P 1. LAPAROSCOPIC LEFT HEPATECTOMY EXPOSING THE MIDDLE HEPATIC VEIN
JAP Kruger, GM Fonseca, VB Jeismann, FF Coelho, P Herman
Presenter: Jaime Kruger MD | Hospital das Clinicas - University of Sao Paulo

Background: Laparoscopic liver resections are being increasingly performed in tertiary specialized HPB centers. Lesions close to major vessels were considered a contraindication for minimally invasive operations, but with progressive technical development such operations can be performed safely offering patients the benefits of laparoscopic approach.

Methods: Video describing technique for a totally laparoscopic left hepatectomy. A 65 years-old female patient presented with epigastric pain. Abdominal MRI revealed a complex cystic mass on the central portions of the left lobe suggesting a mucinous biliary neoplasia. The lesion had a close contact with the middle hepatic vein along most of its extension. Due to the importance of venous drainage on postoperative liver function a laparoscopic left hepatectomy preserving the middle hepatic vein was planned. Five ports were placed and a 10 mm 30 degree scope was employed. Transection was carried out with ultrasonic scalpel under pneumoperitoneum pressure of 12 mmHg.

Results: Operative time was 150 minutes and estimated blood loss was 120 mL. Patient recovered uneventfully and was discharged from hospital on the 4th POD. Pathology report confirmed a benign mucinous biliary neoplasia (former biliary cystadenoma) without areas of suspected displasia or malignant transformation.

Conclusion: Liver resection in large lesions located along major vessels is feasible and should be performed in centers with expertise in laparoscopic liver resection. Preserving adequate liver remnant venous drainage might result in better postoperative function reducing complications.
P 2. LAPAROSCOPIC LEFT HEPATECTOMY FOR HCC IN A CIRRHOTIC PATIENT WITH RIGHT-TO-LEFT LOBE VOLUME SHIFT

JAP Kruger, GM Fonseca, VB Jeismann, FF Coelho, P Herman

Presenter: Jaime Kruger MD | Hospital das Clinicas - University of Sao Paulo

Background: Cirrhotic patients derive great benefit of laparoscopic liver resection, mostly related to reduced blood loss and fewer liver-related complications such as hepatic insufficiency, biliary fistula and ascites. Despite being the preferred method for cirrhotic patients, laparoscopic operations might prove difficult when facing a chronically diseased liver, which is in higher risk of blood loss, difficult transection associated with a fibrotic parenchyma and a distorted anatomy secondary to fibrotic and blood flow modifications induced by chronic inflammatory changes.

Methods: Surgical technique video describing a laparoscopic left hepatectomy. A 71 years-old patient with hepatitis-C related cirrhosis was diagnosed with a 5 cm hepatocellular carcinoma on the left lobe. There were no signs of portal hypertension, liver function was Chil-Pugh class A/MELD 8. Chronic liver disease resulted in anatomic changes with predominant left-lobe corresponding to 60% of total liver volume. A totally laparoscopic left hepatectomy was performed utilizing 5 ports and a 10 mm 30 degree scope. Transection was carried out with a ultrasonic scalpel after classic hilar approach, dissecting individually arterial and portal venous elements. The left biliary duct was transected intraparenchymally with vascular stapler.

Results: Operative time was 180 minutes and estimated blood loss was 100 milliliters. During postoperative recovery the patient developed transient renal disfunction managed conservatively and was discharged on the 7th POD. Pathology report confirmed a 51 mm HCC with microvascular invasion and free margins (20 mm). Patient is disease-free 12 months after surgery.

Conclusion: Chronic changes on the morphology of cirrhotic livers may increase difficulty of laparoscopic liver operations. Even in cases of altered anatomy minimally invasive resections should be pursued as those operations benefit cirrhotic patients and can be safely performed in specialized HPB centers with expertise in laparoscopic liver surgery.
P 4. PATHOPHYSIOLOGY OF BILE ACIDS AFFECTS LIVER REGENERATION IN PATIENTS UNDERGOING LIVER RESECTION
D Pereyra, Claudia Fuchs, M Trauner, P Starlinger
Presenter: Patrick Starlinger MD | Mayo Clinic, Rochester

Background: Bile acids (BAs) are known initiators of liver regeneration (LR) after partial hepatectomy. Previous data shows that BAs positively influence LR through induction of pro-regenerative proteins and via a direct effect on proliferation. However, BAs are known to be toxic in high concentrations. As the majority of the data regarding BAs during LR derives from experimental studies, the present investigation aimed to elucidate the influence of these effectors during human LR.

Methods: In our cohort of 46 patients undergoing liver resection, circulating BAs were measured and profiled preoperatively and on the first postoperative day (POD1). Additionally, liver biopsies were taken at baseline and during LR in a subset of 8 patients. Postoperative liver dysfunction (LD) was prospectively recorded.

Results: While BAs were found to increase significantly during early LR in liver tissue, they seem to decrease from prior to the operation to POD1 in circulation (p=0.001). Interestingly, higher levels were found in patients with LD on POD1. This difference was found to obtain a striking predictive potential with an area under the ROC-curve of 0.860. A cut-off for postoperative BAs was set at 7.7ng/mL, which could identify all patients with LD in the postoperative period (0% in BAs < 7.7ng/mL vs 38% in BAs≥7.7ng/mL, p<0.001). Ultimately, not only concentration but also the profile of BAs in circulation differed markedly between the two groups.

Conclusion: This data suggests that BAs could have an important pathophysiological relevance during the process of LR, while a BA-overload might ultimately lead to liver toxicity and impaired LR after liver resection. The observed marker potential of circulating bile acids should be assessed further in larger patient cohorts.
**P 6. DEFINING HIGH VOLUME CENTER FOR MINIMALLY INVASIVE DISTAL PANCREATECTOMY**  
*RZ Panni, X Lu, G Williams, RC Fields, WG Hawkins, C Hammill, DE Sanford*  
**Presenter:** Roheena Panni MD, MPHS | Washington University, St. Louis

**Background:** Minimally Invasive Distal Pancreatectomy (MIDP) is associated with reduced intra-operative blood loss, transfusion requirement, and shorter length of stay compared to open distal pancreatectomy (ODP). However, its advantages over OPD and oncologic adequacy are unclear, due to the small number of centers performing MIDP and strict patient selection criteria. Several studies have outlined the relationship between hospital volume and postoperative mortality for patients undergoing pancreatic surgery, but the exact effect of centralization of care for MIDP still needs to be determined. The purpose of this study is to evaluate the association between hospital procedure volume and mortality for patients undergoing MIDP using a large database to determine an evidence-based threshold of hospital volume associated with improvement in mortality.

**Methods:** Patients who underwent MIDP were identified using the National Cancer Database from 2010 to 2015. The relationship between hospital volume and 90-day mortality was assessed using a logistic regression model. Logistic regression analysis and restricted cubic spline regression analysis was performed to determine the linear and non-linear association between mean hospital volume and mean 90-day mortality.

**Results:** 2,837 patients underwent distal pancreatectomy at 487 different hospitals. 30- and 90-day mortality of the study population were 1.27% (n=36) and 2.54% (n=72), respectively. Baseline characteristics and mean annual mortality of individual hospitals were determined (fig1). A logistic regression analysis was performed, which demonstrated that institutional volume is significantly associated with decreased overall 90-day mortality. The maximum improvement in 90-day mortality is seen if the annual hospital volume was greater than 7 (p<0.0001). We further explored the non-linear association between institutional volume and 90-day mortality, which demonstrated continued improvement in 90-day mortality with an increase in average hospital volume.

**Conclusion:** Our data suggest that the centralization of MIDP is associated with lower postoperative mortality. Based on the results, we recommend defining a high volume center as hospitals performing eight or more MIDP cases per year. The true impact of this finding on overall survival should be assessed in future studies using large databases with long-term follow-up information.
90 day mortality after minimally invasive distal pancreatectomy decreases with increase in mean hospital volume.
P 7. DEFINING HIGH VOLUME CENTER FOR DISTAL PANCREATECTOMY
RZ Panni, X Lu, C Hammill, RC Fields, WG Hawkins, DE Sanford
Presenter: Roheena Panni MD, MPHS | Washington University, St. Louis

**Background:** The association between high procedural volume and improved outcomes is generally accepted for most high risk, low volume procedures, such as pancreatic or esophageal surgery, which supports the beneficial effects of the concentration of these procedures in high volume centers. Several cutoffs have been reported to define a high volume center for pancreatic surgery; however, the definition of high volume center for distal pancreatectomy still needs to be determined. The purpose of this study was to evaluate the association between hospital procedure volume and patient mortality for patients undergoing distal pancreatectomy using a large database to determine an evidence-based threshold of hospital volume associated with improvement in postoperative mortality.

**Methods:** Patients who underwent distal pancreatectomy were identified using the National Cancer Database from 2004 to 2015. The relationship between hospital volume and 90-day mortality was assessed. Logistic regression analysis and restricted cubic spline regression analysis was performed to determine the linear and non-linear association between mean hospital volume and mean 90-day mortality.

**Results:** 13,307 patients underwent distal pancreatectomy at 1,081 unique hospitals. 30- and 90-day mortality of the study population were 1.77% (n=236) and 4.07% (n=542), respectively. Baseline characteristics and mean annual mortality of individual hospitals were determined. A logistic regression analysis was performed, which demonstrated that institutional volume is significantly associated with decreased 90-day mortality. The maximum improvement in 90-day mortality was seen if the annual hospital volume was greater than 6 (p<0.0001, OR=2.057 (1.697-2.493). We further explored the non-linear association between institutional volume and 90-day mortality, which demonstrated continued improvement in 90-day mortality with an increase in average hospital volume Fig1.

**Conclusion:** This data suggest that hospital case volume has a direct impact on 90-day mortality after distal pancreatectomy. Based on our results, we recommend defining a high volume center as hospitals performing seven or more distal pancreatectomy cases per year.
90-day mortality after distal pancreatectomy decreases with increase in mean hospital volume.
Background: Patients undergoing pancreatic surgery at teaching hospitals have been shown to experience a shorter length of stay and lower in-hospital mortality compared to those undergoing surgery at non-teaching hospitals. Academic programs have also been associated with improved oncologic outcomes with a study showing improved 5-year overall survival (OS) following resection for pancreatic ductal adenocarcinoma (PDAC) compared to community programs. With the advent of minimally invasive surgery, it remains unclear whether academic programs continue to be associated with improved outcomes. This study sought to evaluate differences by facility type in postoperative outcomes and OS for patients who underwent minimally invasive resections for PDAC.

Methods: The National Cancer Database (NCDB) was used to identify patients diagnosed with stage 1 to 3 PDAC who underwent a pancreatic resection from 2010 to 2014. Patients were included if their operation was performed minimally invasively via either a laparoscopic or robotic approach. Exclusion criteria included stage 4 disease, unknown facility type, or care at integrated networks. Hospitals were characterized as academic or community programs according to American College of Surgeons Commission on Cancer designations. Multivariable logistic regression was used to identify predictors of postoperative clinical and oncologic outcomes, and an adjusted Cox regression was used to compare OS between academic and community programs.

