths in the US. Conditionally replicative oncolytic adenoviruses (CRAds) have been developed and tested in clinical trial, but fell short of clinical expectation. We have developed new CRAds for pancreatic cancer with RGD modification to facilitate efficient transduction in CAR negative pancreatic cancer cells and Cox2 promoter-based replication control, which eliminates toxicity in normal organs including liver and normal pancreas. A preclinical challenge that oncolytic viruses face is the absence of suitable animal model which permits in vivo viral replication for toxicology. Given that human adenoviral shows replication tropism to natural host, human cells, the optimal model to use is human tissue. In this study, we used tissue resected from patients undergoing operative procedures to access our adenoviral vectors.

METHODS: After obtaining IRB approval, we collected normal liver, normal pancreas, and pancreatic cancer tissue from specimens resected from patients undergoing planned resections. The tissue was immediately sliced into 200 micron slices using the Krumdieck Tissue Slicer and incubated overnight. They were then infected with Ad RGD wild type or RGDCox2CRAdF vectors. On day 3, samples were collected and DNA was extracted. E4 copy number and B-actin was determined for each sample by PCR. Statistical analysis was performed by Student’s T-test.

RESULTS: After compensation with B-actin, the Ad RGD Cox2 vector showed high replication in pancreatic adenocarcinoma tissues while its replication in normal liver and

T38
normal pancreas was minimal. In contrast, the replication of RGDWt was high regardless of the origin of the tissues. When the replication of these two vectors were compared in each type tissue, the percentage of compensated viral copy number RGDCox2CRAdF in pancreatic adenocarcinoma tissue was significantly higher than those in normal pancreas and normal liver (Table).

### Table 1. Relative Viral Copy Number (Compensated with Beta-Actin)

<table>
<thead>
<tr>
<th>Tissue</th>
<th>RGDCox2CRAdF</th>
<th>RGDWt</th>
<th>COX2CRAdF/Wt (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Liver</td>
<td>1.22 × 10⁶</td>
<td>9.08 × 10⁶</td>
<td>13.49% ± 6.09*</td>
</tr>
<tr>
<td>Normal Pancreas</td>
<td>2.11 × 10⁶</td>
<td>1.61 × 10⁷</td>
<td>13.09% ± 10.05*</td>
</tr>
<tr>
<td>Pancreatic Adenocarcinoma</td>
<td>3.33 × 10⁷</td>
<td>3.18 × 10⁷</td>
<td>104.71% ± 25.45</td>
</tr>
</tbody>
</table>

*p < 0.01 when compared to Pancreatic Adenocarcinoma

**CONCLUSION:** RGDCox2CRAdF vectors show high specificity for pancreatic adenocarcinoma tissue compared to normal pancreas and normal liver. By using human tissue specimens, we can effectively evaluate human adenoviral replication. This model provides us with valuable preclinical data to determine specificity and toxicity of Ad vectors prior to proceeding to Phase I clinical trials.

**W1761**

**Genetic Expression Profile Suggesting Synergy Between Omega-3 Fatty Acids and Gemcitabine Treatment on Pancreatic Cancer Cells**

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**BACKGROUND:** This study aims to establish molecular level changes that promote omega-3 fatty acids (Ω–3 FA) as an effective adjuvant to current gold-standard chemotherapeutic agent gemcitabine (GEM) for treatment on pancreatic cancer cells.

**METHODS:** MIA PaCa-2 pancreatic cancer cell line was cultured using standard protocol in DMEM (control) and treated with 100 µm Ω–3 FA emulsion (95 µm EPA and 78 µm DHA), 100µm GEM and a combination treatment of 100 µm Ω–3 FA emulsion and 100 µm GEM for 12 hours at 37°C and 5% CO2. Cells were isolated, homogenized and RNA was extracted using Qiagen RNeasy columns. Microarray analysis was performed using a 60-mer oligonucleotide array consisting of 113 genes (Superarray). Data was analyzed with minimal value background subtraction and interquartile normalization for all non-bleeding spots. Significance was determined as a 1.5-fold difference in expression relative to DMEM treatment.

**RESULTS:** Microarray analysis revealed 41 significantly expressed genes among all treatment groups (Fig. 1). Ω–3, GEM and Combination treatments exclusively expressed 7, 8 and 8 significant genes, respectively (Fig. 1). Interestingly, the 8 genes exclusive to combination treatment: BIRC5, CDKN2B, CYP19A1, FN1, IL-2, IRF-1, NFKBIA and TP53, are associated with restoration of cell cycle regulation, apoptosis and cell adhesion. Corresponding gene ontology reveals biological processes including diminished caspase inhibition, cell cycle arrest, regulation of proliferation with enhanced mitotic control at G1/S and G2/M checkpoints and oxidoreductase activity.

**CONCLUSION:** This genetic expression profile provides evidence for Ω–3 FA synergistic potentiation of cytotoxic therapy through cell-cycle regulation, restored apoptosis signaling and cell adhesion changes not seen in GEM treatment alone. Future studies include RT-PCR confirmation, protein level analysis and selective genetic knockdown studies.

**W1762**

**Additive Inhibitory Effects of Inositol Hexaphosphate and Pterostilbene on Pancreatic Cancer Cell Growth In Vitro**

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**BACKGROUND:** Diets rich in fruits, vegetables, and fiber have been linked to reduced rates of several cancers. Resveratrol, a phytonutrient found in grapes, is a potent antioxidant that inhibits the growth of several types of cancer. We have shown that pterostilbene, a natural analog of resveratrol found in blueberries, inhibits the growth of cultured pancreatic cancer cell lines in a concentration and time-dependent manner. Pterostilbene appears to act via pro-apoptotic mechanisms. Inositol hexaphosphate (IP6) is a polyphosphorylated carbohydrate found in foods with high fiber content. We have also shown that IP6 significantly inhibits cell growth of pancreatic cancer cells in vitro, via non-apoptotic pathways. We hypothesized that the combination of pterostilbene and IP6 would synergistically inhibit pancreatic cancer cell growth in vitro.

**METHODS:** Two human pancreatic cancer cell lines, Mia PaCa-2 and PANC-1 were treated with increasing doses of pterostilbene (25–75 µM) or IP6 (250–1000 micromolar) and combinations thereof. Cell viability was measured at 24, 48, and 72 hours using a MTT assay. Student's t-test and two-way ANOVA were used for statistical analysis.
RESULTS: Pterostilbene and IP6 inhibited proliferation in both Mia PaCa-2 and Panc-1 cell lines in a concentration and time dependent manner (p < 0.001 at 72 hours for all) when administered alone. After 72 hours of combined treatment, significant additive effects of IP6 at 750 and 1000 micromolar were seen with all pterostilbene doses in both cell lines (p < 0.001).

CONCLUSIONS: The naturally occurring nutrients pterostilbene and IP-6 in combination exhibit synergistic anti-cancer effects in vitro against pancreatic cancer. Further mechanistic studies and in vivo experiments are warranted to determine the potential role for pterostilbene and IP6 in pancreatic cancer treatment.

Basic: Small Bowel

W1763

The Influence of Nutrients, Biliary-Pancreatic Secretions and Systemic Trophic Hormones on Intestinal Adaptation in Gastric Roux-en-Y Model in Rat

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BACKGROUND: Intestinal adaptation following massive intestinal resection requires nutrient stimulation. However, the relative effects of direct mucosal stimulation by nutrients, the additive effects of biliary-pancreatic secretions, and induced enteric hormones are not known. To investigate this, we compared the alimentary limb and the common limb of a Gastric Roux Y bypass model (GRYB) to each other and to sham operated controls.

METHODS: Male rats (350 to 400 g) underwent sham and Gastric Roux en Y surgery: (n = 8/group). Animals were pair fed and followed for 14 days. Weight and postprandial systemic insulin, leptin, Glucagon-like peptide 2 (GLP-2) and (PYY) levels were quantified. Adaptation was quantified by intestinal gross and microscopic morphology and crypt proliferation in each intestinal limb of the bypass and the equivalent points in the sham intestine.

RESULTS: Control animals maintained weight, while bypass animals lost weight and exhibited significant adaptive changes with increased bowel width, Villus height, crypt depth and proliferation were increased in both the proximal alimentary limb and the distal common limb. GRYB animals had elevated systemic postprandial PYY and GLP-2 levels. The naturally occurring nutrients pterostilbene and IP-6 in combination exhibit synergistic anti-cancer effects in vitro against pancreatic cancer. Further mechanistic studies and in vivo experiments are warranted to determine the potential role for pterostilbene and IP6 in pancreatic cancer treatment.

CONCLUSIONS: Despite the significant increase in systemic PYY and GLP-2 levels in the GRYB animals, small bowel adaptation only occurred in bowel segments stimulated by nutrients; there was no additional effect from biliary-pancreatic secretions. Further studies to examine the local factors which mediate the nutrient induced adaptation response are indicated; such local factors could be useful therapy for patients with short bowel syndrome.

W1764

Central Vagal Activation During the Early Phase of Postoperative Ileus

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INTRODUCTION: Neurogenic, inflammatory and pharmacological alterations during surgery contribute to the pathophysiology of postoperative ileus (POI). During the early onset of POI spinal afferent activation seems to occur which may trigger a reflex inhibition of intestinal motility perpetuating POI. However, the role of central vagal afferents in POI is still unknown. We, therefore, aimed to explore central vagal afferent nerve activation in the early development of POI.

METHODS: Under enflurane anesthesia, C57BL/6 mice underwent laparotomy followed by sham treatment or standardized small bowel manipulation to induce POI. Then, after 1h, 3h or 9h, the brain and jejunum was removed and fixed. Fos-immunoreactivity was determined for neuronal activation in the vagal nucleus of the solitary tract (nTS) of the brainstem and leucocyte infiltration in the intestinal muscularis by myeloperoxidase stains (each subgroup n = 6). Data were analyzed by two-way ANOVA.

RESULTS: The number of Fos-positive neurons in the nTS did not differ 1h and 3h after induction of POI, but was significantly increased to 38 ± 1, 48 ± 3, 43 ± 3 during ileus compared to 17 ± 1, 18 ± 2, 23 ± 3 in sham controls (Bregma minus 13.3, 13.8, 14.3 mm) 9h after small bowel manipulation (all P < 0.05). The intestinal muscularis contained more leucocytes during ileus compared to controls 9h after small bowel manipulation (P < 0.05). No change occurred 1h and 3h after induction of POI.

CONCLUSIONS: While reflex inhibition of intestinal motility via spinal afferents seems to occur within the first hour after small bowel manipulation, central vagal afferents were activated after the recruitment of circulating leucocytes in the intestinal muscularis. Vagal afferents projecting to the CNS may be part of the cholinergic anti-inflammatory pathway which ensures that the response remains contained avoiding a detrimental extent of inflammation.
W1765  
Expression Pattern of mSHISA Suggests Its Regulatory Role of Fibroblast Growth Factor 10 and Its Receptor FGFR2B (FGF10/Fgfr2b) Signaling Pathway During Gastrointestinal Development  
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INTRODUCTION: Intestinal atresia occurs in 1:1000 live births and represents one of the most common forms of neonatal intestinal obstruction leading to short bowel syndrome. It is known that the FGF10/Fgfr2b signaling pathway plays a critical role in the regulation of proliferation and apoptosis in multiple organ systems including the developing lungs, limbs, and gastrointestinal tract (GIT). Furthermore, we have shown that loss of either GIT mesenchymal FGF10 or epithelial Fgfr2b, results in a failure of proliferation and subsequently, in intestinal atresia. The functional mechanism of mesenchymal FGF10 signaling through its epithelial receptor Fgfr2b remains to be elucidated. Furthermore, regulation of Fgfr2b has not been fully evaluated. mShisa is an endoplasmic reticulum retention modifier protein that is known to bind with receptors in the FGFr family. It has been suggested that mesenchymal expression of mShisa is up-regulated during development. Our preliminary data suggests its abundance in the epithelium and up-regulation in all stages of GIT development. We hypothesize that mShisa may serve a regulatory role in the FGF10/Fgfr2b signaling pathway during GIT embryogenesis.  
METHODS: We evaluated the expression patterns of mShisa using an RNA probe, produced and used to perform whole mount in situ hybridization (wmiSH) on the intestine of E13-E15 mice. The expression pattern was also evaluated with RT-PCR. In order to validate the correlation of mShisa with Fgfr2b, we also performed wmiSH on E13-E15 mice GIT using an Fgfr2b RNA probe.  
RESULTS: wmiSH data demonstrates abundant GIT epithelial expression of mShisa during development. We also confirm its up-regulation at all stages of GIT development using RT-PCR. In addition, we demonstrate that FGFr2b expression pattern is co-distributed with mShisa in the developing GIT.  
CONCLUSION: Our data shows the abundant epithelial expression of mShisa and its up-regulation at all stages of GIT development. Furthermore, mShisa is known to bind Fgf receptors in the endoplasmic reticulum and Golgi complex where Fgf receptors are known to undergo post-transcriptional modification. Our findings suggest a potential regulatory role of mShisa on the FGF10/Fgfr2b signaling pathway.

Basic: Stomach  
W1766  
A Novel Laparoscopic Device for the Measurement of Gastrointestinal Slow Wave Activity  
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1Surgery, University of Auckland, Auckland, New Zealand; 2Bioengineering Institute, University of Auckland, Auckland, New Zealand; 3Physiology, Al Ain University, Al Ain, United Arab Emirates  
BACKGROUND: Gastric slow wave dysrhythmias are hypothesized to contribute to dysmotility syndromes, including post-operative delays in gastric emptying. However, the clinical significance of gastric dysrhythmias remains poorly understood. Current methods of electro-gastrography (EGG) cannot define the spatiotemporal patterns of slow wave propagation, and the best means to evaluate slow waves is by recording directly from the target organ. New minimally-invasive methods of recording slow waves are required.  
AIMS: To develop a new laparoscopic device for recording serosal slow wave activity. The ideal device should be rapidly deployable,atraumatic to the serosa, and achieve a high signal-to-noise (SNR) ratio.  
METHODS: The device consists of a shaft (4 mm diameter × 30 cm) and cable, and contains four individual electrodes. The electrodes were constructed from Teflon-coated silver wire (0.3 mm), soldered to connecting wires. These were bound in a heat-shrink tube and a stainless-steel shield. The shaft was encased in a teflon sleeve and filled with epoxy resin. The device is sterilized using ethylene oxide. In-vivo validation of the device was performed in an open-abdomen porcine model. Slow wave recordings from the gastric corpus were compared to recordings taken from standard electrodes of the type typically used to record serosal slow waves. An intraoperative trial was also conducted, with antral recordings taken from a 28 year-old female undergoing a laparoscopic cholecystectomy.  
RESULTS: Regular slow wave activity was continuously recorded using the novel device in both the porcine and human trials, at a frequency of 3.1 ± 0.10 cycles per minute. Slow wave amplitudes recorded from two pigs were similar between the laparoscopic device (0.39 ± 0.02 mV) and standard electrodes (0.36 ± 0.01 mV) (p = 0.45). The SNR was slightly superior in the laparoscopic device (13.7 db vs. 12.6 db). High-quality antral slow wave recordings were achieved in the intraoperative trial (amplitude: 0.41 ± 0.04 mV; SNR: 12.6 db).
CONCLUSION: The novel laparoscopic device achieves high-quality slow wave recordings. It is easily deployable and is atraumatic to the serosa. We anticipate that this device will prove an important tool in the clinical investigation of slow wave behaviours, particularly in patients undergoing surgical manipulations of gastric anatomy. This device therefore offers new potential to help clarify the role of dysrhythmias in the pathophysiology of dysmotility syndromes, and especially with regard to surgically-related gastric dysmotilities.