Results: Of 2,136 patients who met inclusion criteria, 542 (25.4%) were treated at community hospitals and 1,594 (74.6%) were treated at academic hospitals. The median follow-up interval for the cohort was 18 months. No significant differences in age, sex, race, insurance type, Charlson-Deyo score, clinical stage or tumor grade were identified between the two groups. However, patients treated at academic hospitals were more likely to travel more than 40 miles for treatment (39.1% vs 20.5%, p<0.0001). The median number of NCDB-reported pancreatectomies performed per year at hospitals that also reported at least one minimally invasive pancreatectomy during 2010 to 2014 was 6. Thus, high-volume hospitals were defined as those that reported, on average, more than 6 pancreatectomies per year. High-volume hospitals were more likely to be academic (65.8% academic vs. 34.2% community, p<0.0001). Treatment at an academic hospital was an independent predictor of receiving neoadjuvant therapy (OR 1.69, 95% CI 1.10 – 2.60, p = 0.02) and attaining fewer positive margins following surgery (OR 0.62, 95% CI 0.47 – 0.82, p = 0.001). Surgery at academic hospitals was also independently associated with improved 1-year OS (HR 0.86, 95% CI 0.74 – 0.99, p = 0.04).

Conclusion: Patients were more likely to undergo neoadjuvant therapy when receiving treatment at academic hospitals. Minimally invasive pancreatic resections for PDAC performed at academic hospitals were associated with fewer positive margins and improved 1-year OS even after adjusting for facility volume, patient and disease characteristics, and receipt of neoadjuvant therapy.
Odds of clinical and oncologic outcomes for patients undergoing minimally invasive pancreatic resection at academic vs. community centers

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Community Center</th>
<th>Academic Center</th>
<th>Unadjusted p value</th>
<th>Odds Ratio (95% CI)*</th>
<th>Adjusted p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoadjuvant Therapy, n (%)</td>
<td>45 (8.3%)</td>
<td>278 (17.4%)</td>
<td>&lt;0.0001</td>
<td>1.68 (1.10 – 2.60)**</td>
<td>0.02**</td>
</tr>
<tr>
<td>Conversion to Open, n (%)</td>
<td>157 (28.8%)</td>
<td>388 (24.3%)</td>
<td>0.03</td>
<td>0.87 (0.66 – 1.13)</td>
<td>0.28</td>
</tr>
<tr>
<td>Length of Stay ≥ 7 days, n (%)</td>
<td>359 (66.2%)</td>
<td>1,016 (63.7%)</td>
<td>0.29</td>
<td>0.85 (0.66 – 1.09)</td>
<td>0.20</td>
</tr>
<tr>
<td>30-Day Unplanned Readmission, n (%)</td>
<td>57 (10.5%)</td>
<td>152 (9.5%)</td>
<td>0.50</td>
<td>0.72 (0.49 – 1.06)</td>
<td>0.10</td>
</tr>
<tr>
<td>Positive Surgical Margins, n (%)</td>
<td>138 (25.7%)</td>
<td>266 (16.9%)</td>
<td>&lt;0.0001</td>
<td>0.62 (0.47 – 0.82)</td>
<td>0.001</td>
</tr>
<tr>
<td>90-Day Mortality, n (%)</td>
<td>39 (7.3%)</td>
<td>86 (5.5%)</td>
<td>0.13</td>
<td>0.88 (0.53 – 1.45)</td>
<td>0.61</td>
</tr>
<tr>
<td>1-Year Overall Survival, %</td>
<td>67.6</td>
<td>77.5</td>
<td>0.0003</td>
<td>0.84 (0.73 – 0.96)†</td>
<td>0.02</td>
</tr>
</tbody>
</table>

*Multivariable logistic regression adjusted for age, race, sex, distance from patient’s zip code to hospital zip code, clinical stage, Charlson score, insurance type, tumor grade, care at high-volume facility, and receipt of neoadjuvant therapy

**Multivariable logistic regression adjusted for age, race, sex, distance from patient’s zip code to hospital zip code, clinical stage, Charlson score, insurance type, tumor grade, and care at high-volume facility

†Hazard ratio from Cox regression adjusted for age, race, sex, distance from patient’s zip code to hospital zip code, clinical stage, Charlson score, insurance type, tumor grade, care at high-volume facility, receipt of neoadjuvant therapy, and margin status
**Background:** Previous studies among populations at high risk of venous thromboembolism (VTE) development have demonstrated that current recommended doses for enoxaparin thromboprophylaxis are associated with high incidence of subprophylactic anti-Factor Xa (anti-Xa) levels. This study examines the efficacy and safety of dose adjusted enoxaparin guided by anti-Xa levels in pancreas surgery patients.

**Methods:** Patients undergoing abdominal cancer surgery at a university affiliated cancer center who received at least three postoperative doses of prophylactic enoxaparin 40mg once daily and had dose adjustments based on peak anti-Xa levels to attain a target of >0.20 IU/ml were prospectively enrolled and compared to a historic cohort of patients receiving recommended enoxaparin thromboprophylaxis without anti-Xa monitoring or enoxaparin adjustment. Incidence of in-hospital VTE and major bleeding following changes in enoxaparin dosing were monitored.

**Results:** The study population comprised 114 patients—36 patients in the prospective intervention group and 78 patients in the historical control group. Baseline characteristic were similar between the intervention and control groups with the exception of Caprini score (8.33 vs 7.31, P=0.007). In the intervention group, 27 of 36 patients (75.0%) initially had subprophylactic peak anti-Xa levels. VTE rates were not significantly different between the intervention and control (0 [0%] vs 6 [7.69%], P=0.174), although did trend toward fewer VTE in the intervention group. There were no differences in major bleeding events (5.56% vs 2.56%; P=0.590), rate of postoperative packed red blood cell transfusion (19.4% vs 25.6%; P=0.627), or mean hemoglobin on discharge (9.74 vs 9.44g/dL, P=0.385). Within the intervention group, prophylactic anti-Xa levels positively correlated with age (68.2 vs 60.8 years, P=0.045) and negatively correlated with operating room time (233 vs 336 minutes, P=0.028) and BMI (25.2 vs 31.6, P=0.010).

**Conclusion:** Thromboprophylactic enoxaparin 40mg daily is often associated with subprophylactic peak anti-Xa levels in pancreatic surgery patients undergoing pancreatic resection. Dose adjustment based on anti-Xa level did alter the incidence of in-hospital VTE and did not increase risk of bleeding.
<table>
<thead>
<tr>
<th>Outcomes Between Patients in the Intervention and Control Cohorts</th>
<th>Intervention N=36</th>
<th>Control N=78</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient VTE, n (%)</td>
<td></td>
<td></td>
<td>0.174</td>
</tr>
<tr>
<td>No</td>
<td>36 (100%)</td>
<td>72 (92.3%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0 (0.00%)</td>
<td>6 (7.69%)</td>
<td></td>
</tr>
<tr>
<td>In Hospital Bleed, n (%)</td>
<td></td>
<td></td>
<td>0.590</td>
</tr>
<tr>
<td>No</td>
<td>34 (94.4%)</td>
<td>76 (97.4%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2 (5.56%)</td>
<td>2 (2.56%)</td>
<td></td>
</tr>
<tr>
<td>Discharge Hgb, g/dL, Mean (SD)</td>
<td>9.74 (1.78)</td>
<td>9.44 (1.45)</td>
<td>0.385</td>
</tr>
<tr>
<td>PRBC Transfusions, n (%)</td>
<td></td>
<td></td>
<td>0.627</td>
</tr>
<tr>
<td>No</td>
<td>29 (80.6%)</td>
<td>58 (74.4%)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (19.4%)</td>
<td>20 (25.6%)</td>
<td></td>
</tr>
</tbody>
</table>

VTE, Venous Thromboembolism; Hgb, Hemoglobin; PRBC, Packed Red Blood Cells.
**Background:** Total pancreatectomy (TP) is primarily performed in patients with diseases involving the entire pancreas e.g. main duct intraductal papillary neoplasm or pancreatic cancer. In high-volume center studies, mortality and morbidity rates were acceptable. However, these series lack to demonstrate a reflection of current practice, because of a wide inclusion period and only inclusions of high-volume centers. The aim of this European prospective snapshot study is to assess generalizable short-term outcomes of elective total pancreatectomy in the current era.

**Methods:** All patients who underwent elective total pancreatectomy for malignant or benign in one of the 42 participating European centers (from 15 countries) between June 1st 2018 and June 30th 2019 were included in the study. Hospitals were identified as high-volume TP centers if performing at least 5 TP annually. Uni- and multivariable logistic regressions with backward step selection were performed to identify predictors for postoperative complications and 30-day mortality.

**Results:** In this preliminary analysis, 253 patients who underwent TP were included of whom 83% was operated in a high-volume center (17 centers were high-volume). Patients were mostly male (57%) and had a median age of 67 years (IQR 57-73). Preoperative diabetes mellitus was present in 36%. Primary elective TP was performed in 43%, in 50% conversion to TP was decided intraoperatively and 7% underwent completion elective TP. Venous resection was performed in 22%, mostly a wedge resection, and arterial resection in 5%. The majority of patients had malignant disease (71%). The most common diagnoses were adenocarcinoma (63%), intraductal papillary mucinous neoplasm (18%), or a neuroendocrine tumor (6%). Major postoperative complications occurred in 22% of all patients and did not differ between patients with malignant or non-malignant disease (23% vs. 21%, p=0.83). In multivariable analysis, ASA score ≥3 (OR 2.08 [95%CI 1.03-4.19] p=0.04), blood loss (OR 1.00 [95%CI 1.00-1.00] p=0.08), and low-volume centers (OR 2.58 [95%CI 1.17-5.67], p=0.019) were associated with major postoperative complications. Postpancreatectomy hemorrhage and bile leakage occurred in 3% and 7% respectively. Patients were readmitted within 90 days after surgery in 15%. Hospital stay was median 12 days (IQR 9-18). Of all patients with at least 30 days or 90 days follow-up, 30-day mortality was 5% (10/210 patients) and 90-day mortality was 9% (17/183). In multivariable analysis, only age (OR 1.09 [95%CI 1.00-1.18], p=0.046) and BMI (OR 1.15 [95%CI 1.02-1.29], p=0.022) were predictors for 30-day mortality.

**Conclusion:** In this first multicenter study, including a large cohort of patients who underwent TP within a small time period, current practice is reflected. Major postoperative complications and 30-day mortality were still considerable and it might be suggested to perform TP solely in high-volume TP centers.
P 11. HEPATECTOMY FOR HEPATOCELLULAR CARCINOMA IN PATIENTS WITH ELEVATED PRE-OPERATIVE BILIRUBIN: AN ACS-NSQIP HPB COLLABORATIVE ANALYSIS

JM Gerry, E Alonso, ML Babicky, PD Hansen, PH Newell
Presenter: Jon Gerry MD | Providence Portland Medical Center

Background: Recent changes to MELD exception rules decrease availability of organs to HCC patients with low biological MELD. We seek to understand if resection of hepatocellular carcinoma (HCC) outside of guidelines, including those with elevated serum bilirubin and those with multifocal HCC, results in unacceptably high morbidity and mortality.

Methods: The ACS-NSQIP targeted hepatectomy database was used to identify patients with HCC who underwent resection from 2014 to 2017. Univariate and multivariate analyses were performed to determine pre-operative and intra-operative factors associated with post-hepatectomy liver failure (PHLF) and in-hospital mortality.

Results: Among 2433 patients who underwent liver resection for HCC, 314 patients (13%) had a bilirubin greater than 1.0 mg/dL, and 975 (40%) had cirrhotic liver texture. PHLF occurred in 176 patients (7.2%), and 46 (1.9%) died in the hospital within 30 days. In multivariate regression, elevated bilirubin was not predictive of PHLF or mortality. Predictors of PHLF included cirrhotic liver texture (OR 1.65, p=0.006) and extent of liver resection with reference to partial hepatectomy (right hepatectomy OR 4.54, p<0.001; trisegementectomy OR 4.22, p<0.001). These were not predictors of in-hospital mortality. In a subgroup analysis of patients with cirrhotic liver texture undergoing partial hepatectomy, an elevated bilirubin was associated with increased PHLF (11% vs. 5.5%, p=0.017) and increased in-hospital mortality (4.5% vs. 1.7%, p=0.023), which compare to a rates of PHLF (16% and 14%) and mortality (2.9% and 4.7%) seen in non-cirrhotic patients undergoing right hepatectomy or trisegementectomy.

Conclusion: In the setting of cirrhosis, PHLF and in-hospital mortality after partial hepatectomy are worse in patients with an elevated bilirubin greater than 1 mg/dL, but the rates are similar to non-cirrhotic patients undergoing major hepatectomy. A mildly elevated bilirubin should not prevent limited resection of HCC in patients with cirrhosis.
**Background:** Biomechanical characterization of human tissue is of increasing importance as new technologies gain importance in modern medicine. Without haptic sensation, measurement of forces associated with surgical techniques will be the primary source of feedback in these new technology assisted procedures (e.g. robotic surgery). An important biomechanical parameter is the suture pullout force (SPOF), indicating the maximum safe force that could be applied to a suture before tearing the tissue. The aim of this study is to analyze suture pullout forces of the pancreatic duct. This data could be used for a wide range of applications including a robot assisted Whipple procedure and for the development of a high-fidelity pancreatic simulation. This data is also useful in understanding how biomechanical properties of the biliary tract change with age, sex, and BMI.

**Methods:** Donated organs used in this study were tested within 72 hours of death. Cross sections of the pancreas were prepared and 4-0 Covidien Sofsilk® sutures were looped through one side of the pancreatic duct wall. The suture strings were clamped to a laboratory developed uniaxial suture instrument. The pancreas was held in place while the suture was pulled in tension at 1.58 mm/sec. The tensile force was measured continuously and the peak force before specimen failure was taken as the SPOF. IBM SPSS Statistics Version 26 was used for statistical analysis of the effect of age (older or younger than 35), sex, and BMI (19-26 or 26+) on SPOF.

**Results:** 103 suture pullout tests were performed on pancreatic ducts from 14 donors. This included 9 males with BMI ranging from 19 to 34 and age ranging from 20 to 69 years old and 6 females with BMI ranging from 20 to 37 and age ranging from 19 to 58 years old. The overall SPOF is 2.87 N ± 1.36 N. The mean SPOF for females is 2.12 N and 3.03 N for males (p=0.019). The SPOF of pancreatic ducts from donors with BMI less than 26 averaged 3.22 N while SPOF for donors with BMI greater than 26 averaged 2.51 N (p=0.045). Donors older than 35 averaged 2.69 N while donors younger than 35 averaged 2.87 N (p=0.123).

**Conclusion:** Preliminary results show a trend suggesting male pancreatic ducts have a higher SPOF than female pancreatic ducts. Additionally, as BMI increases, the pancreatic duct SPOF decreases. The effect of age is inconclusive at this time.
<table>
<thead>
<tr>
<th>Donor</th>
<th>Sex</th>
<th>Age</th>
<th>BMI</th>
<th>Number of Sutures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>20</td>
<td>26.7</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>47</td>
<td>30.7</td>
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<tr>
<td>3</td>
<td>Male</td>
<td>54</td>
<td>29.0</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>30</td>
<td>32.9</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>22</td>
<td>19.0</td>
<td>12</td>
</tr>
<tr>
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<tr>
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<tr>
<td>14</td>
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P 15. HEROIC MEASURES WITH EXTENSIVE VASCULAR RECONSTRUCTIONS FOR INTRAHEPATIC CHOLANGIOCARCINOMA PROVIDES ACCEPTABLE ONCOLOGIC OUTCOMES


Presenter: Abhishek Mathur MD | Columbia University

Background: Intrahepatic cholangiocarcinoma (iCCA) is the second commonest primary malignancy of the liver and its incidence has been increasing over the last decade. However, the survival remains dismal. Untreated unresectable CCA has 3 months median survival and 11 months with adjuvant chemotherapy. Complete tumor extirpation represents the only chance for long term survival. However, the oncological benefit of extensive vascular reconstructions to achieve this has not been clearly elucidated.

Methods: Between January 2002-May 2018 seventy four patients underwent resections for iCCA at our institution. Patient demographics, date of surgery, operative parameters, explant pathology, date of recurrence and death were obtained. Statistical analysis was performed using Chi Square, Student’s T test, Cox-proportional Hazard, Kaplan –Meier curves as needed using SAS software.

Results: Median age of all patients was 59 years and 57% were male. Twenty three percent (n=17) of patients underwent vascular reconstructions. Fifty nine percent of these were caval/hepatic vein or multi-vessel reconstructions and 41% were portal vein alone. Patients undergoing vascular reconstructions underwent a greater proportion of extended hepatectomies (76% vs 33%, p<0.01). Sixty six percent of the patients recurred. No differences were noted in Recurrence free Survival (Median- 338 vs 353 vs 302 days, p=0.97) or Overall Survival (Median- 589 vs 719 vs 497 days; p=0.83) among patients with no vascular reconstructions, any vascular reconstruction, and caval or multi-vessel reconstructions. Explant pathology is shown below.

Conclusion: These data show that patients with intrahepatic cholangiocarcinoma undergoing vascular reconstructions require more extensive hepatic resections and have a higher risk of obtaining a positive margin. However, these patients are still able to obtain reasonable recurrence free and overall survival. Therefore, we propose that heroic measures utilizing extensive vascular reconstructions for intrahepatic cholangiocarcinoma provide acceptable oncologic outcomes and should be undertaken if necessary.

<table>
<thead>
<tr>
<th>Reconstruction</th>
<th>Tumor Size</th>
<th>Poor Tumor Differentiation</th>
<th>Lymphovascular Invasion</th>
<th>Nodal Invasion</th>
<th>Margin Positive (R1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Vascular Reconstruction</td>
<td>7 +/- 4</td>
<td>36%</td>
<td>73%</td>
<td>44%</td>
<td>30%</td>
</tr>
<tr>
<td>All Vascular Reconstruction</td>
<td>8 +/- 4</td>
<td>50%</td>
<td>73%</td>
<td>38%</td>
<td>59%*</td>
</tr>
<tr>
<td>Caval or Multi-vessel Reconstructions</td>
<td>9 +/- 4</td>
<td>44%</td>
<td>78%</td>
<td>40%</td>
<td>60%</td>
</tr>
</tbody>
</table>

*p<0.05 vs No Vascular Reconstruction
P 16. HEPATECTOMY WITH CONCOMITANT ABLATION: COMPARISON OF RADIOFREQUENCY AND MICROWAVE TECHNIQUES
E Gleeson, C Barnett, H Pitt
Presenter: Elizabeth Gleeson MD, MPH | Lewis Katz School of Medicine at Temple University Hospital

Background: Hepatectomy with concomitant ablation expands the pool of patients who otherwise would be relegated to systemic chemotherapy alone. Most analyses of hepatic ablation have focused on patients managed without concomitant hepatectomy and/or have not compared ablative techniques. For the past decade, radiofrequency ablation (RFA) has been utilized most often. However, in recent years microwave ablation (MA) has been gaining popularity. The aims of this study were to compare the utilization over time and the outcomes of RFA and MA in North American patients undergoing hepatectomy.

Methods: Patients undergoing hepatectomy with concomitant ablation were identified in the 2014-17 ACS-NSQIP procedure targeted database. Patients having concomitant biliary enteric anastomoses or colectomy were excluded. Patients having radiofrequency ablation (RFA) or microwave ablation (MA) were compared over time by control charts. RFA and MA patients were propensity score matched based on their age, race, disseminated cancer, operative approach, hepatectomy extent and perioperative transfusions. Outcomes were compared by chi-square and Mann-Whitney U tests.

Results: Of 1,589 patients undergoing concomitant hepatectomy and ablation, 964 (60%) had RFA and 635 (40%) receive MA. Control chart analysis over 16 quarters demonstrated no change in the frequency of RFA with an average of 60 procedures per quarter. In comparison, the quarterly frequency of MA increased from a low of 21 to a high of 79 (p<0.05). After matching, RFA and MA patients had similar mortality, serious morbidity, bile leaks, post hepatectomy liver failure (PHLF), organ space infections (OSI), reoperations and length of stay (Table). However, MA was associated with lower rates of deep vein thrombosis (DVT) and sepsis (each p<0.05).

Conclusion: In recent years microwave ablation (MA) is being utilized more frequently in patients undergoing hepatectomy while concomitant radiofrequency ablation (RFA) rates have not changed. MA is associated with fewer postoperative deep vein thrombosis and lower rates of procedure related sepsis.
Table. Comparison of outcomes in RFA and MA patients undergoing hepatectomy

<table>
<thead>
<tr>
<th>Outcome</th>
<th>RFA (N=549)</th>
<th>MA (N=549)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality (%)</td>
<td>0.7</td>
<td>0.4</td>
<td>0.41</td>
</tr>
<tr>
<td>Serious morbidity (%)</td>
<td>13.1</td>
<td>12.9</td>
<td>0.93</td>
</tr>
<tr>
<td>Bile leak (%)</td>
<td>4.6</td>
<td>5.1</td>
<td>0.66</td>
</tr>
<tr>
<td>PHLF B+C (%)</td>
<td>1.3</td>
<td>0.7</td>
<td>0.36</td>
</tr>
<tr>
<td>OSI (%)</td>
<td>5.6</td>
<td>4.0</td>
<td>0.21</td>
</tr>
<tr>
<td>DVT (%)</td>
<td>1.8</td>
<td>0.5</td>
<td>0.05</td>
</tr>
<tr>
<td>Sepsis (%)</td>
<td>3.8</td>
<td>1.3</td>
<td>0.01</td>
</tr>
<tr>
<td>Reoperation (%)</td>
<td>2.2</td>
<td>2.6</td>
<td>0.69</td>
</tr>
<tr>
<td>LOS (days)</td>
<td>5</td>
<td>5</td>
<td>0.39</td>
</tr>
</tbody>
</table>

PHLF = post-hepatectomy liver failure
OSI = organ space infection
DVT = deep vein thrombosis
LOS = length of stay
Background: Half of patients bearing colorectal tumors are expected to develop liver metastases at some point of their disease. Liver resection is considered the best treatment in order to achieve long-term survival and, sometimes, cure. Along the past two decades 5-year survival has increased after liver resection, mostly due to improved surgical and oncological care. Our institution incorporated a dedicated cancer center during it’s experience on the management of CRLM and witnessed the impact of multidisciplinary specialized care on the survival of patients operated for CRLM. Beyond cumulative survival curves, conditional survival is an interesting tool as it describes expected survival during follow-up, a forward-looking information. We sought to evaluate overall and five-year conditional survival of consecutive patients operated for the treatment of CRLM at the Liver Surgery Unit – Hospital das Clinicas – University of Sao Paulo after the institution of a specialized multidisciplinary cancer center.

Methods: Retrospective analysis comparing two institutional periods in the management of CRLM. Consecutive patients undergoing liver resection with curative intent and histologically confirmed diagnosis of MHCRCR, between January 2000 and December 2015 (follow up until December 2018). ERA 1 corresponded to the initial experience (January 2000 through February 2009) and ERA 2 (March 2009 to December 2015) corresponded to the period after the adoption of specialized oncologic multidisciplinary care. Demographic profile, oncological data, operative outcomes and survival analysis were performed, including 5-year conditional survival.