Clinical: Biliary

W1493

Surgical Treatment for the Patients of Intrahepatic Cholangiocarcinoma with Lymph Node Metastases—Repeat Surgery and Combined Chemotherapy for Recurrence

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BACKGROUND AND AIM: Intrahepatic cholangiocarcinoma (ICC) is increasing worldwide and still remains a major challenge for surgeons with around 30% of 5-year survival rate after curative resection. The results of surgical resection for ICC patients with lymph node metastases are especially poor. We herein evaluate our results of surgical resection for the patients with ICC.

PATIENTS AND METHODS: 44 patients with ICC underwent hepatectomy in our institute until 2006. They are including 13 patients with lymph node metastases. Survival rates after first hepatectomy for the patients were calculated and cases of long-term survival were examined.

RESULTS: Survival rates after first hepatectomy are 51, 29, 22% for 3, 5, 10 years, respectively. Survival rates of the patients with and without lymph node metastases are 42 and 51% for 3 years, and 28 and 29% for 5 years, respectively. There is no significant difference between the survival curves from the groups. 11 out of 13 patients with lymph node metastases have recurrences after first hepatectomy (7 in residual liver; 2 in lung, lymph node, each; 1 in bone, brain, peritoneum, each). 5 patients with lymph node metastases and 11 patients without actually survived more than 3 years. 4 out of those 5 patients with lymph node metastases underwent repeat surgery for recurrences in the residual liver or the lung and 3 of them underwent adjuvant and/or neo-adjuvant chemotherapy. There is one patient who underwent 4 hepatectomy and 1 pulmonary resection, combined with chemotherapy, and survived 6 years and 9 months.

CONCLUSION: In our series, the outcome of hepatectomy for ICC patients with lymph node metastases is comparable to that for patients without. Although recurrence rate after hepatectomy is high for the patients, the residual liver and the lung are the main sites of recurrence and repeat surgery, combined with chemotherapy, is thought to benefit their survival.

W1494

Surgical Gastrostomy for Pancreatobiliary and Duodenal Access Following Roux en Y Gastric Bypass

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HCMC, Minneapolis, MN

BACKGROUND: Pancreatobiliary access following Roux en Y Gastric Bypass (RYGBP) is challenging. We present the largest series to date, evaluating 32 cases of surgical gastrostomy for endoscopic upper gastrointestinal endoscopy.

METHODS: Retrospective chart review of prospectively collected data on patients with history of previous RYGBP that between, 2004–2008, had laparoscopic or open gastrostomy for pancreatobiliary and duodenal access at a single institution. Data reviewed was indication for procedure, surgical findings, successful cannulation and complications.

RESULTS: Thirty patients (25 female) with age ranging from 27 to 72, underwent 32 procedures. The indications to access the gastric remnant were: 3 cholangitis, 13 sphincter of Oddi dysfunction, 5 common bile duct stone/obstruction, 6 pancreatitis, 1 cystic duct leak after cholecystectomy, 2 for pancreatic mass evaluation and 2 for gastrointestinal bleed. Mean operative time was 200 minutes (98–338), estimated blood loss, mean 85cc (10–500). 28 patients had laparoscopic gastrostomy with one conversion to open due to decreased visualization from gaseous distention of the small bowel after the ERCP and 4 open procedures. All 30 patients underwent successful cannulation, 28 had an ERCP, 2 patients had an EGD and 2 patients had an EUS. During surgical exploration 13 internal hernias were found in 10 patients: 7 Peterson hernias, 5 small bowel mesenteric defect and 1 transverse mesocolic defect. Surgical complications included: 1 patient had a wound infection at the gastrostomy tube site and 3 patients had to be re-explored. One had an abscess around the gastrostomy tube site and the other 2 patients had small amount of free fluid with no leak noted.

CONCLUSIONS: Surgical gastrostomy is a safe and effective means to gain access to the upper GI tract following roux-en-Y gastric bypass. Given the incidence of unsuspected intra-abdominal hernias and the occasional need for open exploration, this procedure should be performed by experienced minimally invasive and pancreatobiliary surgeons.

W1495

First Experiences with Transvaginal Hybrid-NOTES Cholecystectomy

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INTRODUCTION: Laparoscopic cholecystectomy has become standard procedure during the last two decades. Natural orifice transluminal endoscopic surgery (NOTES) will further decrease the operative trauma to the abdominal wall and reduce postoperative pain, wound infection, risk
of hernia and hospital stay. We now report the first results of transvaginal Hybrid-NOTES cholecystectomy from Switzerland.

METHODS AND MATERIALS: From July 2008 to October 2008, 4 women were treated by transvaginal Hybrid-NOTES cholecystectomy. Pneumoperitoneum was created through a 5 mm incision in the umbilicus. Two rigid trocars (12 mm and 5 mm) were inserted in the posterior fornix of the vagina. Patient data, operative time, complications and postoperative course were recorded prospectively in each patient.

RESULTS: The average age of the 4 patients was 33 years (19 to 44 years) and the mean body mass index was 25.73 kg/m2. One patient had in advance a cesarean section and another patient a conization. In all patients operation was performed without intraoperative complications and no further procedure was done simultaneously. The mean operative time was 77 minutes (65 to 87 minutes). The mean hospital stay was 2.75 days (2 to 3 days). Non steroidal anti-inflammatory drugs and paracetamol or metamizol were administered for postoperative analgesia. The postoperative course was except for little vaginal bleeding in the first 3 to 7 days uneventful. The further postoperative follow-up after 4 weeks was without complications.

DISCUSSION: The transvaginal Hybrid-NOTES cholecystectomy is a feasible and safe procedure. Operative time was despite lack of experience not longer than in laparoscopic cholecystectomy. The posterior colpotomy is a simple approach to the abdominal cavity and wound healing is very rapid. Using rigid instruments and techniques which are wellknown from laparoscopy, transvaginal cholecystectomy is possible without other medical specialties.

Clinical: Colon-Rectal

W1497
General Surgery in Nonagenarians: A Single Institution’s Ten Year Experience
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INTRODUCTION: To date there have been no published studies exploring outcomes of nonagenarians undergoing general surgical operations. Such data is particularly important in the setting of continued national increases in life expectancy.

METHODS: A single center, retrospective analysis was performed at our institution. General surgical operations performed in nonagenarians from 1998 to 2008 were identified. Two to one controls were generated and matched for procedure and emergency status. Primary outcomes were early (30 day) and late (12 month) mortality. Two sample t-tests were used to compare several independent variables. These included length of stay, duration of operation, ejection fraction, and ASA (American Society of Anesthesiologists) score. Logistic regression was used to analyze associations between select independent variables and the outcomes of interest.

RESULTS: During the study period, 544 total procedures were performed in nonagenarians and of these 53(9.7%) were general surgical operations. Mean age of nonagenarians was 91.5 ± 1.76 (range 90–97) versus that of controls, 60.8 ± 15.8 (range 30–87). The most common operations were...
RESULTS: Tactile variables. 

For pain evaluation, Student T-Test was used for pain duration. In Group A, there was a trend towards a significant difference in pain between the two groups, whereas in Group B, there was no significant difference in pain duration. Postoperative pain duration was not different in the two groups. There was no significant difference in pain duration between Group A and Group B.

CONCLUSION: The study showed that Block technique is significantly less painful than STARR, with less postoperative pain and fewer complications. However, STARR showed a lower rate of early and late complications, with a trend towards a significant difference in late mortality. There was no significant difference in early mortality, length of stay, or operative time between the two groups. There was no significant difference in hospital stay between the two groups. The study showed that STARR technique is less painful than Block technique, with fewer complications and lower hospital stay.

W1499

Laparoscopic-Assisted Versus Open Ileocolic Resection for Crohn’s Disease: Long Term Results of a Prospective Randomized Trial

Emma J. Eshuis, Frederik Slors, Miguel A. Cuesta, Robert Pierik, Pieter Stokkers, Mirjam A. Sprangers, Willem Bemelman

BACKGROUND: The aim of this study was to compare laparoscopic-assisted ileocolic resection for Crohn’s disease with open ileocolic resection. The study was a randomized multicenter trial comparing laparoscopic-assisted ileocolic resection with open ileocolic resection for Crohn’s disease. Little is known about the long-term results of both procedures with respect to surgical recurrence rate, overall reoperation rate, incidence of incisional hernia, quality of life (QOL), and Body Image (BI) and cosmesis.

AIM: The objective of this study is to determine the long-term results of laparoscopic-assisted ileocolic resection with open ileocolic resection for Crohn’s disease. The study evaluated the long-term results of both procedures with respect to surgical recurrence rate, overall reoperation rate, incidence of incisional hernia, quality of life (QOL), and Body Image (BI) and cosmesis.

MATERIALS AND METHODS: Sixty patients who participated in the study were prospectively followed in the outpatient clinic. The study evaluated the long-term results of both procedures with respect to surgical recurrence rate, overall reoperation rate, incidence of incisional hernia, quality of life (QOL), and Body Image (BI) and cosmesis.

RESULTS: Five patients, 1 from the laparoscopic group and 4 from the open group were lost to follow-up. The study evaluated the long-term results of both procedures with respect to surgical recurrence rate, overall reoperation rate, incidence of incisional hernia, quality of life (QOL), and Body Image (BI) and cosmesis.

The study showed that laparoscopic-assisted ileocolic resection was associated with longer hospital stay and higher costs, but lower postoperative pain and fewer complications compared to open ileocolic resection. The study showed that laparoscopic-assisted ileocolic resection is associated with lower postoperative pain, fewer complications, and lower hospital stay compared to open ileocolic resection for Crohn’s disease.

W1498

Surgical Treatment of Rectocele: Block Versus Stapled Trans-Anal Rectal Resection (STARR)

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Surgery, University of Rome Tor Vergata, Rome, Italy

BACKGROUND: The aim of this study was to compare Block technique and Stapled trans-anal rectal resection for treatment of symptomatic rectocele associated with Obstructed Defecation Syndrome (ODS).

PATIENTS AND METHODS: Thirty-two patients (all female) entered the study. All patients underwent anorectal manometry, defecography, and colonoscopy. Sixteen patients were treated with Block technique (Group A); 16 patients were treated with STARR (Group B). The two groups were homogeneous for sex, age, and small bowel resection 5/53 (9.4%). Nonagenarian and control groups were not significantly different with respect to duration of operation, length of stay, and ejection fraction. There was no significant difference in early mortality noted between nonagenarians and controls among all operations, 3/53 (5.6%) vs. 5/106 (4.7%) p = 0.7991. There was a trend towards a significant difference in local mortality between nonagenarians and controls among all operations, 13/53 (25.5%) vs. 21/106 (19.8%) p = 0.0567. Among nonagenarians with an elective operation (34/53; 64.1%), there was one early mortality (1/34; 2.9%) versus none in controls (0/68; 0%), and four late mortalities (4/32; 12.5%) in nonagenarians versus six (6/68; 8.8%) in controls (p = 0.5676). Among nonagenarians with an emergent operation (19/53; 28.8%), there were two early mortalities (2/19; 10.5%) versus five in controls (5/37; 13.2%) (p = 0.7489), and nine late mortalities (9/19; 47.4%) in nonagenarians versus ten (10/37; 26.3%) in controls (p = 0.0473).

CONCLUSION: General surgical operations in nonagenarians are reasonable, without increased early mortality, length of stay, or operative time. There is a significant difference in late mortality among emergent operations in nonagenarians compared with controls. However, general surgical operations, particularly those which are elective, are not prohibitive in nonagenarians.
RESULTS: Small bowel resection.

Following sub-groups: rectal resection, colonic resection or abscess [M] or death [M]. Furthermore, we analyzed the revision [M], anastomotic leakage [M], intraabdominal thrombosis/embolism [M = major complication], surgical wound infection, pneumonia, urinary tract infection, focused on the following post-surgical complications: 1995 until June 2008 (152, 222, 39.1 ± 7.9 years). We abdominal operations in 374 patients with CD from January of Tübingen, Tübingen, Germany Department for General, Visceral and Transplant Surgery, University of Tübingen, Tübingen, Germany

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BACKGROUND: Patients with CD have a lifetime risk of 80–90% for undergoing surgery due to their disease. Many of these patients are set on immunosuppression [IS] at the time point of surgery. Serious side-effects of IS are wound complications, which have been shown in solid organ transplantation both in clinical trials and in animal models. Aim of this study was therefore to evaluate the rates of post-surgical complications after abdominal surgery for CD patients with or without perioperative IS (steroids [S] or azathioprine [A]).

METHODS: We retrospectively analyzed 484 consecutive abdominal operations in 374 patients with CD from January 1995 until June 2008 (152 ± 222, 39.1 ± 7.9 years). We focused on the following post-surgical complications: Wound infection, pneumonia, urinary tract infection, thrombosis/embolism [M = major complication], surgical revision [M], anastomotic leakage [M], intraabdominal abscess [M] or death [M]. Furthermore, we analyzed the following sub-groups: rectal resection, colonic resection or small bowel resection.

RESULTS: There were 69 rectal resections, 137 colonic resections and 172 small bowel resections. 241 operations (= 49.8%) were performed under perioperative IS. The overall complication rate [OCR] was 18.6% (n = 90), the major complication rate [MCR] was 8.7% (n = 42) and the anastomotic leakage rate [ALR] was 3.3% (n = 16). There was no significant difference between patients without immunosuppression [-IS] compared to those with either steroid [+S], azathioprine [+A] or combined [+SA] medication (OCR: –IS 17.7%, +S 20.9%, +A 13.5%, +SA 19.6%; MCR: –IS 7.0%, +S 11.8%, +A 5.4%, +SA 9.8%). Also patients with a high-dose steroid-therapy (≥220 mg/d) had no increased OCR, MCR or ALR. Patients with rectal or colonic resection had a higher complication rate than patients with small bowel resection, but there was also no increase with IS. However, patients on IS were treated significantly longer inpatiently than those without IS despite same complication rates (17 ± 20 vs. 13 ± 8 days, p = 0.01).

CONCLUSION: Surgical recurrence and QOL after laparoscopic and open ileocolic resection for Crohn’s disease are comparable. Overall reoperation rate was significantly higher in the open group. Laparoscopic-assisted ileocolic resection was associated with a significantly better BI and cosmesis.

W1500
Impact of Perioperative Immunosuppression on the Complication Rate After Abdominal Surgery for Crohn’s Disease (CD)
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W1501
Esophagus to Anus: Epidemiology of Primary Melanomas of the Digestive Tract
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BACKGROUND: Primary melanomas of the digestive tract excluding oral cavity and nasopharynx are rare cancers and population based studies are sparse. We analyzed the Surveillance, Epidemiological and End Results (SEER) database in order to characterize this malignancy.

METHODS: SEER 17-registries database was analyzed for malignant melanomas of the digestive tract (the esophagus to the anus) from 1973–2005. Demographic variables analyzed included age, sex, race and marital status. Tumor variables included site, stage at diagnosis, treatment and histology. SEER*Stat and XLSTAT software were used for statistical analysis.

RESULTS: 472 cases were analyzed after various exclusions. Age-adjusted incidence rates were 0.04 per 100,000 for 1973–2005 (95% CI 0.04–0.04). There was a 1.66% overall increase in total cases diagnosed from 1975 to 2005 amounting to an annual increase of 2.21% (p value <0.05). There were 290 (61.4%) females and 182 (38.6%) males. Mean age at diagnosis was 68 (median 71; range 21–100). Patients above the age of 80 were more likely to be females (P = 0.03). 402 patients were white, 24 black, 45 other (American Indian/AK Native/Asian/Pacific Islander) and the rest were of unknown race. Stage of disease was localized in 34%, regional in 25%, distant in 25% and unstaged in 14%. Common sites were rectum (33%), anus and anal canal (26%), over lapping lesions of anorectum (21%) and esophagus (8%). While the rectum was the most common site in either gender (34% in each), 71.5% of anorectal melanomas were found in females while 68% of stomach and 71% of small intestinal melanomas presented in males.
earlier detection. of worse survival. Chances of survival may improve with advanced age and stage of disease continue to be predictors overall prognosis is poor and as in most malignancies, continues to be rare, the incidence has steadily increased. General Surgery, Robert Packer Hospital, Sayre, PA

INTRODUCTION:

Amit Sharma, Mathew Thomas*, Burt Cagir, Thomas J. Vandermeer

Systematic Review of Literature

Malignancy in Fistulous Anorectal Crohn’s Disease—A difference in survival based on site of tumor. There was no significant tic of better survival (P = 0.02), while distant stage pre-

0.0001). On multivariate analysis other race was prognos-

noted in age >80 (P = 0.015) and distant disease (P < 0.0001). On univariate analysis, age and stage were significant variables with worst survival (median survival 16 months). On univariate analysis, age and stage were significant variables with worst survival (median survival 16 months).

CONCLUSION:

While primary gastrointestinal melanoma continues to be rare, the incidence has steadily increased. Overall prognosis is poor and as in most malignancies, advanced age and stage of disease continue to be predictors of worse survival. Chances of survival may improve with earlier detection.

W1502

Malignancy in Fistulous Anorectal Crohn’s Disease—A Systematic Review of Literature

Amit Sharma, Mathew Thomas*, Burt Cagir, Thomas J. Vandermeer

Methods:

As we systematically reviewed all such cases of cancer reported since 1950 in order to further characterize this rare complication of CD.

RESULTS:

In addition to our patient, literature review revealed 57 other cases of carcinomas associated with perineal fistulas in CD. The cohort contained 36 females and 22 males. The mean age at the diagnosis of cancer was 47.4 years for females and 52.9 years for males. Mean duration of CD prior to detection of cancer was 17.5 years in females and 24.8 years in males. Adenocarcinoma was the most common histology (52%) followed by squamous cell carcinoma (36%). There was no difference in gender distribution for adenocarcinoma and squamous cell carcinoma. Patients mostly presented with complaints of pain (34.5%) while the most frequent finding on examination was an abscess (43%). On initial examination malignancy was suspected in only 24% of patients. In 78% of patients the fistula was perianal or anorectal in location. Observed survival rate was 71% at 1 year and 61% at 2 years.

CONCLUSION:

Incidence of cancer in perineal fistulas of CD is rare compared to non-fistulous CD. Overall prognosis appears to be poor. Diagnosis can be often delayed due to non-specific symptoms and findings. While cancer appears to be associated with the duration of CD as well as fistula, this complication can present much earlier than anticipated. A high suspicion for malignancy in chronic perineal fistulas associated with CD should therefore be maintained in spite of negative biopsies. Especially in women, the shorter duration of CD and fistulas prior to malignant degeneration necessitates an aggressive approach to detect cancer at the earliest.

W1503

Medina Catheter Use Following Ileal Pouch-Anal Anastomosis: Quality of Life and Functional Outcome

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Methods:

Ovid MEDLINE was searched for pertinent case reports using a combination of the keywords “fistula”, “cancer” and “Crohn’s disease”, and limited to the English language. Relevant results included both case series and individual case reports by 30 primary authors. The reference lists of the collected articles were also screened for further relevant citations. A patient of ours with similar diagnosis was also included in the series for review. All selected cases were then analyzed by age, gender, duration of CD and fistula, location of fistula, presenting symptoms, delay in diagnosis, method of diagnosis, histopathology and outcome.

RESULTS:

In addition to our patient, literature review revealed 57 other cases of carcinomas associated with perineal fistulas in CD. The cohort contained 36 females and 22 males. The mean age at the diagnosis of cancer was 47.4 years for females and 52.9 years for males. Mean duration of CD prior to detection of cancer was 17.5 years in females and 24.8 years in males (p = 0.0008). Average duration of fistula prior to cancer transformation was 10 years for females and 20 years for males (p = 0.003). Adenocarcinoma was the most common histology (52%) followed by squamous cell carcinoma (36%). There was no difference in gender distribution for adenocarcinoma and squamous cell carcinoma. Patients mostly presented with complaints of pain (34.5%) while the most frequent finding on examination was an abscess (43%). On initial examination malignancy was suspected in only 24% of patients. In 78% of patients the fistula was perianal or anorectal in location. Observed survival rate was 71% at 1 year and 61% at 2 years.

CONCLUSION:

Incidence of cancer in perineal fistulas of CD is rare compared to non-fistulous CD. Overall prognosis appears to be poor. Diagnosis can be often delayed due to non-specific symptoms and findings. While cancer appears to be associated with the duration of CD as well as fistula, this complication can present much earlier than anticipated. A high suspicion for malignancy in chronic perineal fistulas associated with CD should therefore be maintained in spite of negative biopsies. Especially in women, the shorter duration of CD and fistulas prior to malignant degeneration necessitates an aggressive approach to detect cancer at the earliest.

CONCLUSION: Intubation of the pouch is required by some patients with failure of spontaneous defaecation after ileal pouch-anal anastomosis (IPAA). We assessed func-

Social, work and dietary restrictions, and quality of life (QOL) in patients who were using a Medina catheter to evacuate. The Cleveland global quality of life score (CGQOL) has been reported to be 0.8 in the global IPAA population.

METHOD: 31 IPAA patients prescribed a Medina catheter were identified from the pouch database and were sent a questionnaire by post. CGQOL and data on function, social, work and dietary restrictions were recorded.

RESULTS: 23 (74%) of 31 patients [median age 56 years; male 15(68%)] returned the questionnaire. Pouch configurations were J:8; W:10; S:5. The median duration of catheter usage was 9 (0.5–30) years. 22 (71%) patients reported improved QOL after starting regular intubation. Median 24hr bowel frequency was 4 (range 2–14). 16 (48%) of patients used the catheter for every defaecation, 8 (26%) experienced social or work-life restriction, 7 (22%) reported catheter blockage and 12 (52%) reported dietary restriction. The median CGQOL score was 0.72.

CONCLUSION: Medina catheter usage is tolerated in the long term and is associated with satisfactory quality of life of IPAA patients with outflow obstruction. Frequency of defaecation and CGQOL scores are comparable with the global IPAA population.
Transvaginal Laparoscopic Appendectomy
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Transvaginal surgery has become one of the premier access sites for Natural Orifice Transluminal Endoscopic Surgery (NOTES). The transvaginal approach seems to be safe and cause only minimal postoperative pain while providing most favorable cosmetic results for patients. With approval of the Institutional Review Board, a pure transvaginal laparoscopic appendectomy was successfully performed at Yale-New Haven Hospital in November 2008. A 20-year-old female presented to the Emergency Room with right lower quadrant pain and was diagnosed with acute appendicitis. Consequently, she consented to undergo a transvaginal laparoscopic appendectomy. In steep Trendelenberg position, access to the abdominal cavity was accomplished with a 2 cm incision thru the posterior fornix of the vagina. Once intraperitoneal access was established, a 14 mm trocar was introduced to establish pneumoperitoneum up to 15 mmHg. Then, a 5 mm 30 degree angled endoscope and a reticulating grasper for retraction were placed intraabdominal next to the trocar. After a nonperforated appendicitis was identified, the appendiceal base was taken with a 3.5 mm stapler. Subsequently, a 2.5 mm stapler was used to transect the mesoappendix and the appendix was removed thru the 14 mm trocar. Finally, the posterior fornix of the vagina was closed with interrupted absorbable sutures. No transabdominal skin incisions or punctures were necessary throughout the entire case. Operative time was 59 min. No major or minor complications were observed. The patient was discharged home on postoperative day 2, pain was easily controlled with Tylenol. Our case of a pure transvaginal appendectomy employs an easy to accomplish laparoscopic technique that seems to be safe for patients. It provides most favorable cosmetic results and appears to cause only minimal postoperative pain. The significant cosmetic advantage is obvious due to the elimination of abdominal incisions and subsequent scars. However, further studies are warranted to examine the possible advantage in regards to postoperative pain for the transvaginal approach.

Minimally Invasive Treatment of Deep Pelvic Endometriosis Involving the Intestine: Our Experience
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Deep pelvic endometriosis (DIE) with intestinal involvement requires complete excision of implants including bowel resection. We report our experience with minimally invasive treatment of DIE involving the intestine.

PATIENTS AND METHODS: data from all patients undergoing surgery for endometriosis were prospectively entered in a database. We identified 26 consecutive patients (mean age 33 yrs) who underwent 30 laparoscopic procedures for DIE involving the bowel between 03/03 and 03/08. Analyzed data included age, previous history of endometriosis, previous pregnancies, previous surgery, BMI, operative time, intra/postoperative complications, length of stay, short and long term outcomes. Subjective evaluation of improvement after surgery (compared to previous) was assessed using VAS scale and validated questionnaires. Postoperative hormonal therapy was not given.

RESULTS: preoperative symptoms included dysmenorrhea (100%), constipation/diarrhea (77%), tenesmus (73%), rectal pain (69%), dyspareunia (50%), chronic pelvic pain (42%), rectal bleeding (35%) and bloating (69%). Nineteen patients had previous surgery (73%). Preoperative investigations included endorectal ultrasound, barium enema and/or colonoscopy and pelvic MRI. Four patients (15.4%) underwent combined laparoscopic and minilaparotomic approach, 17 patients (65.4%) laparoscopic approach and 5 patients (21%) vaginal approach assisted by laparoscopy. Management of bowel endometriosis included superficial serosal excision and/or implant disc excision (20 patients), bowel resection with anastomosis (4 patients), appendectomy (2 patients) in addition to treatment of all others implants. No intra-operative complications were observed. The conversion rate was 7.7%. Overall complication rate was 7.7% including a fascial hematoma requiring revision and a superficial wound infection. Length of stay averaged 5 ± 3 days (range 2–13 days). Mean follow up was 2.4 yrs. Three patients with persistent pain and one with rectal bleeding presented recurrence during the follow-up and required further surgery. Subjective evaluation showed significant improvement in terms of dysmenorrhea, dyspareunia and chronic pelvic pain. At follow up no evidence of constipation/diarrhea, tenesmus, rectal pain or bleeding and bloating was observed. Questionnaire to evaluate the quality of life showed a significant improvement of anxiety, stress and depression. Four out of 10 of previously infertile patients became pregnant within 6 months after surgery.

CONCLUSIONS: Minimally invasive management of DIE requires a multidisciplinary approach and is associated with a significant improvement of symptoms.
W1506
A Systematic Review on the Surgical Treatment of Rectovaginal Fistulas in Crohn’s Disease: Rectal Versus Vaginal Advancement Flap
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Purpose Despite advances in the treatment of Crohn’s disease, the treatment of rectovaginal fistulas remains challenging. Rectal (RAF) and vaginal advancement flaps (VAF) represent two possible alternative surgical approaches to this problem. The study aims to review results of these surgical procedures for rectovaginal fistulas in Crohn’s disease.

METHODS: Medical databases from 1975 till August 2008 were consulted for potentially relevant publications. All studies dealing with the rectovaginal fistula repair in CD with rectal or vaginal advancement flaps were included. Two researchers worked independently on the study selection, quality assessment, data extraction and analysis phases of the study. Analyses were performed with Review Manager 2.0 software

RESULTS: Eleven observational studies were included with a total of 219 flap procedures for RV fistula. Primary fistula closure pooled rate was 54.2% (range 33.3–100%) after RAF and 69.4% (range 0–92.9%) after VAF (p = 0.13). Four studies were eligible for proper metaanalysis. In 56 patients the relative risk of primary fistula closure of RAF compared to VAF was 1.04 (95% CI: 0.63–1.72). After 79 procedures the relative risk of overall success of RAF compared to VAF was 0.92 (95% CI: 0.58–1.45) (Figure 1). The relative risk of recurrence after RAF compared to VAF was 0.47 (95% CI: 0.15–1.46) (Figure 2); in this case only two studies were taken into consideration.

CONCLUSIONS: Although limited by a few number of studies of low clinical evidence level, this systematic review suggests that there is no significant difference in terms of outcome between RAF and VAF for rectovaginal fistulas in Crohn’s disease. Recurrence rates seem to be lower after RAF but only two studies were available for metaanalyses.

W1507
In Modern Era, Recurrent Abdominal Desmoids Determine Outcome in Patients with Gardner Syndrome: A Cohort Study Including Three Generations of Affected Patients
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INTRODUCTION: The surveillance and treatment of patients with Gardner syndrome is tailored towards early recognition of colonic cancer secondary to intestinal polyposis. However, many Gardner patients suffer from extraintestinal tumors, mostly desmoid tumors, which can be challenging to treat due to invasive growth and frequent local recurrence. The aim of this study was to review our experience in the management of both intestinal malignancies as well as desmoid tumors.

METHODS: Since 1979, we have been treating a family of 105 descendants with Gardner syndrome from three generations living in a remote valley of the Swiss Alps. Patients with positive APC gene mutations were screened by endoscopy, and colorectal resection was performed upon suspicion of pending malignancy. Desmoid patients with locally resectable tumors were treated by surgery alone, whereas large tumours of the abdominal wall were treated by a combination of brachytherapy (BT) and radiotherapy (RT). Outcome was analyzed regarding length of tumor-free survival, overall mortality, and morbidity arising from both surgery and/or radiotherapy.

RESULTS: Of 105 family members, 35 are known to have Gardner syndrome. Preventive colorectal resections were performed in 16 patients (15%), with one death due to subsequent gastric cancer. In 5 patients who denied screening endoscopy, invasive tumors of the colon (3 patients), small intestine and stomach (one patient each) developed. Four of these patients died. In 15 patients a total of 23 desmoid tumors were diagnosed, 10 of which (67%) were located in the mesentery. Nine desmoids (64%) were located within the abdominal wall, and four patients (27%) suffered from desmoids in extra-abdominal locations. Excision alone was performed in nine cases (60%), whereas four patients were treated by a combination of BT and RT. Two other patients (13%) died from non-resectable mesenteric desmoids. Following BT/RT, all three patients were free of recurrence at an average follow-up of 11 months, and no specific local or systemic complications occurred.

CONCLUSIONS: With adequate screening and surveillance for the development of intestinal neoplasms combined with early resection of pending malignancy, good long-term control of these tumors is achievable. However, Gardner-associated desmoid tumors, with their tendency for local recurrence and invasive growth, remain difficult to treat and determine long-term survival and quality of life in many patients. Our data suggest good local control using brachytherapy as an alternative to resection in large desmoids of the abdominal wall that are not amenable to surgical resection.
**W1508**

Systematic Review of Atraumatic Splenic Ruptures: Analysis of Etiologies and Identification of Risk Factors for Rupture-Related Mortality

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**BACKGROUND:** Atraumatic splenic ruptures (ASR) are rare but potentially life-threatening events. Little is known about the etiology and the risk factors influencing mortality.

**AIM:** Characterization of predisposing etiological factors and identification of predictive factors for ASR-related mortality.

**METHODS:** Systematic literature review from January 1980 to June 2008 limited to patients aged ≥18 years. Statistics: logistic regression analysis.