Results: 383 patients were submitted to 402 hepatectomies, 98 patients were operated during ERA 1 and 285 during ERA 2. During ERA 1 patients presented higher levels of CEA (177.0 ng/dL vs. 70.3 ng/dl p<0.001), greater mean size of the largest resected tumor (47.5 mm vs. 33.9 mm p<0.001). In ERA 2 there were more synchronous (70.0% vs. 58.5% p=0.041), bilobar (22.3% vs. 34.8% p=0.025) and multinodular CRLM (22.8% vs. 11.5% p=0.031). During ERA2 exposure to preoperative chemotherapy was more frequent (77.3% vs. 34.1% p<0.001), predominantly oxaliplatin based. Operative results indicated that ERA 2 employed mostly minor (65.9% vs. 42.6% p<0.001) and non-anatomical resections (40.7% vs.12.8% p<0.001). Operative complications (ERA 1 32.3% vs. ERA 2 36.3% p=0.481) and overall mortality were similar between studied periods. Surgical margins did not vary significantly between ERAS. Median follow up was 42.0 months for the whole cohort (ERA1 35.5 months; ERA2 43.0 months). Overall survival in 5 years was 34.5% for ERA 1 and 48.0% for ERA 2 (p=0.011). During follow up years 1 to 5, 5-year conditional survival varied from 35.0% to 62.0% in ERA 1 and from 45.9% to 63.6% in ERA 2. being greater in every follow up year in ERA 2.

Conclusion: The changes along time in the multidisciplinary specialized care to CRLM resulted in increased overall and conditional survival in ERA 2.
Background: Many surgeons selectively place surgical drains for the putative purpose of diagnosing clinically significant bile leaks and organ space infections and mitigating their sequelae including reducing secondary percutaneous drains. No consensus guidelines exist for when it is appropriate for a surgical drain to be selectively placed. Within this context, we sought to analyze both predictors and outcomes associated with surgical drain placement to measure their effectiveness in diagnosing or reducing liver-related complications.

Methods: We studied consecutive patients undergoing hepatectomy from January 2017 to December 2018, using a single-institution database maintained prospectively with biweekly review by a faculty surgeon and two advanced practice providers. Patient health information, perioperative details, and outcomes were recorded for a period of 90 postoperative day. Complications were defined in accordance with the Accordion grading system with major complications defined as \( \geq 3 \). Clinically significant bile leaks were defined by meeting International Study Group of Liver Surgery Grade B or C criteria and combined with organ space infections (OSI) to make a composite endpoint. Statistical analysis was completed using logistic regressions and linear regressions for categorical and continuous variables, respectively, reported as odds ratio (OR) and median values, after controlling for patient ASA, BMI, age, and Kawaguchi-Gayet classification (surgical difficulty and extent).

Results: A total of 466 patients (median age 57 years, interquartile range [IQR 49–66]; 54% female) were analyzed. One hundred (21.5%) patients had surgical drains placed near the liver resection margin, while 366 (78.5%) did not. Clinically significant bile leaks and/or OSI were noted in 22% \( (n=22) \) of patients with surgical drains and 5.7% \( (n=21) \) of patients without surgical drains \( (p<0.001) \). Of 100 drains, 78% did not identify or prevent clinically significant bile leaks and/or OSI. Of the 22 patients with primary drains and clinically significant bile leaks and/or OSI, 10 (45.5%) required additional percutaneous drainage while 12 (54.5%) did not. The presence of a surgical drain was associated with increased median length of stay (LOS) (5 days [IQR 4-6] with drain vs. 4 days [IQR 3-5] without drain, \( p<0.001 \)). After controlling for surgical drain placement, Kawaguchi-Gayet classification was not associated with major complication (OR 1.29 95% CI 0.90 – 1.80, \( p=0.175 \)), clinically significant bile leak (OR 0.70 95%CI 0.39 – 1.26, \( p=0.234 \)), OSI (OR 1.27 95%CI 0.84 – 1.92, \( p=0.254 \)), need for percutaneous drain (OR 0.76 95%CI 0.41 – 1.40, \( p=0.377 \)), or readmission within 90 days (OR 1.05 95%CI 0.76 – 1.45, \( p=0.770 \)).

Conclusion: Almost 4 of 5 surgical drains did not diagnose or drain a clinically significant bile leak and/or OSI. The placement of a surgical drain is associated with increased LOS and may not mitigate the risk of clinically significant bile leaks and/or OSI, but may reduce the need for additional percutaneous drains in high-risk patients who fail a post-resection leak test or inspection.
P 19. USE OF SINGLE NEEDLE HIGH FREQUENCY IRREVERSIBLE ELECTROPORATION (SN-HFIRE) TO CREATE REPRODUCIBLE PANCREATIC ABLATIONS IN A SURVIVAL SWINE MODEL

PN Salibi, MF Lorenzo, Y Zhao, K Aycock, J Sulzer, Vrochides D, RV Davaols, DA Iannitti, IH McKillop
Presenter: Patrick Salibi MD | Atrium Health

Background: Irreversible electroporation (IRE) is an alternative to thermal ablation for treating unresectable pancreatic malignancies. However, IRE can be technically demanding due to the need to place multiple electrodes in an anatomically challenging environment, the risk of thermal damage to critical structures adjacent to the electrodes and extended intraoperative times (relative to thermal ablation). To address these limitations, we developed an experimental single needle-dual electrode high frequency IRE (SN-HFIRE) delivery system. The aim of this study was to evaluate the efficacy of SN-HFIRE in vivo by performing pancreatic ablations using different pulse delivery parameters designed to maintain ablation size while reducing the potential for thermal damage in a survival swine model.

Methods: Under surgical anesthesia and ultrasound guidance, the SN-HFIRE device was placed in either the head or tail of the pancreas. Bipolar HFIRE pulses of 2,250 or 2,750V were delivered using a 2-5-2 pulse waveform (on-off-on time [\text{s}]) as either a single contiguous series of pulse trains (CD; 2,250V, 1x100-bursts, 100µs on-time/burst), or four sets of 25 bursts (2,500V, 4x25-bursts, 60µs on-time/burst) with a 60sec delay between each set (DD). Intraoperative SN-HFIRE delivery was performed in the absence of paralytics or cardiac synchronization. Intraoperatively, tissue surface and electrode temperature were continuously measured along with physiological parameters (Chem-8), muscle movement, and cardiac output. Following SN-HFIRE delivery the laparotomy was closed and animals recovered and monitored for 3-days. At necropsy, tissue was collected and analyzed for ablation size, and ablation characteristics assessed histologically to identify areas of necrotic versus apoptotic cell death.

Results: All animals (n=4) survived the procedures to experimental completion in the absence of detectable adverse events. Pancreatic SN-HFIRE device placement was achieved in less than 5mins and delivery of SN-HFIRE pulses was completed in 100secs (CD) versus 240sec (DD) (n=4 per group). No discernable muscle movement or cardiac events were detected during SN-HFIRE delivery for either CD or DD settings. Electrode surface temperature was significantly higher in CD versus DD (16.3+/-1.00C versus 6.5+/-0.60C) and translated to changes in measurement of tissue surface temperature (5.6+/-1.3 (CD) versus 0.3+/-0.50C [DD]). At necropsy, there were no abnormalities in the physiological parameters measured (Chem-8), and sites of ablation were readily identifiable prior to sectioning/staining. Following tissue staining (tetrazolium chloride) ablated regions demonstrated clearly defined boundaries of live-dead tissue from which measurements were used to calculate ablation volume. Using the CD approach mean ablation volume was 938+/-181mm3 versus 1044+/-208cm3 (DD). Histologically, H&E staining confirmed clear demarcation between ablated and healthy tissue, with a notable absence of infiltrating immune cells in both the CD and DD groups.

Conclusion: SN-HFIRE allows the ability to rapidly create reproducible pancreatic ablations in vivo using a single-needle delivery device. The use of SN-HFIRE further simplifies intraoperative procedures and reduces pulse delivery time as it obviates the need for cardiac synchronization or intraoperative paralytics. Refining the pulse characteristics to include a delay between pulse train delivery significantly reduces the potential for thermal damage adjacent to the electrodes without compromising the ablation size that can be achieved.
P 20. PREDICTORS OF PROLONGED PANCREATIC FISTULA IN PATIENTS UNDERGOING PANCREATEODUODENECTOMY (WHIPPLE PROCEDURE)
MC Tee, RD Brahmbhatt, S Raman, J Franko
Presenter: May Tee MD, MPH | Mercy Medical Center

Background: Postoperative pancreatic fistula (POPF) contributes to substantial morbidity associated with pancreateoduodenectomy (PD). Risk stratification for development of POPF, based on factors such as pancreatic duct size, pancreatic texture, and intraoperative blood loss, may mitigate severity of POPF by treatment with antibiotics, additional drains, or feeding tubes. We aimed to examine predictors of prolonged POPF (POPF at 30 days or greater) in patients undergoing PD to provide further stratification of patients at risk.

Methods: The American College of Surgeons National Surgical Quality Improvement Program pancreatectomy procedure targeted participant use file was queried from 2015-2017, when persistent POPF at postoperative day 30 was captured. All PD procedures were extracted with emergent cases excluded. Univariable and multivariable analyses were conducted to examine the association between persistent POPF and 30-day surgical outcomes.

Results: N = 12,014 patients undergoing open and minimally invasive PD were evaluated. On univariate analyses, persistent POPF was associated with the following outcomes: surgical site infection (SSI) superficial (11.0% vs. 7.4%, P < 0.001), deep SSI (3.1% vs. 1.2%, P < 0.001), organ space SSI (44.1% vs. 13.1%, P < 0.001), wound dehiscence (2.3% vs. 1.0%, P < 0.001), pneumonia (6.7% vs. 3.5%, P < 0.001), reintubation (9.2% vs. 3.2%, P < 0.001), pulmonary embolus (2.9% vs. 1.1%, P < 0.001), failure to wean off mechanical ventilation (9.2% vs. 2.4%, P < 0.001), renal insufficiency (1.6% vs. 0.6%, P < 0.001), renal failure (2.4% vs. 0.8%, P < 0.001), myocardial infarction (2.3% vs. 1.1%, P=0.001), deep vein thrombosis (6.8% vs. 2.6%, P < 0.001), sepsis (19.2% vs. 8.5%, P < 0.001), septic shock (9.9% vs. 2.4%, P < 0.001), length of stay greater than 12 days (58.9% vs. 23.7%, P < 0.001), discharge to destination other than home (28.9 vs. 12.8%, P < 0.001), return to operating room (13.5% vs. 4.9%, P < 0.001), readmission to hospital (23.8% vs. 15.8%, P < 0.001), delayed gastric emptying (35.2% vs. 15.4%, P < 0.001), percutaneous drain placement (33.3% vs. 10.9%, P < 0.001), and postoperative C. difficile colitis (3.3% vs. 1.8%, P=0.003). On multivariable analyses, independent predictors of prolonged POPF include: male sex (OR=1.6, P < 0.001), obesity (OR=1.5, P < 0.001), operative time greater than 420 minutes (OR=1.2, P=0.03), preoperative chemotherapy (OR=0.6, P=0.002), postoperative blood transfusion (OR=1.7, P < 0.001), pancreatic duct < 3mm (OR=1.7, P=0.002), soft pancreatic texture (OR=2.4, P < 0.001), and drain to suction (OR=1.4, P=0.015).

Conclusion: Prolonged POPF is a major source of morbidity following PD but not mortality. Further risk stratification for POPF may be considered for male patients with increased body mass index undergoing prolonged PD procedures. Significant perioperative blood loss requiring transfusion, small pancreatic duct, and soft pancreas remain important predictors of prolonged POPF. Interestingly, drain placed to suction was associated with increased odds of prolonged POPF but neoadjuvant chemotherapy appeared to be protective against prolonged POPF.
P 21. IMPACT OF NEOADJUVANT RADIATION ON POSTOPERATIVE OUTCOMES OF PATIENTS WITH PANCREATIC CANCER UNDERGOING PANCREATODUODENECTOMY
AH Zureikat, A Chopra, M Zenati, A Olson, S AlMasri, N Ayoub, S Burton, KK Lee, A Paniccia, DL Bartlett
Presenter: Samer AlMasri MD | University of Pittsburgh Medical Center

Background: Neoadjuvant chemotherapy (NC) and chemoradiation (NCRT) are increasingly used to downstage pancreatic adenocarcinoma (PDA), particularly in head tumors requiring pancreatectoduodenectomy (PD). While NCRT may increase margin negative rates and sterilize regional lymph nodes, its impact on postoperative morbidity remains poorly characterized. This study aimed to compare the impact of NCRT and NC on the postoperative morbidity of patients with PDA undergoing PD.