**RESULTS:** Identification of 633 publications reporting on 845 patients. There was a 2:1 male predominance. Mean age was 44.9 ± 16.7 years (median 45, range: 18–86 years). In 59 patients (7%) the spleen was normal and no predisposing factor was identified (atraumatic-idiopathic splenic rupture). One, 2 or 3 predisposing factors were found in 711 (84.1%), 69 (8.2%) and 6 patients (0.7%), respectively (atraumatic-pathologic splenic rupture). Six major etiological groups were defined: a) neoplastic disorders (malignant 16.4% and non-malignant hematological disorders 2%), primary neoplastic 8.1% and secondary metastatic disorders of the spleen 3.8%), b) infectious disorders (viral 14.9%, bacterial 6.5%, protozoal 5.8%, fungal 0.1%), c) inflammatory, non-infectious disorders (pancreatitis 11%, amyloidosis 3.8%, vascular 2.2%, genetic 1.7%, autoimmune 1.4%), d) drug-induced disorders (9.1%), e) mechanical disorders (pregnancy-related 4.3%, congestive splenomegaly 2.5%) and f) normal spleen (6.4%). Splenic rupture was diagnosed by laparotomy 42.3%, computed tomography 32.4%, ultrasound 18.6%, scintigraphy 0.7%, laparoscopy 0.5%, angiography 0.3% or at autopsy 5.2%. Therapy consisted of total splenectomy 84.4%, splenorrhaphy 0.9% or conservative measures 14.7%. Splenomegaly was found in 55%. ASR-related mortality was 12.2%. Multivariate analysis found splenomegaly (odds ratio [OR] 2.337, standard error [SE] 0.967, 95% confidence interval [CI] 1.038–5.258, P = 0.04) and age ≥40 years (OR 1.939, SE 0.472, CI 1.203–3.386, P = 0.008) to be associated with mortality. Male gender, primary operative treatment and the coincidence of multiple predisposing factors were not related with mortality. Neoplastic disorders were associated with an increased ASR-related mortality (OR 2.634, SE 0.541, CI 1.762–3.938, P = 0.008) compared to the other etiological groups. Patients with an atraumatic-idiopathic splenic rupture (normal spleen, group f) showed a decreased ASR-related mortality (OR 0.111, SE 0.112, CI 0.015–0.807, P = 0.03).

**CONCLUSIONS:** Most ASR are atraumatic-pathologic splenic ruptures. Splenomegaly and advanced age are negative predictive factors for survival. Neoplastic disorders are associated with an increased rupture-related mortality.

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**W1509**

CEA and SCC-Antigen mRNA Expression in Preoperative Peripheral Blood Is a Significant Prognostic Factor in Patients with Esophageal Cancer

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Although circulating tumor cells (CTCs) in peripheral blood have recently been reported in patients with various types of cancer, the significance in esophageal cancer remains unknown. This study examined the correlation between prognosis and preoperative CTCs in peripheral blood in esophageal cancer patients who underwent surgery. A total of 115 patients with squamous cell carcinoma of the esophagus (ESCC) underwent curative resection at our hospital between September 2002 and December 2006. Peripheral blood samples were collected immediately before surgery and was subjected to real-time RT-PCR analysis for quantitation of carcinoembryonic antigen (CEA) mRNA and squamous cell carcinoma antigen (SCC) mRNA. Patients who had one or more positive markers as determined by RT-PCR were defined as CTC-positive. Twelve patients (10.4%) were CTC-positive. There were no significant relationship between CTC-positivity and any clinicopathological parameters. Overall survival did not significantly differ between the CTC-positive and CTC-negative patients (p = 0.17). However, disease-free survival was significantly better in CTC-negative patients than in CTC-positive patients (p = 0.0002). Multivariate analysis identified the number of lymph node metastasis (HR: 2.62, 95% CI: 1.22–5.61,
The incidence of distant organ failure was significantly higher in CTC-positive patients than in CTC-negative patients (5/12 vs. 15/103, p = 0.034), whereas the other types of recurrence did not significantly differ between the two groups.

CONCLUSIONS: CTCs in preoperative peripheral blood could be a predictive factor for poor prognosis and distant organ metastasis in patients with squamous cell carcinoma of the esophagus who underwent curative resection.

W1510

Esophageal Adenocarcinoma Arising After Fundoplication: A Population Based Analysis
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BACKGROUND: The effect of fundoplication, the most common antireflux operation, on the development of esophageal adenocarcinoma (EAC) caused by gastroesophageal reflux disease (GERD) remains controversial. Our aim was to investigate whether fundoplication has a protective role against EAC.

METHODS: Finnish Cancer Registry, Statistics Finland, and National Research and Development for Welfare and Health—audited Finnish national registers—provided the rate of fundoplication between 1987 and 2006 and all EACs diagnosed in Finland (population ca. 5 million) between 1980 and 2006. The hospital and outpatient records of EAC patients were evaluated.

RESULTS: The mean annual rate of fundoplication in Finland was 977. Of 1038 EACs, 57 had undergone fundoplication at mean age of 54.4 years (range 27–76): 42 men (74%), 15 female (26%). Mean age at the diagnosis of EAC was 65.6 (range 29–89). The mean time interval between fundoplication and EAC was 10.5 years (range 0–34). Before fundoplication 39 (68%) patients had had endoscopic esophagitis, including 24 with Barrett esophagus (1 high grade dysplasia). At the time of EAC diagnosis, objectively normal fundoplication was ascertained in 23 cases (40.4%) and failed in 20 patients (35.1%). Of these 20, 17 (29.8%) were diagnosed at endoscopy and 3 at pH measurement. In 14 patients (24.5%) the postoperative condition of fundoplication could not be verified. Of these, 4 (7.0%) had symptoms of heartburn and/or regurgitation.

CONCLUSIONS: Intention to treat GERD with antireflux surgery does not prevent from the development of EAC. EAC can arise also in patients with functional fundoplication. Although EAC can develop in preoperatively normal esophageal mucosa, patients with Barrett esophagus and endoscopic esophagitis seem to be at higher risk for EAC.
Reflex symptoms. Patients were randomized to a pH restricted (n = 44) or unrestricted diet (n = 41). Distal esophageal acid exposure was monitored for 48 hours and the pH components of the 1st and 2nd 24 hour recordings were compared. Patients were considered to have an abnormal pH test if there was increased esophageal acid exposure on either or both days of monitoring.

RESULTS: There were significant differences in acid exposure between the first and second days of pH monitoring in the unrestricted diet group (table). Exclusion of the meal period did not eliminate day-to-day variability and did not change any studies from abnormal to normal.

<table>
<thead>
<tr>
<th></th>
<th>Restricted (p value*)</th>
<th>Not Restricted (p value*)</th>
<th>Not Restricted Meal Excluded (p value*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite Score</td>
<td>0.41</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Fraction time pH &lt; 4</td>
<td>0.11</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Fraction time pH &lt; 4 (upright)</td>
<td>0.2</td>
<td>0.006</td>
<td>0.01</td>
</tr>
<tr>
<td>Fraction time pH &lt; 4 (supine)</td>
<td>0.2</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>Fraction time pH &lt; 4 (post-prandial)</td>
<td>0.31</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td># of episodes</td>
<td>0.31</td>
<td>0.06</td>
<td>0.32</td>
</tr>
</tbody>
</table>

(“Wilcoxon Signed Rank Test”)

CONCLUSIONS: Restriction of the diet to pH controlled food and liquids results in significantly less day-to-day variability in acid exposure on a 48 hour Bravo pH study. If an unrestricted diet is used, excluding the meal periods is of no benefit in reducing day-to-day variability.

Comparison between day 1 and day 2 pH recordings in patients with restricted diet, without restricted diet and without restricted diet after exclusion of the meal periods.

W1513

Stapled Pyloroplasty: A Fast and Safe Technique


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OBJECTIVES: The necessity of pyloroplasty after esophagectomy and gastric pull-up is debated. Disadvantages of a standard pyloroplasty include the potential for leak, added time to the procedure particularly during minimally invasive esophagectomy, shortening of the length of the graft, and perhaps an increased potential for post-operative bile reflux. The aim of this study is to report our experience with a novel internal pyloroplasty technique using a circular stapling device which is applicable to both laparoscopic and open esophagectomy.

METHODS: Retrospective review of the records of 144 consecutive patients that had esophagectomy and stapled pyloroplasty (SP) from 2002–2008. The SP is performed through a lesser curve gastrotomy with a 21 mm circular stapler that is opened across the pylorus and then closed while pushing the anterior wall of the pylorus downward into the stapler using a suture. The stapler is fired and a bite of the anterior muscular wall of the pylorus is removed, thereby disrupting the pyloric ring. The gastroscopy is excited with tubularization of the stomach.

RESULTS: The median age of the 144 patients was 63 years, and median follow up was 21 months. The SP technique was used in 117 open and 27 minimally invasive esophagectomies. None of the patients had evidence of a leak clinically or on routine post-operative barium swallow. The pylorus was dilated during subsequent endoscopy for post-operative symptoms in 11/144 (8%) patients. Postoperative dumping syndrome was seen in 2 (1%) patients. No complications related to the procedure have occurred.

CONCLUSION: Stapled pyloroplasty is an alternative to standard pyloroplasty with esophagectomy and is associated with no graft shortening and no post-operative leak rate. It can be done rapidly during both open and minimally invasive esophagectomy, and may be less disruptive to the pyloric function than a standard pyloroplasty.

W1514

Mucosal Stripping Vagal Sparing Esophagectomy for End Stage Achalasia


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OBJECTIVES: Mucosal stripping vagal sparing esophagectomy removes the esophageal mucosa while preserving the esophageal muscular wall. This procedure is an option in patients with end-stage achalasia and megaesophagus, and avoids a thoracotomy as well as the risk of significant bleeding that can occur with a transhiatal resection in these patients. The aim of this study is to assess the in hospital characteristics and long term outcome of patients who underwent mucosal stripping vagal sparing esophagectomy.

METHODS: Retrospective review of the charts and symptomatic follow-up of all patients who had mucosal stripping vagal sparing esophagectomy for end stage achalasia from 1993–2008.

RESULTS: There were 19 patients (7 males/12 females) with a median age of 49 years. Previous myotomy was performed in 10/19 (53%) and previous dilatation in 16/19 (84%). Gastric pull-up was performed in 10 (53%) and colonic interposition in 9 (47%). There were no perioperative deaths. The median operative blood loss was 800 ml and the median hospital stay was 13 days. No patient had mediastinal bleeding requiring thoracotomy. Perioperative complications included: mediastinal fluid collection in 4 and an abscess between the native esophageal muscle and the gastric pull-up in 1. Four patients required reoperation
including: evacuation of mediastinal hematoma in 1, VATS for multiloculated pleural effusion in 1, chronic colonic ischemia requiring take down of conduit in 1 and repair of anastomotic breakdown in 1 patient. At a median follow-up of 6 years, 18/19 (95%) patients were alive. Six patients (32%) had nocturnal regurgitation but none required reoperation (4 colon interposition and 2 gastric pull-up). On symptomatic follow-up 16/19 (84%) were free of dumping and 16/19 (84%) were free of diarrhea. The median weight loss was 7 pounds in 10/19 (53%) patients and the weight returned to the preoperative value in 9/19 (47%).

CONCLUSIONS: Mucosal stripping vagal sparing esophagectomy can be performed safely in patients with end stage achalasia and megaesophagus with minimal mediastinal bleeding. Placement of the graft within the native esophageal muscular tube minimizes redundancy and displacement of the graft. Regurgitation is more significant after colon interposition, and gastric pull-up is now favored. Mucosal stripping vagal sparing esophagectomy should be considered in the surgical treatment of patients with end stage achalasia and megaesophagus.

### W1515
Laparoscopic Heller Myotomy with Dor Fundoplication (HM+Dor) for Achalasia: Multichannel Intraluminal
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HM+Dor fundoplication is generally considered as the operative procedure of choice for esophageal achalasia. Post treatment complications include persistent or recurrent dysphagia, and gastroesophageal (G-R) reflux with related complications. One of the goals of instrumental follow-up in these patients is to evaluate silent reflux which can be present in up to 20% of patients. Aim of the present study was to characterize reflux events after HM+Dor in patients treated for achalasia, using MII-pH monitoring.

#### Seventeen consecutive patients who underwent HM+Dor fundoplication for achalasia (9 female; median age 39 (range 24–77 yrs;) underwent a clinical and physiopathological (esophageal stationary manometry and MII-pH impedance) evaluation after a median of 24 months after surgery (range 6–109). All patients were asymptomatic for acid reflux and none was on antisecretory therapy. Three patients reported persistent dysphagia for solid at follow up (Eckardt 2). Median Eckardt score was 7 (range 2–11) and 1 (0–3) respectively before and after surgery (p: 0.0001). Mean pressure of lower esophageal sphincter was 37 mm Hg (SD + 19.6) and 9.2 mm Hg (SD + 4.1) before and after HM. All but one had a residual pressure <4 mm Hg. The MII-pH data after HM + Dor in achalasia patients are reported in Table. Esophageal acid exposure is in the normal range after surgery in this cohort of patients. We found a pathological number of non acid reflux, mainly in patients complaining of residual dysphagia (Fisher’s exact test p < 0.05), in spite of a normal bolus clearance time.

<table>
<thead>
<tr>
<th>MII-pH</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esophageal total acid exposure (%)</td>
<td>0.003</td>
<td>0–0.4</td>
</tr>
<tr>
<td>Number of reflux events</td>
<td>60.5</td>
<td>20–283</td>
</tr>
<tr>
<td>Number of acid reflux events</td>
<td>1.5</td>
<td>0.25–107</td>
</tr>
<tr>
<td>Number of non acid reflux events</td>
<td>58</td>
<td>20–156</td>
</tr>
<tr>
<td>Bolus clearance time (s)</td>
<td>12</td>
<td>3–32</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Dor fundoplication is a valid option after HM for achalasia to prevent G-R reflux. In these patients reflux events are mostly non acid and may be positively correlated with dysphagia. More data are needed to confirm the role of MII pH in patients with motility disorder.

### W1516
A Safe and Reproducible Anastomotic Technique for Minimally Invasive Ivor Lewis Esophagectomy—The Circular Stapled Anastomosis with the Transoral Anvil
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BACKGROUND: Esophageal adenocarcinoma is the most common subtype of esophageal cancer in the U.S. In most of these cases, an Ivor Lewis approach permits a complete resection and dissection of abdominal and mediastinal lymph nodes. Although an esophago-gastric anastomosis that is hand-sewn or created with a linear stapler usually provides a low rate of strictures and leaks, it can be technically challenging and time consuming, particularly when minimally invasive techniques are used.

OBJECTIVE: To present the initial results of a standardized 25 mm/4.8 mm circular stapled anastomosis using a transorally placed anvil.

METHODS: We evaluated a prospective cohort of consecutive patients offered minimally invasive Ivor Lewis esophagectomy in a tertiary referral medical center. The esophago-gastric anastomosis was done using a 25 mm anvil (Orvil, Autosuture, Norwalk, CT) passed trans-orally, in a tilted position, and connected to a 90 cm long PVC delivery tube through an opening in the stapled esophageal stump. The anastomosis was completed by joining the anvil to a circular stapler (EEA XL 25 mm with 4.8 mm Staples, Autosuture, Norwalk, CT) inserted in the gastric conduit. Primary outcomes were leak and stricture rates.