Methods: A single-center, retrospective analysis of consecutive patients with PDA treated with NC or NCRT followed by PD between 2009 and 2019 was performed. All complications within the first post-operative year were recorded. Logistic regression analysis was performed to identify predictors of morbidity. Kaplan-Meier estimates and Cox proportional analysis were performed with overall survival (OS) and complication-free survival as the primary outcome.

Results: Of 354 patients, 271 received NC and 83 received NCRT [60% received SBRT and 40% received other RT (EBRT/ IMRT/ 3D-conformal therapy)]. Mean age was 66.4 years and 50.6% were females. Patients who received NCRT were more likely to be females, had higher rates of locally advanced disease, arterial involvement and received higher number of NC cycles (all p<0.05). Compared to NC, patients who received NCRT had higher rates of open surgeries and vascular resections, longer operative times, higher operative blood loss and rates of ICU admissions, longer hospital stay, higher 90-day mortality, serious complications (Clavien grade >3), lower rates of receipt of adjuvant therapy, and higher rate of complications within 1 year (all p<0.05). Patients who received NCRT had significantly higher rates of GI bleed (p=0.012) and portomesenteric vessel thrombosis (p=0.0001) (Table). The most common cause of GI bleed in patients who received NCRT was a pseudoaneurysm (66.67%). On multivariate analysis, NCRT remained associated with longer (>10 days) post-operative hospital stay (OR=2.38; p=0.008), higher rate of serious complications (OR=1.95; p=0.04) and less receipt of adjuvant therapy (OR=0.41; p=0.011). On subgroup analysis of various RT modalities, SBRT was not a significant predictor of serious complications (OR=1.23; p=0.65) on multivariate analysis. Patients who received NCRT had significantly shorter complication free survival within the first post-operative year compared to those who received NC, on Kaplan-Meier (p=0.018) and Cox- regression analysis (HR=1.5; p=0.049). Median OS of patients who received NCRT was not significantly different from those who received NC (28.7 vs. 31.4 months; p=0.962).

Conclusion: NCRT is associated with increased morbidity following PD, which may be explained by a higher proportion of locally advanced disease and vascular resections in this cohort. In this analysis, neoadjuvant SBRT was not associated with serious complications and may offer a safer alternative to NCRT, warranting its prospective analysis.
<table>
<thead>
<tr>
<th>Variable</th>
<th>NC (n=271)</th>
<th>NCRT (n=83)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGE (Delayed gastric emptying) [n(%)]</td>
<td>43 (15.9)</td>
<td>17 (20.5)</td>
<td>0.327</td>
</tr>
<tr>
<td>CR-PF (Clinically relevant pancreatic fistula) [n(%)]</td>
<td>6 (2.2)</td>
<td>1 (1.2)</td>
<td>1.00</td>
</tr>
<tr>
<td>Bile (HJ) leak [n(%)]</td>
<td>2 (0.7)</td>
<td>1 (1.2)</td>
<td>0.553</td>
</tr>
<tr>
<td>GJ (Gastrojejunostomy) leak [n(%)]</td>
<td>3 (1.1)</td>
<td>1 (1.2)</td>
<td>1.00</td>
</tr>
<tr>
<td>Chyle leak [n(%)]</td>
<td>11 (4.1)</td>
<td>5 (6.0)</td>
<td>0.451</td>
</tr>
<tr>
<td>GI (Gastrointestinal) bleed [n(%)]</td>
<td>12 (4.4)</td>
<td>10 (12.1)</td>
<td>0.012</td>
</tr>
<tr>
<td>Portomesenteric vessel thrombosis [n(%)]</td>
<td>12 (4.4)</td>
<td>15 (18.1)</td>
<td>0.0001</td>
</tr>
<tr>
<td>SSI (Surgical site infection) [n(%)]</td>
<td>61 (22.5)</td>
<td>25 (30.1)</td>
<td>0.157</td>
</tr>
<tr>
<td>Anastomotic stricture [n(%)]</td>
<td>5 (1.9)</td>
<td>2 (2.4)</td>
<td>0.668</td>
</tr>
<tr>
<td>Cholangitis [n(%)]</td>
<td>8 (3.0)</td>
<td>2 (2.4)</td>
<td>1.00</td>
</tr>
<tr>
<td>Pancreatitis [n(%)]</td>
<td>2 (0.7)</td>
<td>1 (1.2)</td>
<td>0.553</td>
</tr>
<tr>
<td>SBO (Small bowel obstruction) [n(%)]</td>
<td>6 (2.2)</td>
<td>5 (6.0)</td>
<td>0.080</td>
</tr>
<tr>
<td>Bowel perforation [n(%)]</td>
<td>1 (0.37)</td>
<td>0 (0)</td>
<td>0.579</td>
</tr>
<tr>
<td>Incisional hernia [n(%)]</td>
<td>19 (7.0)</td>
<td>9 (10.8)</td>
<td>0.258</td>
</tr>
<tr>
<td>GJ (Gastro-jejunal) ulcer [n(%)]</td>
<td>4 (1.5)</td>
<td>4 (4.8)</td>
<td>0.091</td>
</tr>
<tr>
<td>Serious (&gt;Claven 3) complication [n(%)]</td>
<td>58 (21.4)</td>
<td>29 (34.9)</td>
<td>0.012</td>
</tr>
<tr>
<td>Post-operative hospital stay [median (IQR)]</td>
<td>7 (6-9)</td>
<td>9 (7-14)</td>
<td>0.0001</td>
</tr>
<tr>
<td>ICU admission [n(%)]</td>
<td>114 (42.7)</td>
<td>67 (80.7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>30-day mortality [n(%)]</td>
<td>2 (0.74)</td>
<td>2 (2.4)</td>
<td>0.235</td>
</tr>
<tr>
<td>90-day mortality [n(%)]</td>
<td>4 (1.5)</td>
<td>7 (8.4)</td>
<td>0.005</td>
</tr>
</tbody>
</table>
P 23. DEFINING AN OPTIMAL CUT OFF POINT FOR THE NEUTROPHIL-LYMPHOCYTE RATIO IN PATIENTS WITH PANCREATIC INTRAEPITHELIAL NEOPLASIA

J Polanco-Santana, M Castillo-Angeles, M Callery, T Kent

Presenter: John Polanco Santana MD | Beth Israel Deaconess Medical Center

Background: Pancreatic intraepithelial neoplasms (PanIN) are lesions that arise from proliferation and metaplasia of the pancreatic ductal epithelium. Classification is based on the degree of dysplasia. The neutrophil-to-lymphocyte ratio (NLR) has been previously used as a measure of inflammatory response in various malignancies but has not been studied in PanIN. Therefore, the aim of this study was to assess the relationship between NLR and PanIN, and to determine an optimal cut-off point that differentiates between PanIN grades, with the hypothesis that the NLR would be greater with higher-grade PanIN.

Methods: This single-institution retrospective cohort study included adult patients with biopsy-proven PanIN. Patients with documented invasive cancer, infection, or acute pancreatitis were excluded. Demographics, clinical characteristics, and histology were collected. Multivariate logistic regression was performed to determine the association between NLR and PanIN. For clinical purposes to determine the optimal cut-off point to differentiate between PanIN grades, we used a two-tier grading system, grouping PanIN I and II as low-grade, and PanIN III as high-grade; receiver operator characteristic (ROC) curves and corresponding area under the curve (AUC) were generated.

Results: Of a total of 2,261 patients who had undergone a diagnostic procedure of the pancreas at one institution, 499 were identified as having PanIN. 77 patients met the criteria to be included in the study. 50 (64.9%) participants were classified as having grade I, 23 (29.9%) as grade II, and 4 (5.2%) as grade III PanIN. The mean age was 61.3 ± 13.2; 56 (72.7%) participants were female. The median (IQR) NLR value was 2.41 (1.15). The median (IQR) NLR value for PanIN I was 2.31 (1.01), 2.85 (2.68) for PanIN II, and 8.95 (4.23) for PanIN III, with a statistically significant difference between groups (p = 0.015). After adjusted analysis, NLR was significantly associated with PanIN grade (OR 1.89, 95% CI 1.37 – 2.60, p < 0.001). The optimal cut-off point for NLR was determined to be 2.43 (AUC 97.46%, p = 0.04).

Conclusion: Early detection of pancreatic cancer is of paramount importance due to its poor prognosis. PanIN is a common precursor to pancreatic ductal adenocarcinoma (PDAC). We identified a statistically significant association between NLR and PanIN grade, as well as an NLR cutoff indicative of high-grade PanIN, the immediate precursor to invasive PDAC. These findings should prompt further investigation, in a larger sample, into the potential utility of NLR to aid in decision-making of if/when resection of high grade PanIN lesions is warranted.
Background: Previous studies have documented cost variation for inpatient surgical procedures suggesting opportunities for savings, however assessment by claims data is often criticized for lacking clinical granularity and validation. By leveraging linkage between two unique datasets, a clinical registry and a claims based registry, we sought to characterize variation in payments for pancreaticoduodenectomy (PD) across hospitals in Michigan. By linking outcomes to cost this study is able help differentiate between quality problems (e.g. complications) and efficiency problems (e.g. overutilization). Variation in outcomes and utilization may highlight opportunities for collaborative quality improvement and practice standardization.

Methods: We linked Michigan Surgical Quality Collaborative (MSQC) clinical registry data for PD performed at 8 Michigan hospitals to the Michigan Value Collaborative (MVC) registry from 2014 to 2018. The MSQC is a regional collaborative that maintains a robust and well-established state-wide clinical registry focused on outcomes and health care use. The MVC is a statewide collaborative focused on improving the value of care in the state of Michigan which maintains a claims-based registry with 30-day price-standardized episodes of care from multiple payers. Payment components between hospitals were compared with identified drivers of variation (e.g., index hospitalization/procedure, readmissions, post-acute care, and professional fees).

Results: Among 1,535 PD episodes identified, the 30-day episode payment by hospital ranged between $34,680 and $56,973 with a median of $40,063. Index hospitalization payments were the primary driver of this variation (46%), followed by post-acute discharge payment (34%). Readmissions by hospital ranged from 5% to 22% with a median of 17%; post-operative morbidity ranged from 11% to 35% with a median of 28%. Notably, higher payments were not associated with improved clinical performance (Figure 1). As such, individual hospitals may look at their own complication/cost profiles to understand if they are managing complications as efficiently as possible. Alternatively, hospitals with low morbidity but high costs may be over-utilizing services (e.g. post-acute care).

Conclusion: In this analysis, the linkage of clinical registry data with claims-based registry data provides a unique opportunity to study drivers of cost and variation. For patients undergoing PD in Michigan, we found a wide variation in surgical episode spending across hospitals without major difference in clinical performance. Hospital leaders may seek to better understand variation in practices between their hospitals in order to standardize care and reduce variation in post-acute care and other utilization. Similar procedure-specific analyses should be performed for other clinical service lines in order to understand whether variations in quality (e.g., complications) or efficiency (e.g., post-acute care) drive observed differences in spending.
Figure 1: Hospital Mean Total Episode Payment compared to Mortality

Notes: Each circle represents one hospital in Michigan. The X-axis represents the mean post-operative morbidity. The Y-axis represents the mean total episode payment.
P 25. SURGEON-PLACED CONTINUOUS INFUSION PAIN CATHETERS MARKEDLY DECREASE NARCOTIC USE AND IMPROVE OUTCOMES AFTER PANCREATECTOMY

L Kone, T Tran, N Kunda, AV Maker

Presenter: Lyonell Kone MD, MHS | University of Illinois at Chicago

Background: Pancreatectomy results in significant postoperative pain and typically requires opioid analgesia for adequate pain control. Local anesthetics as part of a multi-modality pain regimen may decrease postoperative pain and opioid requirements, but can be limited by onset of action, duration of effect, and inability to dose titrate after administration. It is hypothesized that surgeon placement of tunneled peri-incisional catheters with continuous infusion of local anesthetic after pancreatic surgery may improve outcomes.

Methods: Patients that underwent open pancreatectomy by a single surgeon and had complete information on pain scores, opioid and non-opioid pain medication administration, and perioperative outcomes of interest were included. Patient’s demographics, comorbidities, and perioperative data were abstracted. 19-gauge continuous infusion (CI) perforated catheters were tunneled in the pre-peritoneal space on either side of the midline incision at the time of facial closure. Catheters were placed to a double elastomeric pump (ON-Q), loaded with 0.25% bupivacaine at a continuous rate. Multivariate analyses with stepwise linear and logistic regressions were performed adjusting for potential confounders. Patient-controlled analgesia (PCA), PCA + CI, and epidural analgesia (EA) were compared. The primary outcomes were total opioid use (including morphine equivalents of tramadol) and patient reported pain scores. Secondary outcomes included time to ambulation and urinary catheter removal.

Results: When compared across baseline characteristics, there were no differences in age, gender, BMI, ASA status, operative time, EBL or amount of administered non-opioid analgesia (acetaminophen, and ketorolac) (n=66). Univariate analysis revealed a decrease in total opioid use with CI (n=45) compared to PCA (n=11) (mean morphine equivalent: 83 vs. 207mg, p=0.022) and EA (n=9) (83 vs. 156mg, p=0.004) (Figure). After inclusion of potential confounders in a stepwise linear regression, CI was independently associated with a decrease in opioid use compared to PCA (Coef: -107, p=0.024) and EA (Coef: -73, p<0.001). There was a trend towards improved pain scores with CI compared to PCA (Coef: -1.3, p=0.062). Furthermore, patients that received CI were more likely to ambulate, and for further distances, on post-operative day one (POD1), (CI vs. EA, OR: 20, p=0.026) and had earlier urinary catheter removal (CI vs. EA, Coef: -1.59, p=0.002). There were no significant differences in time to return of bowel function, antiemetic use, emesis, superficial or deep organ infections, or length of stay between the groups.

Conclusion: The use of a surgeon-placed continuous infusion local anesthesia system at pancreatectomy decreased opioid requirements compared to PCA or EA without increasing subjective pain. CI also improved the initiation and distance of ambulation, and time to urinary catheter removal compared to EA. In this controlled, single-surgeon series, CI catheters are easy to place and control by the surgeon, are titratable, decrease narcotic use, and may improve outcomes compared to other traditional modalities of post-pancreatectomy/laparotomy pain control.
**Figure 1.** Graph represents average total opioid use stratified by analgesia type. Y-axis truncated between 100-125mg and collapsed by 30% above 125 to improve visualization of differences. Statistics performed with non-parametric testing. * p< 0.05; **p<0.01; POD: “post-operative day”."
**P 26. TUMOR BIOLOGY, NOT TISSUE OF ORIGIN, DRIVES OUTCOMES FOLLOWING RESECTION OF DUODENAL/AMPULLARY AND PANCREATIC NEUROENDOCRINE TUMORS**

*R Schmocker, M Wright, D Ding, J Cameron, J He, W Burns, C Wolfgang, R Burkhart*

**Presenter:** Ryan Schmocker MD, MS | Johns Hopkins University School of Medicine

**Background:** Previous data has suggested that duodenal/ampullary neuroendocrine tumors (DANETs) and pancreatic neuroendocrine tumors (PNETs) have different clinical outcomes and patterns of recurrence. We report a large single institutional database to determine the pathologic characteristics, outcomes, and patterns of recurrence for these tumors.

**Methods:** A prospectively maintained; single institution database of all pancreatic resections was queried for patients undergoing surgical resection for a neuroendocrine tumor. Patients with MEN1 syndrome and follow up less than 1 year (unless this was secondary to disease progression) were excluded. Chart review was undertaken to identify patients undergoing resection of a DANET or PNET and to obtain demographic and clinical variables. Patients undergoing surgery from 2000-2018 were included.

**Results:** A total of 310 patients were included, 50 with DANETs and 260 with PNETs. Patients in the DANETs group were significantly older (60.0yr vs 59.6yr; p = 0.018), had higher grade tumors (22.0% G2 or G3 tumors vs. 9.3%; p = 0.019), and had more node positive resections (70.0% vs. 36.9%; p < 0.001). As expected, patients with DANETs were significantly more likely to have a local resection (18.0% vs 0.0%; p <0.001). Despite these poor pathologic features, there was no difference in overall survival (66.6 vs 60.9mo) or recurrence free survival (50.0 vs 50.4mo) when comparing the groups. The following factors on univariate analysis were associated with worse survival for all included patients: lymphovascular invasion (LVI), increasing T stage, node positivity, metastatic disease at the time of surgery, and age. DANET was not a significant predictor of overall survival. On multivariate analysis age was the strongest predictor of poor survival (HR 1.05 per year; p <0.001), followed by M1 disease (HR 3.72; p = 0.002), and LVI (HR 1.96; p = 0.050). There was no difference in the patterns of recurrence between the groups with both groups having liver recurrence as the most common site.

**Conclusion:** In this large single institutional study, DANETs appear to have worse pathologic features at the time of resection when compared with PNETs. However, there is no difference in overall or recurrence free survival, suggesting that the underlying tumor type is a more important driver of outcomes than the specific pathologic characteristics. Increasing age, the presence of metastatic disease, and LVI were the drivers of worse outcomes in all included patients. Additional study is required to further characterize the predictors and outcomes of DANETs.
<table>
<thead>
<tr>
<th>Patient Characteristics</th>
<th>Duodenal/Ampullary (N=50)</th>
<th>PNET (N=260)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years (IQR)</td>
<td>60.0 (56.1-66.9)</td>
<td>56.9 (56.5-66.3)</td>
<td>0.018</td>
</tr>
<tr>
<td>Gender (N - Male)</td>
<td>31 (62.0%)</td>
<td>132 (50.8%)</td>
<td>0.145</td>
</tr>
<tr>
<td>Functional NET</td>
<td>5 (10.0%)</td>
<td>26 (10.0%)</td>
<td>1.000</td>
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</tbody>
</table>

**Operative/Pathologic Characteristics**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Duodenal/Ampullary</th>
<th>PNET</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>39 (78.0%)</td>
<td>263 (90.8%)</td>
<td>0.019</td>
</tr>
<tr>
<td>2</td>
<td>8 (16.0%)</td>
<td>14 (5.4%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3 (6.0%)</td>
<td>10 (3.9%)</td>
<td></td>
</tr>
<tr>
<td>T Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>14 (28.0%)</td>
<td>107 (41.2%)</td>
<td>0.219</td>
</tr>
<tr>
<td>2</td>
<td>17 (34.0%)</td>
<td>86 (33.1%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>18 (36.0%)</td>
<td>65 (25.0%)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1 (2.0%)</td>
<td>2 (1.0%)</td>
<td></td>
</tr>
<tr>
<td>Node Positive</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Metastatic Disease at Surgery</td>
<td>8 (16.0%)</td>
<td>25 (9.6%)</td>
<td>0.180</td>
</tr>
<tr>
<td>Margin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R0</td>
<td>47 (94.0%)</td>
<td>223 (85.8%)</td>
<td>0.277</td>
</tr>
<tr>
<td>R1</td>
<td>4 (6.0%)</td>
<td>36 (13.9%)</td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>0</td>
<td>1 (0.4%)</td>
<td></td>
</tr>
<tr>
<td>Lymphovascular Invasion</td>
<td>14 (28.0%)</td>
<td>71 (27.3%)</td>
<td>0.920</td>
</tr>
<tr>
<td>Surgery Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radical Pancreatectomy</td>
<td>41 (82.0%)</td>
<td>224 (86.2%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Limited Pancreatectomy</td>
<td>0</td>
<td>36 (13.9%)</td>
<td></td>
</tr>
<tr>
<td>Local Resection</td>
<td>9 (18.0%)</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Follow Up**

<table>
<thead>
<tr>
<th>Follow up, mo (Median +/- IQR)</th>
<th>Duodenal/Ampullary</th>
<th>PNET</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow up, mo (Median +/- IQR)</td>
<td>60.3 (22.9-86.1)</td>
<td>60.9 (34.0-102.5)</td>
<td>0.584</td>
</tr>
<tr>
<td>RFS , mo (Median +/- IQR)</td>
<td>50.0 (29.2-73.2)</td>
<td>50.4 (28.0-92.6)</td>
<td>0.918</td>
</tr>
<tr>
<td>Overall Survival , mo (Median +/- IQR)</td>
<td>66.6 (40.1-87.4)</td>
<td>60.9 (35.3-102.9)</td>
<td></td>
</tr>
</tbody>
</table>

**Recurrence Site**

<table>
<thead>
<tr>
<th>Any Recurrence*</th>
<th>Duodenal/Ampullary</th>
<th>PNET</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Recurrence*</td>
<td>13 (26.0%)</td>
<td>60 (23.1%)</td>
<td>0.655</td>
</tr>
<tr>
<td>Local</td>
<td>3 (6.0%)</td>
<td>14 (5.4%)</td>
<td>0.861</td>
</tr>
<tr>
<td>Liver</td>
<td>10 (20.0%)</td>
<td>47 (18.1%)</td>
<td>0.748</td>
</tr>
<tr>
<td>Lymph Nodes</td>
<td>1 (2.0%)</td>
<td>12 (4.6%)</td>
<td>0.398</td>
</tr>
</tbody>
</table>

* Subgroups do not add up to total number of recurrences as patients could have multiple sites of disease recurrence
P 27. PRIOR HISTORY OF ACUTE PANCREATITIS PREDICTS WORSE SURVIVAL FOR PATIENTS WITH RESECTABLE PANCREATIC CANCER
Y Gong, G Luo, C Liu, X Yu
Presenter: Yitao Gong | Fudan University Shanghai Cancer Center

Background: Mounting evidence has suggested that acute pancreatitis (AP) is a risk factor of pancreatic cancer (PC) and may accelerate oncogenesis in PC, but its role in survival in PC patients, especially in patients with resectable pancreatic cancer has not been investigated. The objective was to investigate the association of history of AP with survival among PC patients who have undergone surgical resection in a retrospective cohort-based study.

Methods: In this retrospective cohort of 662 pancreatic cancer patients who underwent radical surgical resection, we evaluated survival by acute pancreatitis history prior to PC diagnoses using Kaplan-Meier methods and log-rank tests. Multivariate analyses for mortality were estimated using Cox proportional hazards model, adjusted for age, sex, tumour location, tumour grade, tumour stage, diabetes mellitus status, baseline CA19-9 level, adjuvant chemotherapy and adjuvant radiotherapy.