RESULTS: Twenty-two patients (mean age 68 years; range 42 to 84) with distal esophageal cancer (n = 19) or high-grade dysplasia in Barrett’s Esophagus (n = 3) underwent an Ivor Lewis Esophagectomy between Oct. 2007 and Nov. 2008. Eight patients had received neo-adjuvant therapy. The abdominal portion of the operation was completed laparoscopically in 17 patients (77%). The thoracic portion was completed using a mini-thoracotomy in 13 patients (59%) and thoracoscopic technique in 9 (41%). Proximal and distal margins were negative in all patients. A median of 16 lymph nodes (range 8 to 29) were dissected from each specimen, with a median of 2 (range 0 to 15) histologically positive nodes. No intra-operative technical failures of the anastomosis, post-operative leaks, pleural space...
infections, or deaths occurred. Twelve general complications occurred in 8 patients (36%); the most common was atrial fibrillation. The average hospital stay was 11 days (range 8 to 17). Two patients had stricture at 21 and 25 days post-operatively, and were successfully treated with a single endoscopic dilation.

CONCLUSIONS: The circular stapled anastomosis with the transoral anvil technique eliminates the need to insert and secure the anvil into the esophageal stump, and allows for a safe and reproducible anastomosis. This straightforward technique is particularly suited to the thoracoscopic approach.

W1517
Comparing Esophagectomy Techniques at a Single Center: Transthoracic Versus Transhiatal Versus Minimally Invasive Esophagectomy
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Surgery, Creighton University, Omaha, NE

OBJECTIVE: To compare the operative outcomes between different open and minimally invasive esophageal resection techniques.

METHODS: All patients undergoing esophageal resection and gastric pull-up with cervical esophageogastric anastomosis between 2003 and 2008. Of these there were 28 open transthoracic (TTE), 39 open transhiatal (THE), and 27 minimally invasive esophagectomy (MIE). The age of patients undergoing THE was significantly higher than the TTE and MIE groups. There was no significant difference in sex or co-morbidities between the 3 groups. 60% of THE, 64% of TTE and 74% of MIE patients underwent neoadjuvant therapy. There was significantly higher blood loss in THE (857 cc) as compared to the MIE group (430 cc) resulting in a significantly higher percentage of patients in TTE (82%) and THE (69%) requiring blood products as compared to MIE (26%) group. The operation duration were all significantly different with TTE being the longest in duration at 502.6 min, followed by MIE at 429.1 min, and 328.3 min. There were significantly more lymph nodes removed in the TTE verse THE group (p = 0.001) with 19.4 (range 39–11) and 12.9 (range 25–5) respectively. There was on average 15.6 (range 42–1) lymph nodes removed in the MIE patients which was not significantly different from either THE or TTE. Post-operatively there was one death in each the THE and MIE groups and no post-operative deaths in the TTE group. There was no significant difference in mean hospital stay between the groups, with the median stay being 13, 13 and 14 days in the TTE, MIE, and THE groups. There were significantly higher complications in THE compared to TTE and MIE groups.

CONCLUSIONS: There is significantly decreased blood loss and requirement for blood transfusion along with decreased morbidity with MIE compared to TTE and THE.

W1518
Minimally Invasive Esophagectomies (MIE) at a Non University Tertiary Care Center (NUTCC): Feasibility and Outcomes
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INTRODUCTION: Minimally invasive surgery has been applied in a number of ways to esophagectomy. Newer techniques have improved patient outcomes while maintaining oncological principles, however, mortality still exists. The aim of this study was to assess the feasibility of performing MIE with a combined thoracoscopic and laparoscopic approach at a NUTCC.

METHODS: Minimally invasive esophagectomies (MIE) in the form of combined thoracoscopic and laparoscopic esophageal resections that were performed cooperatively by two surgeons between September 2005 and August 2008 were retrospectively reviewed. The records were reviewed with respect to preoperative and postoperative data, thirty-day mortality, morbidity and histopathology data.

RESULTS: Thirty four (34) patients underwent minimally invasive esophagectomy for esophageal disorders, 61% for adenocarcinomas, 21% for squamous carcinomas, and 9% for high-grade dysplasia with Barrett’s. Three patients underwent MIE for benign conditions (2 for end stage achalasia and 1 for corrosive esophageal stricture). Mean age at presentation was 62.6 years. Comorbidities were documented in 79% of the study group, with 53% being ASA class III and 41% as ASA class IV. Most patients (68%) presented with dysphagia. A total of 18 patients (58%) had received preoperative chemoradiotherapy. The mean operating time was 294 minutes. Mean blood loss was 302 mL. The mean intraoperative transfusion rate was 21%. Three patients (9%) required extension to mini-celiotomy. The mean length of hospital stay was 14.6 days. Delayed gastric emptying was the most common complication in the post-operative period, and was seen in 15% of patients. Three patients (9%) required a reoperation for wound problems. There was no anastomotic leak. There was no mortality reported in the series. The overall morbidity was 48%.

CONCLUSIONS: Minimally invasive esophagectomy can be performed with results that meet and exceed reported benchmarks in terms of perioperative outcome at NUTCC. The combined (Thoracoscopy and Laparoscopy) technique may help to achieve low mortality and hence better safety. It is a team-based approach, as factors beyond the surgical technique affect the outcomes of surgery.
Clinical: Hepatic

W1519
Safety and Effectiveness of Systematic Long-Term Drains Maintenance After Hepatic Resection
Guido Torzilli¹, Matteo Donadon, Fabio Procopio, Matteo M. Cimino, Matteo Marconi, Angela Palmisano, Daniele Del Fabbro, Marco Montorsi
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BACKGROUND: The routine use of abdominal drains after hepatic resection is a matter of debate as well as its long-term maintenance. However, undetected bile leakage may be the source of major morbidity, which may require interventional procedures or even reoperations. The aim of this study was to investigate the safety and effectiveness of the systematic long-term drains maintenance after hepatic resection for liver tumors.

METHODS: We reviewed the records of 327 consecutive patients who underwent hepatic resection at our Unit based on the same prospective selection process. One-hundred-sixty-eight patients (52%) had hepatocellular carcinoma, 105 (32%) had colorectal liver metastases, and 54 (16%) had other malignancies. Each patient had abdominal drains placement, and those drains were maintained for at least 7 days after surgery. The bilirubin concentration was significantly increased between the 3rd and 5th POD (P < 0.001), and then significantly decreased at the 7th POD (P < 0.001). Eight patients (2%) had biliary fistula, which was conservatively treated by drain maintenance. Only one patient (0.3%) required a percutaneous drainage for a fluid collection developed after drains removal. No infections or others drains-related complications occurred.

RESULTS: The median number of drains per patient was 2 (range 1–5). The 90-days mortality was 1%. The overall morbidity rate was 17% and major morbidity occurred in 6%. The trend of the bilirubin concentration showed that the bilirubin significantly increased between the 3rd and 5th POD (P < 0.001), and then significantly decreased at the 7th POD (P < 0.001). Eight patients (2%) had biliary fistula, which was conservatively treated by drain maintenance. Only one patient (0.3%) required a percutaneous drainage for a fluid collection developed after drains removal. No infections or others drains-related complications occurred.

CONCLUSIONS: The late onset of biliary fistula justify the long-term maintenance of drains after hepatic resection for liver tumors, which is a safe and effective method in reducing the rate of undetected abdominal collections and in preventing postoperative morbidity and mortality.

W1520
Prediction of Iron Overload with a New Mass Spectrometry Method for Detection of Hepcidin in Plasma
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Hepcidin (Hep) has emerged as the primary regulator of iron homeostasis. Aims: 1) to assess the performance of plasma Hep measured by a SELDI-TOF-MS method in different conditions of iron metabolism disorders with respect to healthy controls (HC); 2) to identify, among a large series of metabolic, liver and iron metabolism indices, including Hep, those of potential diagnostic utility. Patients: 10 type I hemochromatosis (HH); 17 NAFDL; 10 HCV and 155 HC (normal ultrasound, normal LFTs, alcohol assumption <20 g ethanol/day). Plasma Hep was measured by SELDI-TOF-MS (reference standard = known concentrations of the synthetic 25-aa peptide). The following were included: glucose, insulin, C-peptide, HbA1c, cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, ferritin, transferrin, Fe++, TIBC, ALT, GGT, Hb, Hct, MCV, Ca++, uric acid, urea nitrogen, total proteins. Hep was higher in HCV (26.3 ± 7.2 nmol/L, mean ± SE) than in HC (12.3 ± 1.0) (F = 3.2, p < 0.05). Fe++ and TIBC were higher in both HH and HCV with respect to HC (F = 7.9, p < 0.001 and F = 23.7, p < 0.001), while ferritin and transferrin were associated with Hep only (F = 7.0, p < 0.001 and F = 7.8, p < 0.001). Glucose, C-peptide and insulin were higher in HH and NAFDL with respect to HC (F = 21.1, p < 0.001, F = 18.1, p < 0.001 and F = 21.9, p < 0.001). Hep was correlated with ferritin (r = 0.451, p < 0.001) and the index Hep/ferritin (H/F) was reduced in HH patients only (F = 2.18, p = 0.07). H63D heterozygotes subjects revealed a pattern of iron overload [higher Fe++ (t = 2.7, p < 0.05), TIBC (t = 3.5, p < 0.01), and lower H/F (t = 2.5, p < 0.05)] compared to H63D wild type subjects. To identify the indices which better allow to classify HH and NAFDL, the Biomarker Pattern software was employed. HH vs. HC without H63D mutated allele: the best algorithm included as main splitters H/F, glucose and Fe++, which allowed to correctly classify 100% HH and 98.6% HC (AUC = 0.993). NAFDL vs. controls: the best algorithm included as main splitters insulin and glucose, which allowed to correctly classify 94% NAFDL and 89% HC (AUC = 0.951). In Conclusion, the new plasma Hep mass spectrometry method yields accurate measurements which reflect pathologic and genetic influences; simple non invasive markers (H/S, glucose and iron insulin and glucose) can suggest the presence of HH or NAFDL.
W1521

Safe Liver Resection for Hilar Cholangiocarcinoma Without Preoperative Biliary Drainage and Portal Vein Embolization

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BACKGROUND: Major hepatic resections in steatotic livers may carry high risk of postoperative liver failure unless preoperative biliary drainage is carried out.

AIM: to analyze the results of surgical resection in hilar cholangiocarcinoma treated over an 18 year period and determine mortality and morbidity rates of hepatic resection in hilar cholangiocarcinoma and the factors affecting surgical outcome.

PATIENTS AND METHODS: During the period 1987 to 2008, 84 hepatic resections were performed for Klatskin tumours. They included extended right hepatectomy in 7, right hepatectomy in 11, left hepatectomy in 25, extended left hepatectomy in 6, and parenchyma-conserving liver resections in 32 patients. In addition, 8 patients underwent resection and reconstruction of the portal vein, and two patients underwent reconstruction of the right hepatic artery. Median bilirubin levels were 10.6 mg/dl (range 4.3 to 27.6 mg%). Age, sex, comorbid illnesses, bilirubin levels, elevated liver enzymes, abnormal but correctable prothrombin time, operating time, intra-operative hypotension, blood loss, vascular resection, infected bile, and disease stage were examined for correlation with mortality and morbidity.

RESULTS: 7 patients died (mortality 8.3%). All the deaths were in the major hepatic resection group. On univariate analysis: operating time, intraoperative blood loss, hypotension, comorbid illnesses, bilirubin levels >20 mgs%, and vascular resection were risk factors for mortality. On multivariate analysis, however, concomitant vascular resection and intra operative blood loss and hypotension were the only factors correlating with mortality. 33 major complications occurred in 21 patients (39%).

CONCLUSION: Safe hepatic resection for hilar cholangiocarcinoma can be carried out in patients with jaundice without preoperative biliary drainage. Concomitant vascular resection, and bleeding may however place the patient at risk for postoperative morbidity.

W1522

Hemostasis After Liver Resection Improves After Single Application of Albumin and Argon Beam Coagulation

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1Oregon Medical Laser Center, Providence Health and Services, Portland, OR; 2Providence St. Vincent Medical Center, Providence Health and Services, Portland, OR; 3Providence Portland Medical Center, Providence Health and Services, Portland, OR; 4GMIS, The Oregon Clinic, Portland, OR

INTRODUCTION: Bleeding from the liver surface is common after hepatic resection and is often controlled using argon beam coagulation (ABC) alone. Animal studies have demonstrated that applying 38% Human Serum Albumin to the resected surface before ABC results in fewer rebleeds. The combination of ABC and albumin (ABCA) has not been reported in humans. The aim of this study was show feasibility of using ABCA for hemostasis of the liver following hepatic resection in humans.

METHODS: Ten patients underwent liver resection. All ten received ABCA. The liver surface was coated with albumin and coagulated. The liver was covered with gauze for 3 min and inspected for bleeding. This process was repeated if necessary. The number of rebleeding episodes, the time of ABC, overall blood loss, and liver functions were monitored. Patients were followed for at least 6 months.

RESULTS: Nine of 10 patients required a single application of ABCA, and one patient required 2 treatments. Average time of ABC use was 5 ± 3 min. Median blood loss was 1100 mL. Liver functions returned to near normal within 4 days of resection.
RESULTS: Data on gastric tubes and nutrition.

In our pancreatic surgery database (including complete operation via enteral feeding tubes and gradually replaced by regular oral diet. The perioperative data were recorded by regular oral diet. The perioperative data were recorded.

95% (DGE A 21%, grade B 7%, grade C 5%). A clinically relevant DGE (grade B or C; 12%) occurred significantly more frequently in the presence of other complications (DGE B/C in 21% vs. 1% in patients without other complications; p < 0.001), with surgical complications (DGE B/C in 26% vs. 4% without surgical complications; p < 0.001), with abdominal abscesses (DGE B/C 37% vs. 9% without abscesses; p < 0.001) or in patients with a pancreatic leak (DGE B/C 25% vs. 9% without a pancreatic leak; p < 0.001). A diabetes (24% of the patients) did not correlate with the occurrence of DGE.

CONCLUSIONS: As evaluated by the new ISGPS-classification DGE occurred in 37% of the patients after PPPD. However, DGE was of no or minor relevance in about two thirds of the cases. A clinically relevant DGE (grade B/C) almost always correlated with other postoperative complications.

W1524

Endoscopic Papillectomy in Suspicious Lesions of the Papilla of Vater (N = 54 Patients)

Uwe Will, Frank Meyer

For the treatment of tumor lesions of the papilla of Vater (papilla), it is required, in addition to a sufficient pathohistologic investigation, to achieve an adequate pretherapeutic tumor staging, which allows a decision-making toward the appropriate treatment (surgical intervention, papillectomy, papillotomy) according to the patients specific finding. These requirements can be fulfilled by endoscopic ultrasoundography (EUS). The aim of the study was to investigate feasibility, treatment results & outcome of endoscopic papillectomy.

METHODS: Through a defined time period, all consecutive patients with tumor-like lesions of the papilla, who were considered for endoscopic papillectomy, were enrolled in this systematic bicenter case-controlled study. The patients were subdivided into 4 groups according to endoscopic & EUS findings as well as pathohistologic diagnosis. Feasibility & treatment results were characterized by R0 resection rate, morbidity (e.g., rate & spectrum of complications) & mortality; outcome was assessed by recurrence rate & tumor-free survival.

RESULTS: From 1996–2003, 58 patients underwent endoscopic papillectomy. Main symptoms prompting to diagnostic were unclear abdominal pain in 50% & cholestasis in 44%. Overall, 54/58 patients (93.1%; sex ratio, males:females = 25:29 [1:1.16]; mean age, 65years [range, 22-88years]) were enrolled. Prior to papillectomy, EUS was performed in 4/5 (79.6%; n = 43) of patients. Group(G) 1 (adenoma, n = 24): 91.7% (n = 22) with R0 resection; minor complications, 12.5% (n = 3); tumor-free survival after a mean of 18.5 months, 87.5%; recurrence, 12.5% (n = 3). Gr.2 (carcinoma/neuroendocrine tumor, n = 18):

<table>
<thead>
<tr>
<th>Table 1. Surgical Metrics</th>
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<tbody>
<tr>
<td>Patient</td>
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<td>---------</td>
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<tr>
<td>1</td>
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<td>9</td>
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<tr>
<td>10</td>
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<tr>
<td>Median ± StdDev</td>
</tr>
</tbody>
</table>

CONCLUSIONS: ABCA performed well in controlling hepatic bleeding, much like previous observations in animal studies. Further clinical trials are justified using this technique.