Results: The log-rank tests showed that the patients with history of acute pancreatitis had worse overall survival compared to those without acute pancreatitis history (p = 0.007). The multivariable-adjusted HR for mortality comparing participants with acute pancreatitis to those without was 1.709 (95% CI: 1.187- 2.459, P-value = 0.004). After categorizing patients with history of acute pancreatitis into recent (< 2 years) and remote history (≥ 2 years) of AP, patients with recent history of AP, rather than patients with remote history of AP, were found to have significantly worse survival (P-value = 0.007) than those without AP history.

Conclusion: Our findings indicate that history of acute pancreatitis, especially recent history of acute pancreatitis, is associated with worse survival in resectable pancreatic cancer patients.
P 28. WHIPPLE FOR DUODENAL ADENOMA: IS IT WORTH THE RISK?
N Eng, D Mustin, S Maithel, M Shah, K Cardona, J Sarmiento, M Russell, D Kooby
Presenter: Nina Eng | Emory University

Background: Proceeding with pancreatoduodenectomy (PD) for patients with large duodenal adenomas (DA) without histologic confirmation of adenocarcinoma can be a difficult decision for both the patient and surgeon, given surgical risks and potential for benign final histology. We analyzed our health system’s 10-year experience with PD for DA to assess final pathologic diagnosis and perioperative outcomes.

Methods: Records for all patients who underwent PD for the preoperative diagnosis of DA between 2008-2018 were reviewed for patient, tumor, and perioperative outcomes, utilizing the Clavien-Dindo classification for complication stratification and labeling major complication as a score of >3. Pancreatic gland firmness and pancreatic duct size were reviewed.

Results: Of 1,241 patients who underwent PD from 2008-2018, 3.6% (n=45) had a preoperative diagnosis of DA with plan for PD. Among these patients, 56% (n=25) were female, median age was 64 (range 41-89), and median BMI was 28.1 (range 17.9-44.7). Median length of surgery was 185 minutes (range 109-480), estimated blood loss was 150mL (range 20-700), and hospital length of stay was 8 days (range 4-62). All patients in this cohort were noted to have a soft pancreatic gland texture with a normal pancreatic duct diameter. On final pathology, 71% (n=32) had benign adenomas, and 29% (n=13) had underlying adenocarcinoma. Postoperatively 24% (n=11) of patients suffered at least one major complication resulting in reoperation, ICU transfer, and/or death. 13% (n=6) of patients suffered from a postoperative pancreatic fistula (POPF), 9% (n=4) of which were classified as grade C. The 30-day hospital readmission rate and mortality rate were 13% (n=6) and 6.7% (n=3), respectively.

Conclusion: Our findings suggest that patients with a preoperative diagnosis of large duodenal adenomas undergoing pancreatoduodenectomy experience substantial morbidity and postoperative pancreatic fistula rates with higher than expected mortality. Furthermore, in our experience, malignant disease was encountered on final pathology less than one third the time. This information is useful when counseling patients regarding the risks and benefits of proceeding with pancreatoduodenectomy for a preoperative diagnosis of large duodenal adenomas.
P 29. IMPACT OF TIMING OF CHEMOTHERAPY FOR PANCREATIC CANCER IN THE ELDERLY: A NATIONAL CANCER DATABASE STUDY

N Lad, F Kunzler, N Machado, M Rubens, R Jimenez, H Asbun

Presenter: Neha Lad MD | Miami Cancer Institute

Background: Recent reports have confirmed that chemotherapy improves overall survival in patients with pancreatic cancer. The aim of this study is to specifically evaluate the effect of timing of chemotherapy on overall survival of elderly patients undergoing pancreatic surgery for pancreatic adenocarcinoma (PDAC).

Methods: The NCDB was reviewed from 2004 to 2016. The effect of chemotherapy in elderly patients (≥75) was studied. Three major groups were analysed: adjuvant (ADJ), neoadjuvant (NEO) and neoadjuvant with adjuvant (BOTH). Chi-square test was used to find differences in patient characteristics between groups. Log rank test and multivariable Cox proportional regression models were used to find factors associated with survival.

Results: A total of 380,524 patients were diagnosed with pancreatic adenocarcinoma during the study period. Of these, 130,039 were ≥75 years of age, which included 18,291 patients (7.1%) who underwent surgical treatment. Chemotherapy was provided as follows: 5,640 underwent adjuvant chemotherapy (ADJ), 888 neoadjuvant chemotherapy (NEO) and 345 received at least 2 cycles before, but also received chemotherapy after (BOTH). There was a significant difference in the proportion of patients with Stage I to IV between groups, with a majority being diagnosed at stage II patients in NEO (48%) and BOTH (53%). Demographics and Charlson-Deyo comorbidity score were similar across the groups. The 3 year survival rate was 31.9% in BOTH (95% CI: 26.4 - 38.6), 24.7% in NEO (95% CI: 21.6 - 28.3) and 25.0% in ADJ (95% CI: 23.8-26.3). Univariate Cox regression shows a significantly improved survival in BOTH in comparison to ADJ (p=0.0081) and a trend in improvement in comparison to NEO (p=0.079). There was a non significant tendency to improved survival when comparing elderly patients that received only neoadjuvant vs those that received only adjuvant (p=0.23). On multivariate analysis comorbidities were identified as an independent factor negatively impacting survival. Chemotherapy given as BOTH was independently associated with improved survival (figure 1).

Conclusion: Elderly surgical patients undergoing BOTH neoadjuvant and adjuvant chemotherapy had improved survival when compared to patients receiving chemotherapy only in an adjuvant setting. Therefore, BOTH should not be withheld in elderly patients just because of their age.
Survival probability

Strata

- ADJ
- NEO
- BOTH

\[ p = 0.016 \]
Background: Laparoscopic microwave ablation (MWA) has become a standard tool in the treatment of many primary and metastatic hepatic lesions. Its use in patients with colorectal liver metastases (CRLM) has been met with some resistance out of concern for local recurrence. The current study aimed to examine the rates of local recurrence in a high-volume center that preferentially utilizes ultrasound guided, minimally-invasive operative MWA. Additionally, to better understand the significance of local recurrences we determined the incidence of regional and metastatic spread of disease following MWA.

Methods: A retrospective chart review was conducted for patients who underwent laparoscopic MWA between 2007-2018 at Carolinas Medical Center. Patients were identified by International Classification of Disease (ICD)-9 and 10 codes for colorectal adenocarcinoma and the current procedural terminology (CPT) code for laparoscopic ablation of liver tumors (47370). Demographic and surgical details were collected and rates of incomplete ablation (viable tumor identified on initial imaging), local recurrence (at the ablation site), regional recurrence (hepatic recurrence not at the previous ablation), and metastatic recurrence determined by follow-up imaging.

Results: A total of 167 patients with 328 tumors underwent MWA from 2007-2018 with an average follow up of 17.7 months (range: 0-80mos). Incomplete ablation occurred in 7 patients (4%). An additional 39 patients (22%) developed local recurrence. Regional and metastatic recurrence outpaced local recurrence and occurred in 91 (51%) and 71 (40%) patients, respectively. In total, 64% went on to develop regional and/or metastatic spread of disease. In patients with regional or metastatic spread of disease local recurrence occurred in 28%.

Conclusion: While local recurrence remains a concern following MWA for CRLM, patients from our cohort developed regional and/or metastatic spread of disease at higher rates than the observed local recurrence rate reflecting the systemic nature of the disease process. Similarly, isolated failure of local control was relatively rare. Given the significant potential for distant recurrence, MWA may provide the best balance of local control and overall operative risk.
Friday, March 6 - Sunday, March 8, 2020 | ePoster Display, Kiosk #4

P 33. LAPAROSCOPIC HEPATECTOMY FOR HEPATOCELLULAR CARCINOMA: A STUDY ON THE ADOPTION AT A LARGE ACADEMIC CENTER

X Pereira, CC Mandujano, G Romero-Velez, S Bellemare, M Kinkhabwala, JP Rocca
Presenter: Xavier Pereira MD | Montefiore Medical Center

Background: Laparoscopic Hepatectomy (LH) for hepatocellular carcinoma (HCC) represents a major change in surgical practice for the established liver surgeon. LH has gradually evolved through the steps of surgical innovation: proof of concept, procedure development, procedure refinement, and now phasing into widespread adoption at most academic centers. However, technical challenges impacting operative outcomes and effects on R0 resection have slowed the adoption of laparoscopy in liver surgery. While landmark studies have confirmed the safety of laparoscopy to early adopters, they often fail to capture the efficacy, safety, and comparable oncologic outcomes that can be seen with the widespread adoption of LH at most academic centers. We sought to describe the adoption of LH for HCC at our institution with an emphasis on early patient selection, a safe and gradual increase in case complexity, and its effects on procedural and oncologic outcomes.

Methods: Patients undergoing hepatectomy for HCC between July 2016 to December 2018 were reviewed. Patient demographics, indications for surgery, hepatic disease burden, co-morbidities, intraoperative and postoperative data were reviewed retrospectively. Open (OH) vs. laparoscopic procedures (LH) were matched for comparison of endpoints using Chi square, Student’s T-test, and Mann-Whitney U tests.

Results: Comparative distribution of 177 cases on a quarterly timeline is presented (Figure 1), highlighting a steady adoption of LH. Of the 56 patients matched for analysis, 27 underwent open hepatectomy (OH) while 26 underwent LH. These cohorts were well matched without notable difference in the Charlson Comorbidities Index (CCI) (p-value 0.943) or Childs class (p-value 0.077). The LH group showed less tumor burden (p<0.0639), less segments involved (p<0.0063) and less complex resections based on the Iwate difficulty scoring (p<0.0013) indicating an expected bias in patient selection, more conservative for LH. The average LOS, EBL, and intraoperative transfusions were lower in the laparoscopic group vs. the open group (P < 0.0115 and p<0.0483). The proportion of R0/R1 resections was no different between both groups (p<0.2771) achieving R0 resections in 92% of LLRs vs. 80% of OLRs. The median recurrence-free survival and median patient survival was not different between groups. As the study period went on, progression in the learning curve of LH correlated with an increase in the proportion of CCI score >70% and the Iwate difficulty scoring per case, as well as an increase in operative time and a rate of conversions with more challenging cases.

Conclusion: Widespread adoption of LH on diseased livers with HCC relies on progressive patient selection reassuring the surgical team on taking more challenging cases. Even with increasingly difficult cases, the complication rate and oncologic outcomes remain comparable to open surgery.
Background: We have previously demonstrated that robotic-assisted hepatectomy has advantages for locations otherwise difficult for laparoscopy, while avoiding the morbidity of a laparotomy. We hypothesized that patients who underwent robotic-assisted minor liver resections would have superior peri-operative outcomes resulting in decreased overall peri-operative cost of care.

Methods: We queried the electronic medical record for patients who underwent a liver resection from 1/1/16-8/14/19 (n=282). Concurrent major visceral resection, hepatic artery infusion pump placement (n=142), and laparoscopic approach (n=6) were excluded. Demographic, clinical, and peri-operative financial data were analyzed. Financial data included operating room, room and board, laboratory, and pharmacy charges normalized to Medicare reimbursements based on 2017 diagnosis related groups. Data were compared using Chi-square, Mann-Whitney, Kruskal-Wallis, logistic and linear multivariable analyses where appropriate.