Clinical: Pancreas

W1523

Delayed Gastric Emptying After Pylorus-Preserving Pancreatectoduodenectomy—Analysis of 420 Patients Using the New ISGPS-Klassifikation

Tobias Keck, Frank Makowiec, Ulrich F. Wellner, Ulrich ADAM, Ulrich T. Hopt

Delayed gastric emptying (DGE) is a frequent complication after pylorus-preserving pancreatectoduodenectomy (PPPD). Among others the location of pylorojejunosotmy and the presence of other surgical complications may influence the occurrence of DGE. Since definitions of DGE varied largely in the past, the International Study Group of Pancreatectomy Surgery (ISGPS) recently proposed a standardized classification of DGE 2007 into grade A (no clinical relevance) and grade B and C (clinically relevant). We, therefore, analyzed our experience with DGE after more than 400 PPPDs using the new ISGPS-classification.

METHODS: Since 1996 420 PPPDs were performed for pancreatic cancer (36%), extrapancreatic periampullary cancer (25%), chronic pancreatitis (28%) or others (11%). The pylorojejunosotmy was always performed in retrocolic fashion, abdominal drains were always placed. Prokinetic drugs were only given in the case of DGE. In almost all cases postoperative feeding was started at day one after the operation via enteral feeding tubes and gradually replaced by regular oral diet. The perioperative data were recorded in our pancreatic surgery database (including complete data on gastric tubes and nutrition).

RESULTS: Complication rates after 420 PPPDs were 54% (any), 36% (surgery-related), 19% (infectious), 16% (pancreatic leak) and 10% (abdominal abscess). Mortality was 2.9%, reoperation rate for complications 11%. DGE (all grades) occurred in 37% (grade A 25%, grade B 7%, grade C 5%). A clinically relevant DGE (grade B or C; 12%) occurred significantly more frequently in the presence of other complications (DGE B/C in 21% vs. 1% in patients without other complications; p < 0.001), with surgical complications (DGE B/C in 26% vs. 4% without surgical complications; p < 0.001), with abdominal abscesses (DGE B/C 37% vs. 9% without abscesses; p < 0.001) or in patients with a pancreatic leak (DGE B/C 25% vs. 9% without a pancreatic leak; p < 0.001). A diabetes (24% of the patients) did not correlate with the occurrence of DGE.
W1525
Factors Associated with Early Liver Recurrence After Pancreatoduodenectomy
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1GI and General Surgery, Mayo Clinic, Rochester, MN; 2Biostatistics, Mayo Clinic, Rochester, MN; 3Pathology, Mayo Clinic, Rochester, MN

BACKGROUND: Hepatic metastases, by far the most common site of pancreatic ductal adenocarcinoma (PC) metastases, are involved in 50-62% of failures after operative resection. Metastatic recurrence, not loco-regional recurrence, is the most important determinant of poor survival after pancreatoduodenectomy (PD).

HYPOTHESIS/AIM: We hypothesized that patients who develop early hepatic recurrence after PD for PC have unique preoperative and tumor characteristics but similarly “successful” resections when compared to patients who have relatively greater recurrence-free survival. Our aim was to compare preoperative factors and tumor characteristics between patients with early hepatic recurrence versus those with extended recurrence-free intervals.

METHODS: We reviewed 599 patients who underwent PD for PC at our institution from 1981 to 2007; 75 patients developed liver recurrence within 8 months of PD. These patients were matched by age, sex, and era of PD to a reference group consisting of 75 patients whose recurrence-free survival exceeded our entire cohort’s median recurrence-free survival of 15 months. Comparisons of preoperative and tumor characteristics were evaluated using Wilcoxon rank sum, Chi-square, and Fisher’s exact tests.

RESULTS: Preoperative jaundice, weight loss, abdominal pain, ASA score, BMI, and use of neoadjuvant or adjuvant therapy were not different between patients with early liver recurrence versus the reference group (all p > 0.08). In terms of tumor-related factors, patients with early liver recurrence had larger and higher grade neoplasms at PD compared to the reference group (p = 0.005 and 0.026, respectively). Other tumor characteristics, including tumor stage and nodal metastases were not different between patients with early liver recurrence and the reference group (p = 0.10 and 0.87, respectively). R0 resection rates were not different between patients with early liver recurrence and the reference group (p = 0.56).

CONCLUSIONS: Patients who develop liver recurrence within 8 months of PD for PC have larger and higher grade neoplasms compared to patients with recurrence-free survival greater than 15 months. Development of early liver recurrence is not related to the presence of higher stage neoplasms, nodal metastases, or lack of curative (R0) resection at the time of PD. Identification of these and other factors that are unique in the development of early liver recurrence may offer an opportunity for novel adjuvant treatment strategies for patients with PC.

W1526
Effect of Pancreatoduodenectomy on the Course of Hepatic Steatosis
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PURPOSE: Several reports have suggested the development of hepatic steatosis after gastrointestinal bypass surgery in patients without metabolic syndrome. The aim of this study was to investigate the effect of pancreatoduodenectomy (PD) on the course of hepatic steatosis by use of CT attenuation values.

MATERIALS AND METHODS: A retrospective case-crossover study by using the PD database of NCKUH. Between January 2004 and January 2008, patients admitted for PD were enrolled. Exclusion criteria included multiple liver metastasis, severe obesity (BMI > 30), unavailable pre-op and post-op over 6-months CT images. The pre-PD and post-PD liver attenuation, ratio of liver-to-spleen attenuation, and pre-PD and post-PD difference between liver and spleen attenuation were compared. Paired student t test was used for statistical analysis.

RESULTS: 99 patients were extracted from the database and finally 50 patients were eligible. The mean follow-up period for the study group was 18.0 ± 1.6 month, range from 6 to 43 months. The pre-PD and post-PD liver attenuation was 52.3 ± 1.1H and 47.6 ± 2.0 H (p = 0.044). The pre-PD and post-PD ratio of liver-to-spleen attenuation were 1.12 ± 0.02 and 1.01 ± 0.04 (p = 0.033). The pre-PD and post-PD difference between liver and spleen attenuation were 5.52 ± 1.07 H and 0.55 ± 1.85 H (p = 0.031).

CONCLUSION: According to the quantitative analyses of attenuation on CT image, the progression of hepatic steatosis was found after pancreatoduodenectomy. The mechanism of post-PD hepatic steatosis is necessary to be further elucidated.
A Comparison of Laparoscopic and Open Distal Pancreatectomy
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General Surgery, University of California, Los Angeles, Los Angeles, CA

BACKGROUND: The adaptation of laparoscopic surgical techniques to pancreatic diseases has been slow since the procedures are technically complex and the oncologic implications are unclear. Only small series of laparoscopic distal pancreatectomy (LDP) have been reported, and the advantages of laparoscopic over open distal pancreatectomy (ODP) have yet to be confirmed.

METHODS: MEDLINE and PubMed were systematically searched from the last 10 years for series reporting at least 10 LDP or 100 ODP cases. We also reviewed our own experience with LDP and ODP and analyzed these data. The effects of operative approach were assessed by calculating pooled estimates of blood loss, operative time, complications, mortality, pathologic parameters, and length of hospital stay. Separate analyses were performed for each outcome by using odds ratio (OR).

RESULTS: Twenty-two case series were included (n = 1,075 patients). There were more females in the LDP group (42.6% vs. 62.9%; p < 0.0001), and operative blood loss was greater for ODP (699 ± 15 mL vs. 269 ± 20 mL, p = 0.0002). The spleen was preserved in 19.8% of ODP and 38.8% of LDP (p < 0.0001). The laparoscopic approach increased the odds of having a postoperative complication (OR 1.32, 95% CI: 1.02–1.70, p = 0.03). The rate for pancreatic fistula was similar for LDP (17.9%) and ODP (14.3%) (OR 1.31, 95% CI: 0.94–1.83, p = 0.11). Postoperative pseudocyst (OR 99.85, 95% CI: 6.05–1647.13, p = 0.01) and splenic infarct (OR 5.12, 95% CI: 1.38–19.00, p = 0.02) were higher in the LDP group. Other complications were more frequent in the ODP group (p = 0.02). For example, patients having an ODP were more likely to require reoperation (OR 2.23, 95% CI: 1.01–4.93, p = 0.05). The rate of an R1 resection was similar (ODP 1.3%, LDP 1.5%, p = 0.80). Lymph node harvest was not consistently reported in the outside series, but among our own patients undergoing LDP, there were fewer nodes (5.3 ± 1.5) examined than in patients who had ODP (9.3 ± 0.7, p = 0.01). There was a trend towards increased length of stay for ODP (11.0 ± 1.6 days) compared with LDP (7.5 ± 1.1 days; p = 0.15). Mortality rate (ODP 4.1%, LDP 5.0%, p = 0.72) was similar regardless of operative approach.

CONCLUSIONS: While LDP offers some advantages over ODP, the complication rate appears higher and there may be fewer lymph nodes sampled. Additional studies will be required to reliably assess the pros and cons of laparoscopic pancreatic surgery, and to clarify the technique and indications for specific clinical conditions.

Colectomy in Necrotizing Pancreatitis Portends a Complex Clinical Course
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General Surgery, IU, School of Medicine, Indianapolis, IN

INTRODUCTION: Necrotizing pancreatitis (NP) is a severe inflammatory process involving the pancreas, peripancreatic soft tissue, and mesenteric fat particularly in the transverse mesocolon and the root of the small bowel mesentery. Mesocolic involvement with this necrotizing process can directly and indirectly affect the blood supply to the colon resulting in ischemia, end-organ damage, and the need for colectomy. The aim of this study was to define the incidence and clinical outcome of patients requiring colectomy is the setting of NP.

METHODS: Records of all patients with acute pancreatitis (ICD-9 code 577.0) admitted to Indiana University Hospital between January 1996 and April 2008 were cross-referenced with radiographic imaging data to identify patients with NP. Of 340 patients with NP, 37 patients required colectomy (Colectomy group). These patients were matched for age, gender, body mass index (BMI), and medical co-morbidities (diabetes, hypertension, coronary artery disease, pulmonary disease) with 37 NP patients who did not require colectomy (control group). Indications for and timing of colectomy were recorded, and clinical outcomes of the two groups were compared. Data were analyzed with Student’s t-test, Chi square and Fisher exact test. P value of less than 0.05 was considered statistically significant.

RESULTS: Eleven percent of all patients with NP (37/340) required colectomy. Indications for colectomy were: ischemia (20, 54%); fistula (8, 22%); intraoperative perforation (4, 11%); and other (5, 14%). Six percent of patients had colectomy prior to debridement, 40% required colectomy during initial pancreatic debridement, and 54% required the colectomy following the initial debridement. Outcomes for controls and colectomy patients are shown in the Table.

<table>
<thead>
<tr>
<th>Table 1.</th>
<th>Group</th>
<th>Control</th>
<th>Colectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>54 ± 3</td>
<td>54 ± 2</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>28 ± 1</td>
<td>26 ± 1</td>
<td></td>
</tr>
<tr>
<td>Length of Stay (LOS)</td>
<td>24 ± 1</td>
<td>37 ± 5*</td>
<td></td>
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<tr>
<td># Re-Admissions</td>
<td>0.9 ± 0.2</td>
<td>3.0 ± 0.6*</td>
<td></td>
</tr>
<tr>
<td>Total LOS</td>
<td>30 ± 2</td>
<td>63 ± 5*</td>
<td></td>
</tr>
<tr>
<td># Operations</td>
<td>1.8 ± 0.2</td>
<td>3.9 ± 0.4*</td>
<td></td>
</tr>
<tr>
<td># Debridement</td>
<td>1.3 ± 0.1</td>
<td>1.9 ± 0.1*</td>
<td></td>
</tr>
<tr>
<td>Mortality</td>
<td>2/37 (5%)</td>
<td>7/37 (19%)*</td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.01 vs. control
CONCLUSIONS: These data show that: 1) colonic involvement is common in the setting of necrotizing pancreatitis, 2) ischemia is the most common indication for colectomy, and 3) patients requiring colectomy have significantly longer length of stay, readmission rate, and number of operations compared to those who did not require colectomy. In the setting of necrotizing pancreatitis, colectomy is common and portends a complex clinical course; clinicians must have a high index of suspicion for as well as an appreciation of the consequences of colonic involvement.

W1529

Pancreatic Cancer (CaP) Actual Survival at Ten or More Years: Does Therapy Influence Survival?
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1Surgery, St. Vincents Hospital, New York, NY; 2Pancreas & Biliary Center, St. Vincent’s Hospital, New York, NY

Actual 10+ yr survival with CaP is uncommon. Most 5 yr survivors die of disease before the 7th yr. One review noted only 13, 10+ yr survivors. Between 1994–2001, 180 Pancreatoduodenal resections (PDR) were done; 80 for CaP. Thirteen survived 5 or more years (17%). Ten survive(d) ten + yrs (13%). Two others are well at 83, 91 months. One pt. died of metastases from CaP or a subsequent lung cancer at 84 months. 5 other patients treated prior to 1994 survive(d) 10+ years. Three treatments were used; surgery alone (S), surgery & adjuvant therapy (S&A), or neo-adjuvant therapy & surgery (N + S). Of all 10+ yr survivors 2 had (S); 5 (S + A), and 8 (N + S). Two pts survive at 83 & 91 mos after S + A. In this series nearly all 5+ yr survivors of CaP, live(d) 10+ yrs. Nearly all had intense multi-drug chemotherapy; 8/15 10+ yr survivors had unresectable CaP initially and underwent surgery after neo-adjuvant therapy.

CONCLUSIONS: Most 10 yr survivors had neo-adjuvant treatment prior to PDR. The anticipated mortality from metastases was not seen 5+ yrs after surgery, in S + A, or N + S (13/15 survivors). Additional studies, re. N + S are warranted to determine if this improves resectability & prolongs survival with CaP.

W1530

Diagnostic Accuracy of EUS in Detecting Pancreatic Neuroendocrine Tumors: A Meta-Analysis and Systematic Review
Srinivas R. Puli1, Matthew L. Bechtold1, Jyotsna Bk Reddy1, Srinivas R. Rapoje2, Mainor R. Antillon1, William R. Brugge3
1Department of Gastroenterology and Hepatology, University of Missouri – Columbia, Columbia, MO; 2Denver Health Medical Center, Denver, CO; 3GI Unit, Massachusetts General Hospital, Boston, MA

BACKGROUND: The published data on accuracy of Endoscopic Ultrasound to detect pancreatic neuroendocrine tumors (PNT) has been varied. Detection of PNT is critical from a therapeutic stand point.

AIM: To evaluate the accuracy of EUS in detecting PNT.

METHOD: Study Selection Criteria: Only EUS studies confirmed by surgery or appropriate follow-up were selected. Only studies from which a 2 x 2 table could be constructed for true positive, false negative, false positive and true negative values were included. Data collection & extraction: Articles were searched in Medline, Pubmed, Ovid journals, Cumulative index for nursing & allied health literature, International pharmaceutical abstracts, old Medline, Medline nonindexed citations, and Cochrane Central Register of Controlled Trials & Database of Systematic Reviews. Two reviewers independently searched and extracted data. The differences were resolved by mutual agreement. 2 x 2 tables were constructed with the data extracted from each study.

STATISTICAL METHOD: Meta-analysis for the accuracy of EUS was analyzed by calculating pooled estimates of sensitivity, specificity, likelihood ratios, and diagnostic odds ratio. Pooling was conducted by both Mantel-Haenszel method (fixed effects model) and by the DerSimonian Laird method (random effects model). The heterogeneity among studies was tested using Cochran’s Q test based upon inverse variance weights.

RESULTS: Initial search identified 2610 reference articles, of these 140 relevant articles were selected and reviewed. Data was extracted from 13 studies (N = 456) which met the inclusion criteria. Pooled sensitivity of EUS in detecting a PNT was 87.2% (95% CI: 82.2–91.2). EUS had a pooled specificity of 98.0% (95% CI: 94.3–99.6). The positive likelihood ratio of EUS was 11.1 (95% CI: 5.34–22.8) and negative likelihood ratio was 0.17 (95% CI: 0.13–0.24). The diagnostic odds ratio, the odds of having anatomic PNT in positive as compared to negative EUS studies was 94.7 (95% CI: 37.9–236.1). All the pooled estimates calculated by fixed and random effect models were similar. SROC curves showed an area under the curve of 0.94. Begg-Mazumdar bias indicator for publication bias gave a Kendall’s tau value of 0.31 (p = 0.16), indication no publication bias. The p for chi-squared heterogeneity for all the pooled accuracy estimates was > 0.10.

CONCLUSIONS: EUS has excellent sensitivity and specificity to detect PNT. EUS should be strongly considered for evaluation of PNT.

W1531

Pancreatoduodenectomy (PD) at a Non University Tertiary Care Center (NUTCC): Outcomes and Feasibility
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1Upper Gastrointestinal and Hepatobiliary Surgery, Methodist Dallas Medical Center, Dallas, TX; 2Cancer Center, Methodist Dallas Medical Center, Dallas, TX; 3HPB & GI Surgical Oncology, Renown Regional Medical Center, Reno, NV

BACKGROUND: A successful outcome to PD is attributed to a high volume at University Centers. Over the past decade, an association between volume and outcome in PD has been firmly established. Despite studies which
suggest that community centers can perform these procedures with favorable outcomes, the underlying issue of where these complex surgeries should be performed is still debated. This paper examines the outcomes of PD in a NUTCC.

METHODS: Medical records of 122 patients, who underwent PD by a single surgeon between September 2005 to August 2008 at a high volume NUTCC, were analyzed. The patients were managed by a multidisciplinary team consisting of a gastroenterologist, surgeon, hepatobiliary fellow, general surgery residents, ICU nursing staff, operating room team, and a surgery floor nursing staff. The records were reviewed with respect to preoperative and postoperative data, thirty-day mortality, morbidity and histopathology data.

RESULTS: A total of 122 patients underwent PD. There was a female predominance with a male to female ratio of 0.84. Comorbidities were documented in 58% patients. The mean age was 68 yrs. Jaundice was the most common presenting symptom in 68%. Preoperative ERCP with stenting was done in 41% patients. The mean operative time was 237 mins. The mean estimated blood loss was 480 ml. 32% underwent a pylorus preserving PD 35% patients received intraoperative blood transfusions, 20% received blood in the postoperative period. The mean length hospital stay was 13 days. Thirty day mortality was 3.2% and overall morbidity was 49%. Reoperation was necessary in 5% patients, mainly for wound problems. 64% patients underwent PD for malignancy, of which 39% patients had carcinoma of the pancreatic head. 44% patients underwent PD for benign disorders. The mean number of nodes retrieved was 15.

CONCLUSIONS: PD can be performed at a NUTCC with results that meet and exceed nationally reported outcomes and benchmarks. The key elements to success in this endeavor include an incorporation of a multidisciplinary team for management of the PD patient.

W1532

Bridge to Surgery Using Partially Covered Self Expandable Metal Stents (PCMS) in Malignant Biliary Stricture: An Acceptable Paradigm?

George H. Pop, James A. Richter, Bryan Sauer, Michele E. Rehan, Henry C. Ho, Melissa S. Phillips, Kristi Ellen, Todd W. Bauer, Reid B. Adams, Vanessa M. Shami, Michel Kahaleh

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BACKGROUND AND AIM: PCMS (Wallstent, Boston Scientific) have been extensively used for palliation of malignant distal biliary strictures. Many centers have been using them as a bridge to surgery (BTS) regardless of resectability with or without eventual neoadjuvant therapy. We analyzed the outcome of all patients receiving PCMS who were subsequently referred for surgery.

METHODS: Our prospectively established pancreaticobiliary database was retrospectively analyzed, to retrieve all patients undergoing PCMS placement for malignant biliary stricture and then undergoing surgery. Cancer type and staging, adverse events related to stent placement or surgery, type of surgery performed, time between stenting and surgery, length of hospitalization post op and follow-up post surgery were recorded.

RESULTS: 27 patients (21 men, median age of 66 years, range 39–82) received PCMS (Table 1). Indications for placement included biliary stricture related to pancreatic cancer (n = 23) or other cancers (n = 4). Median time between stenting and surgery was 32 days (range: 6–569). Median hospitalization following surgery was 7 days (0–40). All patients underwent exploratory laparoscopy, followed in 8 (30%) by a Whipple procedure with uneventful removal of the PCMS. 19 patients (70%) were found to be unresectable on laparoscopy or laparotomy with 8 (30%) patients undergoing peritoneal or liver metastasis biopsy. PCMS were left in place in those 19 patients. Complication related to PCMS included migration (n = 5, 19%), tissue overgrowth (n = 2, 7%), and impaction (n = 1, 4%), all of them managed by endoscopic removal and replacement with PCMS, with only one of them subsequently undergoing a Whipple, the others being unresectable. Median follow-up post surgery was 210 days (range: 9–1642).

<table>
<thead>
<tr>
<th>STENT COMPLICATIONS Migration</th>
<th>5 (19%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tissue Overgrowth</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>Impaction</td>
<td>1 (4%)</td>
</tr>
</tbody>
</table>

Preop Chemoradiation          2 (7%)

Time from Stent to Surgery (days) 32 (6–569)

Laparoscopy Whipple Biopsy       27 (100%)

Duration of Hospitalization (days) 7 (0–40)

STENT COMPLICATIONS Migration Tissue overgrowth Impaction

Value listed as number (%) or median (range) * Time after stent removal

CONCLUSION: PCMS are an appropriate BTS option. For resectable patients, PCMS results in biliary drainage and allows for neoadjuvant treatment without precluding subsequent curative resection (Whipple). For unresectable patients, long term biliary drainage is provided by PCMS.

W1533

Leakage of Gastro-Enteric and Entero-Enteric Anastomosis After Pancreatic Surgery

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1Surgery, Academic Medical Center, Amsterdam, Netherlands; 2Radiology, Academic Medical Center, Amsterdam, Netherlands

BACKGROUND: Common anastomotic complications after pancreatic surgery are leakage from the pancreaticojejunostomy or hepaticojejunostomy. Leakage from a gastro-enteric or entero-enteric anastomosis after pancreatic surgery is rarely described.
AIMS: To evaluate the incidence of gastro-enteric and entero-enteric leakage and to describe the presentation, treatment and outcome.

METHODS: Between 1992–September 2008 a consecutive series of 1141 patients underwent exploration in the Academic Medical Center for potentially resectable pancreatic head or peripancreatic tumor. Drainage notes, radiologic investigations and operation notes of relaparotomies were evaluated to identify patients with leakage of gastrojejunostomy (GJ), duodenojejunostomy (DJ) or jejunoojejunostomy (JJ). Clinical presentation, radiologic findings, treatment and outcome were analyzed.

RESULTS: Eight (0.7%) patients had enteric anastomosis leakage; 6 (DJ 5, GJ 1) of 764 patients following pancreatoduodenectomy (PD), and 2 (GJ 1, JJ 1) of 377 patients following palliative bypass procedure. Median postoperative day of diagnosis of enteric leakage was 9 (range 2–23). Clinical signs included tender abdomen, fever, high drain output suspicious of enteric content (absence of amylase or bilirubin) and enterocutaneous fistula. Median peak white blood cell count before diagnosis was 14.6 × 109/L (range 8.4–28.0). Common radiological findings were pneumoperitoneum and free or localized fluid. In three patients following PD gastro-enteric leakage developed in association with postoperative pancreatic fistula. Four patients underwent relaparotomy: 2 pylorus-preserving PDs were converted to “classic” PD, 1 had revision of the anastomosis and 1 had primary closure. Other patients were treated by US/CT-guided percutaneous drainage. One patient in the palliative bypass group refused intervention and died on postoperative day 19.

CONCLUSIONS: A 0.7% enteric leakage rate was responsible for one death related to the complication. Clinical deterioration with tender abdomen and/or high drain output without amylase or bilirubin should raise suspicion of enteric anastomotic leakage. Type of (surgical) treatment depends on index surgery, time interval to diagnosis, clinical situation and extent of anastomotic defect.

Clinical: Small Bowel

W1534

Relationship of the Number of Crohn’s Strictures and Strictureplasties to Postoperative Recurrence

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1Surgery, Mount Sinai Medical Center, New York, NY; 2Medicine, Mount Sinai Medical Center, New York, NY

BACKGROUND: Strictureplasty is well established as a safe and effective surgical therapy for Crohn’s Disease (CD). Yet, postoperative recurrence following strictureplasty remains a problem for CD patients, and associated risk factors are still uncertain. The goal of this study is to examine the relationship between recurrence and the number of both strictures (NSX) and strictureplasties (NSXP).

STUDY DESIGN: The authors’ prospectively-created database was used to retrospectively identify patients who had undergone strictureplasty between 1983 and 2008. Recurrence was defined as reoperation, and rates were compared based on the NSX and NSXP using Kaplan Meier curves. Cox regression analyses were used to evaluate the relationship between both NSX and NSXP and recurrence after adjusting for potential confounders.

RESULTS: A total of 339 strictureplasties were performed in 88 patients at initial operation. The five-year reoperation rate was 14% for patients with ≤8 strictures compared to 31% for those > 8 strictures (p = 0.01); and five-year reoperation rate was 14% for patients with ≤4 strictureplasties compared to 33% for those with >4 strictureplasties (p < 0.01). In multivariate regression of NSX and NSXP as continuous variables, both were independently associated with recurrence (p ≤ 0.01), with an 8% increase in recurrence for each additional stricture and 22% increase in recurrence for each additional strictureplasty.

CONCLUSIONS: These data suggest that both the NSX and NSXP are associated with CD recurrence and may be used as prognostic indicators for CD.

W1535

C-Reactive Protein Levels for Predicting Early Recurrence After Ileo-Cecal Resection in Crohn’s Disease: Preliminary Report of a Prospective Longitudinal Study

Giuseppe S. Sica1, Edoardo Iaculli2, Livia Biancone2, Emma Calabrese2, Cristina Fiorani1, Sara Onali2, Francesco Pallone2, Achille Gaspari1
1Surgery, Tor Vergata, University of Rome, Rome, Italy; 2Medicine, Tor Vergata University of Rome, Rome, Italy

BACKGROUND: Previous studies have evaluated the ability of biological markers to detect disease relapse in Crohn’s disease (CD). However, no studies investigated the role of C-reactive protein (CRP) levels as a prognostic factor to predict recurrence and degree of recurrence after surgical resection.

AIM: to explore whether C-reactive protein (CRP) is a valid marker to predict an early recurrence following ileo-cecal (I-C) resection in CD.

METHODS: Thirty-nine consecutive CD patients undergoing laparoscopic or open I-C resection for CD in our Unit were enrolled in this prospective longitudinal study. CRP levels were measured pre-operatively, 48 hours after surgery and at discharge. As control group, 20 patients undergoing right colectomies for cancer in our Unit during the same period were evaluated. CRP was measured using the same intervals as in CD patients. Small intestine contrast ultra-sonography (SICUS) was performed to detect early recurrence at 6 month after surgery. Rutgeerts’ score (grade 0–4; recurrence score ≤1) was assessed at 1 year with conventional colonoscopy. Statistical analysis included the Fisher exact test (2 tails) for qualitative variables, the Student’s t test for quantitative variables and regression analysis for coefficient of correlation.
RESULTS: twenty-two patients undergoing a protocol of study searching for recurrence at 6 month using the SICUS were assessed. Findings compatible with recurrence at the anastomotic site (bowel wall thickness ≤3 mm) were observed in 15 cases (68%). Normal CRP levels at discharge were observed in 2 out of the 7 patients showing no sonoographic findings of recurrence. All 15 CD patients undergoing colonoscopy at 12 months showed recurrence. No significant correlation was observed between endoscopic degree of recurrence and the 3 given measurement of serum CRP levels, also when the difference between each time determination in each patient was considered for the analysis. In the control group the median CRP values were higher 48 hours after surgery than at discharge and, as expected, both levels were higher in the CD group than in the controls (67.1 mg/L; p = 0.02 vs. 21 mg/L; p = 0.04).

CONCLUSION: SICUS and endoscopic recurrence after I-C resection in CD patients, do not seems to correlate with a high CRP level at discharge. At the present, serum CRP levels in the peri-operative period do not represent a useful marker for predicting the degree of endoscopic recurrence 1 year after ileo-colonic resection.

Clinical: Stomach

W1536

Longitudinal Study of Long Term Quality of Life Outcomes After Laparoscopic Roux-en Y Gastric Bypass
Hsin-Yi Chang*, James R. Wallace, Deborah Andris
Surgery, Medical College of Wisconsin, Milwaukee, WI

OBJECTIVE: There are few studies of quality of life outcomes after laparoscopic roux-en-y gastric bypass in the current literature. Of the published data, only a small number measure outcomes beyond 1 year, and many are cross sectional studies. In this longitudinal study, pre-operative and post-operative quality of life was measured in a total of 113 patients.

METHODS: Since 1999 all new patients seen in the bariatric surgery program at the Medical College of Wisconsin have filled out an SF-36 health questionnaire at their initial consultation. Patients are routinely re-surveyed at their post-operative visits. Collected data was reviewed and 113 patients were identified who had filled out an SF-36 at their initial consultation and again 3–7 years post-operatively. All patients underwent a laparoscopic, retrocolic roux-en-y gastric bypass with a hand sewn gastro-jejunal anastomosis. Results shown as mean ± SD, and SF-36 results were analyzed with the Quality Metric Health Outcomes scoring software and a paired, two-tailed t-test.

RESULTS: 113 patients (101 F, 12 M) with an age of 44 ± 9 at time of surgery were surveyed from Jan 2000 through Sept 2008. Length of follow up was 51 ± 13 months. Initial BMI 48.4 ± 6, BMI at follow up 33.5 ± 7. Analysis of pre-operative versus post operative SF-36 scores show significant (p < .001) improvements in all 8 measured scales. Data is presented as scored against norms from the general 1998 US population, on a scale with a mean of 50 ± 10. Physical functioning = 34.0 ± 10.3 vs. 49.1 ± 10.1, Role physical = 38.2 ± 10.8 vs. 49.5 ± 10.9, Bodily pain = 39.1 ± 9.0 vs. 47.9 ± 12.6, General health = 37.2 ± 10.9 vs. 51.2 ± 9.9, Vitality = 38.1 ± 9.3 vs. 49.3 ± 11.4, Social Functioning = 37.8 ± 12.5 vs. 47.6 ± 12.2, Role emotional = 43.4 ± 13.3 vs. 49.5 ± 10.8, Mental health = 43.4 ± 11.0 vs. 48.3 ± 10.7. Comparison of the physical and mental component summaries shows that while both physical and mental components improve post operatively, gains are greater in the physical component (PCS = 34.9 ± 9.6 vs. 49.5 ± 10.7, MCS = 44.3 ± 11.9 vs. 48.6 ± 11.0).

CONCLUSION: Quality of life is significantly improved in a sustained manner after gastric bypass. The degree of improvement, however, does not appear to be related to amount of weight lost. The physical component, which was greater than one standard deviation below the norm in pre-operative patients, was improved to near the mean post-operatively, while mental component scores showed significant but lesser gains.

W1537

The First-Assist in Laparoscopic Gastric Bypass Surgery—Effect on Operative Time
Cara Cenera*, John Gaughan2, Laurie White1, John E. Melilahn1, Daniel T. Dempsey1, Ian Soriano1
1Surgery, Temple School of Medicine, Philadelphia, PA; 2Biostatistics, Temple University School of Medicine, Philadelphia, PA

BACKGROUND: Surgical residents rotate on different surgical services in order to obtain a comprehensive surgical experience, typically spending anywhere from 1–4 months. Dedicated non-physician surgical assistants (NPSA), by virtue of repetition and familiarity with the procedure, also assist primary surgeons in bariatric surgery. We wanted to test the hypothesis that operative time would be longer for resident-assisted (RA) Laparoscopic Roux-en-Y Gastric Bypass (RYGB) versus non-physician surgical assistant (NPSA) assisted cases. Our goal is to initiate more consistent and effective resident teaching methods (such as simulation-based and video-based techniques) in conjunction with intra-operative training, shorten the learning curve for advanced laparoscopic procedures and decrease operating room time, and consequently improve patient outcomes.

METHODS: We conducted a retrospective analysis of 1031 bariatric cases from 2001–2008 by a single surgeon at our institution of which 680 were uncomplicated laparoscopic retro-colic gastric bypass procedures. Patients who underwent secondary procedures (cholecystectomy, liver biopsy, endoscopy, etc.) were excluded. Complete data was available for 300 patients. 49 cases were performed with senior surgical residents while 251 cases were performed with a single, dedicated non-physician surgical assistant (NPSA).

RESULTS: We found a statistically significant difference between Resident-Assisted cases vs. NPSA’s (3.7 hrs ± 0.8 [2.5–6.4] versus 2.5 hrs ± 0.5hrs [1.4–4.5]; p < 0.0001). As expected, there was a difference in operative time between
W1538
Nitinol Is a Superior Suture Material for Fundoplications in Laparoscopically Adjustable Gastric Banding Procedures
Amber N. Horwith*, Dana Osborne, Carson D. Liu
Surgery, SkyLex Advanced Surgical Inc., Los Angeles, CA

INTRODUCTION: Laparoscopic Adjustable Gastric Banding (LAGB) has a reported 3–7% slippage rate. Patients who undergo LAGB have undergone various plications of the stomach and placement of the band in a Pars Flaccida position to decrease incidence of slippage of the band.

METHODS: 450 consecutive patients have undergone LAGB with nitinol sutures. Patients received four nitinol sutures in first generation of LAGB by Allergan. Patients received three sutures implanted in LAGB second and third generation LAP BANDS.

RESULTS: All but two patients had a partial slippage of the lesser curvature in the 450 patients undergoing the LAGB with nitinol sutures. This is much less than the reported 3–7% with silk or polyester sutures. Slippage of stomach occurred only in patients with large weight loss and the slippages occurred in an area away from the fundoplication (Lesser curvature side). The fundoplication was intact during re-operation and the patients only required an additional suture along the lesser curvature side. To date, no injury to the balloon of the LAGB have occurred with nitinol sutures.

CONCLUSION: Nitinol sutures are superior to silk or polyester sutures as the last 450 consecutive patients have not had a suture failure with their fundoplication. Nitinol sutures generate a foreign body reaction which may help to form adhesions and superior tensile strength as compared to conventional silk or polyester sutures. Partial gastric slips can occur in LAGB patients, but they rarely occur and seem to occur in patients who have had significant weight loss.

W1539
Near Total Gastric Resection with Roux-en-Y Reconstruction as an Option for Post Operative Gastric Dysfunction
Jill Zink*, Joseph A. Talarico, Amy Cha, Fady Moustahar, Matthew Kroh, Stacy A. Brethauer, Bipan Chand
Bariatric and Metabolic Institute, Cleveland Clinic Foundation, Cleveland, OH

INTRODUCTION: Gastric dysfunction is a challenging disease, often requiring additional surgical interventions to help alleviate poor gastric motility or unremitting symptoms.

MATERIALS AND METHODS: A single surgeon’s complete operative experience from 9/02 to 7/08 was reviewed. Patients with a diagnosis of gastric dysfunction that underwent revisional surgery were selected for review. Patients were examined for age, sex, initial procedure and indication, presenting symptoms, surgery performed, complications, and resolution of symptoms.

RESULTS: Seventeen patients underwent a total or near-total gastrectomy with Roux-en-Y (RY) reconstruction. Two were male and fifteen were female, the average age was 55 (range 29–78). Thirteen patients presented after surgical therapy for peptic ulcer disease (Billroth I, Billroth II, Gastrectomy with Vagotomy, Vagotomy & Pyloroplasty), 2 patients had gastric dysfunction from iatrogenic vagal nerve injury from Nissen fundoplication, one patient had severe diabetic gastroparesis, and one patient had a Billroth II for carcinoid. The most common presenting symptoms were nausea (16 pts), vomiting (16 pts), weight loss (11 pts), abdominal pain (10 pts), and reflux (9 pts). All patients underwent near complete gastrectomies with RY reconstruction, 12 were done laparoscopic, three were done open, and two were converted to open. Thirteen patients reported improvement in symptoms (average follow-up 12 months). Two patients reported minimal or no improvement in symptoms and two patients had only one month follow-up. Post operative complications included wound infection (3 pts), bowel obstruction requiring surgery (1 pt), and jejunostomy tube leak requiring revision (1 pt). There were no mortalities.

CONCLUSIONS: Revisional gastric surgery may be required after surgical treatment for peptic ulcer disease and may be indicated for iatrogenic vagal nerve injury or diabetic induced medically refractory gastroparesis. The most common presenting symptoms are nausea and/or vomiting with reflux and weight loss. Near total gastric resection with roux-en-y reconstruction resulted in 87% of patients with improved symptoms.
Combined Science

W2082
YKL-40 a Potential Biomarker for Colorectal Cancer
Hannah K. Swayne1, Christopher N. Chapman2, Jackie Cao2, Rong Shao3, Richard B. Arenas1, Brooke Bentley3
1Surgery, Baystate Medical Center, Springfield, MA; 2Pathology, Baystate Medical Center, Springfield, MA; 3Pioneer Valley Life Sciences, Springfield, MA

BACKGROUND: The increasing complexity in colon cancer treatment has generated a need to discover novel predictive biomarkers. No biomarker exists that can accurately stratify patients for optimal therapy nor effectively monitor for a favorable response. YKL-40, a serum secreted glycoprotein of the chitinase gene family, has been detected in patients with cancer and has correlated with metastasis and a poor prognosis. To date, the expression profile of YKL-40 has not been described in colorectal cancer. We therefore investigated whether expression of YKL-40 is tumor specific in primary colorectal cancer and is conserved in metastatic disease in hopes of developing a reproducibly measurable biomarker to correlate with cancer phenotype and to help guide therapy.

MATERIALS AND METHODS: Data from tumor registry and medical records identified 175 patients with Stage IV disease. Patients were selected based on available tissue from distant metastases. YKL-40 expression was analyzed by immunohistochemistry performed on the original tumor, lymph node and distant metastasis. The tissue staining was scored by the intensity and percentage of positively stained cells.

RESULTS: Ten patients were identified with obtainable tissue specimens to measure YKL-40 expression. YKL-40 expression was equally expressed by intensity and percentage scores in the primary tumor, metastatic lymph node and distant metastasis within each patient. Expression profile was conserved irrespective of the treatment with chemotherapy and/or radiation. Interestingly, an increased expression of YKL-40 occurred in inflammatory cells within the stroma recapitulating the profile of expression in the primary and metastatic tumors.

CONCLUSION: Our preliminary results demonstrate the conservation in expression of YKL-40 with advanced and metastatic colorectal cancer. YKL-40 is ubiquitously expressed in Stage IV disease with a pattern that is conserved in the primary and metastatic tissues irrespective of treatment. The preliminary data also suggest that YKL-40 may serve as a good biomarker to guide treatment for Stage II and III colon cancer. The presence of expression within infiltrative inflammatory cells supports a role of YKL-40 in the inflammatory process but raises question to the origin of serum-secreted protein. Further data analysis is underway to confirm our results and to explore the validity of YKL-40 as a predictive biomarker for colorectal cancer.

W2083
Robotic Single Incision Surgery with the da Vinci Surgical System: Initial experience with Transabdominal and Transvaginal Access in Human Cadavers
Olivier J. Wagner2, Monika E. Hagen1, Philippe Morel2, Mark A. Talamini1, Kari Thompson1, ADAM Spivack1, Garth R. Jacobsen1, Santiago Horgan1
1Department of Surgery, University of California San Diego, San Diego, CA; 2Division of Digestive Surgery, University Hospital Geneva, Geneva, Switzerland

BACKGROUND: Despite cosmetic advantages of single incision surgery and NOTES, technical challenges using only one access make these techniques non-intuitive and widespread acceptance is limited. Robotic surgery might have the potential to overcome such hurdles due to the option of unusual arm configurations, computer technology to change robotic arm control and alternative setup options. We report our initial experience with robotic single incision surgery with intersecting robotic arms both through the abdominal wall and the vagina in human cadavers.

MATERIALS AND METHODS: The da Vinci Standard System (Intuitive, Sunnyvale, CA, USA) was used to perform single incision surgery in human cadavers transabdominally and the da Vinci S system was used transvaginally. For the transabdominal access, a robotic 10-mm scope stabilized with a 12 mm port and two 5-mm robotic instruments were introduced through a multichannel single port (TriPort, ACS, Wicklow, Ireland) through the abdominal wall. The camera was placed centrally and both robotic arms were crossed at the level of the abdominal wall, inverting both instruments’ tips to achieve triangulation. Cables of the robotic arms (Da Vinci standard) were switched from right to left and vice versa at the surgical console to reverse the control of working arms and thereby to achieve intuitive manipulation. The same robotic setup was used for the transvaginal access with the da Vinci S System, but camera and working arms were introduced through separate trocars and the control of robotic arms was switched at the surgical console.

RESULTS: With the transabdominal setup, it was possible to work with the robotic system in the typical, intuitive fashion even though working arms were intersected. A slight loss of range of motion was discovered due to the unusual setup of the working arms. Still, tissue manipulation and suturing was easily possible. Set-up allowed the usual range within the operative field. Transvaginal setup including docking of the system and introduction of instruments into the abdominal cavity was possible, but no useful manipulation could be performed due to space restriction of the vagina and between the thighs.

CONCLUSIONS: Transvaginal robotic surgery with the da Vinci Surgical System does not appear to be feasible using the above setup. Though, transabdominal robotic single port surgery is feasible by using intersected robotic working arms crossed at the level of the abdominal wall and reversed robotic arm control. This approach seems to offer all advantages of single incision surgery while maintaining the intuitive control of robotic surgery. Clinical application appears justified.
2010 ANNUAL MEETING

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<tr>
<th>Time</th>
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<tr>
<td>SATURDAY, MAY 30, 2009</td>
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<tr>
<td>8:00 AM – 2:30 PM</td>
<td>RESIDENTS &amp; FELLOWS RESEARCH CONFERENCE (by invitation only)</td>
<td>Monroe Ballroom, Palmer House Hilton</td>
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<td>MONDAY, JUNE 1, 2009</td>
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<tr>
<td>7:45 AM – 8:15 AM</td>
<td>OPENING SESSION</td>
<td>S504</td>
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<td>8:15 AM – 9:15 AM</td>
<td>PRESIDENTIAL PLENARY I (PLENARY SESSION I)</td>
<td>S504</td>
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<td>9:15 AM – 10:00 AM</td>
<td>PRESIDENTIAL ADDRESS: “Above Average”</td>
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<td>10:30 AM – 11:15 AM</td>
<td>PRESIDENTIAL PLENARY II (PLENARY SESSION II)</td>
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<td>11:15 AM – 12:15 PM</td>
<td>DOBIS AND JOHN L. CAMERON GUEST ORATION: Communication as a Quality Maker: A Cut to the Chase</td>
<td>S504</td>
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<td>12:00 PM – 2:00 PM</td>
<td>POSTER SESSION I</td>
<td>South Hall</td>
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<tr>
<td>12:30 PM – 1:45 PM</td>
<td>MEET-THE-PROFESSOR LUNCHEONS</td>
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<td>2:15 PM – 3:45 PM</td>
<td>CONTROVERSES IN GI SURGERY A</td>
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<td>DDW COMBINED CLINICAL SYMPOSA</td>
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<td>ANNUAL BUSINESS MEETING</td>
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<td>7:30 AM – 9:15 AM</td>
<td>VIDEO SESSION I: BREAKFAST AT THE MOVIES</td>
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<td>8:30 AM – 9:30 AM</td>
<td>CLINICAL WARD ROUNDS: GASTRIC TUMORS</td>
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<td>8:30 AM – 10:00 AM</td>
<td>PUBLIC POLICY COMMITTEE PANEL: Genomics and Cancer Care: What Every Clinician Should Know</td>
<td>S505a</td>
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<td>9:30 AM – 11:00 AM</td>
<td>SSA/AHPBA JOINT SYMPOSIUM: Managing Complications of Acute Pancreatitis</td>
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<td>10:00 AM – 11:15 AM</td>
<td>BASIC SCIENCE PLENARY (PLENARY SESSION IV)</td>
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<td>QUICK SHOTS SESSION I</td>
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<td>10:00 AM – 11:15 AM</td>
<td>VIDEO SESSION III: NOTES APPENDICETOMY—READY, SET, ... GO?</td>
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<td>10:30 AM – 12:00 PM</td>
<td>DDW COMBINED CLINICAL SYMPOSM: Management of Hepatitis C Non-Responders and Relapsers (AASLD, AGA, SSAT)</td>
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<td>11:15 AM – 12:00 AM</td>
<td>MAIA AND FRANK G. MOODY STATE-OF-THE-ART LECTURE: The Evolving Era of Surgeon Shortage</td>
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<td>7:30 AM – 9:30 AM</td>
<td>SSA/ISDS JOINT BREAKFAST SYMPOSUM: Prevention, Evaluation, and Treatment of Leaks After Gastrointestinal Surgery</td>
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<td>8:30 AM – 10:00 AM</td>
<td>EDUCATION COMMITTEE PANEL: Advancing Endoscopy in GI Surgery</td>
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<td>8:30 AM – 10:00 AM</td>
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<td>VIDEO SESSION IV: NOTES — SINGLE PORT ACCESS SURGERY</td>
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<td>DDW COMBINED CLINICAL SYMPOSM: Common Approaches to Pelvic Floor Abnormalities (SSAT, AGA)</td>
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<td>SSA/SAGES JOINT LUNCHEON SYMPOSM: The Endoscope as a Surgical Tool</td>
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Notes:
- Hyatt Regency McCormick CC22B
- Hyatt Regency McCormick CC22D
- South Hall
- Monroe Ballroom, Palmer House Hilton
- Chicago Stock Exchange Trading Room, Art Institute of Chicago