Results: There were 134 patients who underwent a liver resection: 80 open (60%), 54 robotic (40%). Of these patients, there were 41/80 (51%) open and 46/54 (85%) robotic minor hepatectomies (1-2 liver segments). Patients who underwent minor hepatectomies were similar in age, body mass index, comorbidities, and percent with prior abdominal surgery by operative approach (all p>0.05). Specimen size (257+/-152 vs 172+/-60 cc), surgical duration (277+/-27 vs 233+/-26 minutes), estimated blood loss (194+/-62 vs 187+/-71 mL), and margin status (93% vs 89% were also similar, yet complications (10/41, 24%, vs 3/46, 7% p=0.02) and length of stay (6.2+/-0.9 vs 2.3+/-0.7, p<0.001) were both significantly higher for patients who underwent open resection. These findings persisted in multivariable analysis. Patients who underwent open minor liver resection were 3.4 times more likely to stay longer (95% CI 2.1-4.8, p<0.001), and 7.8 times more likely to develop a complication (95% CI 1.1-57.5, p=0.02) compared to patients who had robotic surgery. Minor robotic liver resections had a median total cost $560 lower than open resections ($3239 (IQR 2322-4065) vs $3799 (IQR 3030-5195), p=0.03), due to lower cost for room and board, labs, radiology, pharmacy, and physical therapy (Figure, *statistical significance). Operating room costs were higher for robotic operations, but this did not achieve statistical significance ($2107 (IQR 1669-3076) vs $1951 (IQR 1458-2425), p=0.08). In multivariable analysis, the primary factor associated with increased total cost was development of complications (p=0.001). Only 3/46 (7%) of robotic minor hepatectomies required conversion to an open operation; these patients had similar surgical duration, estimated blood loss, post-operative complications, length of stay, and total cost when compared to those who started with an open approach.

Conclusion: Patients who underwent robotic minor liver resections had fewer complications, shorter hospitalizations, and lower total cost for care when compared to those who underwent open operations. There was no patient or financial penalty for starting robotically and converting to an open operation. This suggests that when feasible and appropriate, a robotic approach should be the goal for minor liver resections.
Cost of Minor Hepatectomy by Operative Approach and Category of Care

- Lab: *p=0.002
- Pharmacy: *p=0.008
- Room & Board: *p<0.001
- Operating room
- Total cost *p=0.03

US dollars adjusted to Medicare reimbursement

*Statistical significance
P 37. THE LAPAROSCOPIC APPROACH FOR TWO STAGE HEPATECTOMY: A SINGLE CENTER FIVE YEAR EXPERIENCE  
M D’Hondt, E Taillieu, C De Meyere, I Parmentier  
Presenter: Mathieu D’Hondt | Groeninge Hospital Kortrijk

**Background:** Laparoscopic liver resection (LLR) as a treatment for colorectal liver metastases (CRLM) has proven to be feasible and safe in selected patients. A laparoscopic approach leads to better short-term outcomes and comparable oncologic outcomes when compared to open liver resection (OLR). However, its role in two-stage hepatectomy (TSH) remains poorly explored. The aim was to evaluate whether LLR can or should have a role in TSH and which advantages it could entail compared to OLR in the context of TSH.

**Methods:** A single-center retrospective study was performed. The role of LLR in the first and second stage of TSH was evaluated in 20 consecutive patients who were planned to undergo TSH between April 2014 and September 2019. Demographics, comorbid factors, perioperative outcomes and short-term outcomes were studied by means of descriptive statistics only, because of the low sample size.

**Results:** Out of 293 liver resections (LR) for CRLM, 191 were performed laparoscopically (65%). In 20 patients, a TSH was planned (M/F: 15/5; median age on date of surgery: 65 years (59.5 – 68.5)). Seventeen patients (85%) received neoadjuvant chemotherapy before first stage hepatectomy (FSH). FSH was performed laparoscopically in 19 patients (95%). All FSH were parenchymal sparing minor hepatectomies. There were no conversions in the laparoscopic group. Overall there were no transfusions and 85% of the liver resections (LR) were R0 resections. There were 3 R1 resections (15%), but all were R1Vasc. Median blood loss was 50cc (40-100); operative time 125 min (97.5-162.5); and hospital stay 4 days (3.75-6). Portal vein embolization (PVE) was performed in 11 patients (55%) to increase the future liver remnant (FLR) needed to perform second stage hepatectomy (SSH). Eleven patients (55%), of which 5 who underwent previous PVE (45%), underwent SSH. Reasons why SSH could not be performed include disease progression (7), insufficient FLR volume (1) and refusal for surgery (1). In the interval between FSH and SSH, 6 patients received chemotherapy (55%). SSH was performed laparoscopically in 5 patients (45%) (among which one conversion). All SSH were major hepatectomies and pathology showed an R0 resection in all cases. Operative time and overall blood loss were slightly higher in the LLR group compared to the OLR group (190 min (180-240) vs 180 min (152.5-200)) and 200cc (100-300) vs 160cc (105-312.5)). Mortality was nil in both groups. There were no postoperative complications (Clavien-Dindo ≥3) in the OLR group, while in the LLR group, one patient suffered a bleeding (grade IIIa). Adjuvant chemotherapy was administered to 3 patients in the LLR group and to 5 patients in the OLR group.

**Conclusion:** The already proven advantages of LLR in the treatment of CRLM favor the role of a laparoscopic approach in TSH for CRLM. In the first-stage (often a minor parenchymal sparing hepatectomy), LLR is progressively becoming the gold standard. Laparoscopic second-stage major hepatectomy is feasible in experienced hands, but should be limited to selected cases and should be performed in expert centers.
Number of LR for CRLM between September 2011 and September 2019
n = 293

LR: n = 191

OLR: n = 102

Number of planned TSH* between April 2014 and September 2019
n = 20

FSH laparoscopic: n = 19

FSH open: n = 1

PVE performed: n = 11

Patients with PVE who got SSH: n = 5

SSH not executed: n = 9
  disease progression: 7
  insufficient volume FUR: 1
  refusal for surgery: 1

SSH**: n = 11

SSH laparoscopic: n = 5;
  of which 1 conversion

SSH open: n = 6

FSH laparoscopic + SSH open: n = 6

FSH laparoscopic + SSH laparoscopic: n = 5

---

LR = liver resection; CRLM = colorectal liver metastases; LUR = laparoscopic liver resection; OLR = open liver resection; TSH = two-stage hepatectomy; FSH = first stage hepatectomy; SSH = second stage hepatectomy; PVE = portal vein embolisation

* All FSH were minor hepatectomies; ** All SSH were major hepatectomies
P 38. TRANSDUODENAL SPHINCTEROPLASTY FOR SPHINCTER OF ODDI DYSFUNCTION
M Bonds, J Rekman, WS Helton
Presenter: Morgan Bonds MD | Virginia Mason Medical Center

Background: Sphincter of Oddi dysfunction is a rare condition resulting in the non-calculous obstruction of pancreatic and biliary secretions at the pancreaticobiliary junction. Most cases are treated via endoscopic sphincterotomy. However, when this fails, surgical intervention is necessary. We present a video of transduodenal sphincteroplasty, an uncommon procedure in the modern era.

Methods: A 64 year old woman presented to our institution after 10 years of recurrent epigastric pain and nausea after previous cholecystectomy. She was diagnosed with type III sphincter of Oddi dysfunction. Initially, she underwent two years of endoscopic interventions including endoscopic sphincterotomy, biliary and pancreatic stents, and botulinum toxin injections. She responded to these treatments for 3-4 months before her symptoms returned. Given that she responded to botulinum toxin injections, it was felt she had an incomplete sphincterotomy due to a long Sphincter of Oddi and, for this reason, she was evaluated for a transduodenal sphincteroplasty to complete her sphincterotomy.

Results: The video demonstrates the key steps to completing a sphincterotomy via transduodenal sphincteroplasty. The Ampulla of Vater was identified through a lateral duodenotomy. Full thickness sutures were placed at the one o’clock and eleven o’clock position between the duodenal mucosa and the bile duct. Cautery completed the sphincterotomy between these stitches, dividing a band of scar tissue. Pancreatogram confirmed the pancreatic duct remained patent and choledochoscopy ensured there were no retained stones within the bile duct. Unfortunately, the patient’s symptoms returned 3 months postoperatively.

Conclusion: Transduodenal sphincteroplasty is a procedure that is rarely performed in the era of endoscopic sphincterotomy. This video demonstrates the key steps for successfully performing this procedure. It also presents the challenges of managing patients with type III sphincter of Oddi dysfunction. While the operation described is a safe and effective way of completing a long biliary sphincterotomy, the long term benefits can be difficult to predict.
P 39. ROBOTIC PANCREATICODUODENECTOMY DECREASES THE RISK OF CLINICALLY RELEVANT POST-OPERATIVE PANCREATIC FISTULA: A PROPENSITY MATCHED NSQIP ANALYSIS

C Vining, K Kuchta, Y Berger, D Schuitevoerder, K Roggin, J Matthews, M Talamonti, M Hogg

Presenter: Charles Vining MD | University of Chicago

Background: Recent NSQIP analysis has shown a decrease in clinically relevant post-operative pancreatic fistula (CR-POPF) for minimally invasive pancreaticoduodenectomy (PD) with time. Additionally, a recent tertiary care single-institution study has demonstrated robotic pancreaticoduodenectomy (RPD) to be protective against CR-POPF compared to open PD (OPD). We sought to evaluate the rate of CR-POPF of RPD compared to OPD using the ACS NSQIP database.

Methods: This is a retrospective cohort study from 2014 to 2017 using the ACS NSQIP multi-institutional clinical registry. Procedure-targeted pancreatectomy PUF was queried for all patients undergoing PD. NSQIP fistula risk score was calculated and patients were categorized into negligible, low, medium and high risk. Multivariate logistic regression and propensity score matching was used to identify risk factors for CR-POPF.

Results: Of 13,002 PDs performed over the study period, 12,507 (93.2%) were OPD and 495 (3.8%) were RPD. The rate of CR-POPF (15.6% vs 11.9%; p=0.026) was higher in OPD compared to RPD. On subgroup analysis, OPD had higher CR-POPF in high risk patients (32.9% vs 19.4%; p=0.007), but a trend in intermediate risk (17.8% vs 11.8%; p=0.070) and no difference for negligible and low risk groups (table). On multivariable analysis OPD was a predictor of increased CR-POPF (Odds Ratio [OR] 1.61 [1.15-2.25 95% CI]; p=0.005). Other operative factors associated with increased CR-POPF included soft pancreatic texture (OR 2.65 [2.27-3.09]; p<0.001) and concomitant visceral resection (OR 1.41 [1.03-1.93]; p=0.031). Increased duct size (reference < 3mm) was predictive of decreased CR-POPF: 3-6mm (OR 0.70 [0.61-0.81]; p<0.001) and ≥ 6mm (OR 0.47 [0.37-0.60]; p<0.001). Following propensity score matching, RPD continued to be protective against the occurrence of CR-POPF (OPD OR=1.54 [1.09-2.17]; p=0.013).

Conclusion: This is the largest multicenter study to evaluate the impact of RPD on CR-POPF and is consistent with previous single-institution data. It suggests that RPD can be protective against the formation of CR-POPF, especially for patients at high risk of POPF.
<table>
<thead>
<tr>
<th>Distribution of POPF by Surgical Approach and Risk Group</th>
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<tbody>
<tr>
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<tr>
<td><strong>All</strong></td>
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</tr>
<tr>
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<tr>
<td>% POPF</td>
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<td>% CR-POPF</td>
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<tr>
<td>Total POPF</td>
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<tr>
<td>% POPF</td>
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<tr>
<td>Imputed % POPF (Mean ± SE)</td>
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<tr>
<td>Total CR-POPF</td>
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<tr>
<td>% CR-POPF</td>
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<tr>
<td>Imputed % CR-POPF (Mean ± SE)</td>
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<td>Total POPF</td>
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<td>% POPF</td>
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<td>p-value vs. Robot</td>
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<tr>
<td>Imputed % POPF (Mean ± SE)</td>
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<tr>
<td>p-value vs. Robot</td>
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<tr>
<td>Total CR-POPF</td>
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<tr>
<td>% CR-POPF</td>
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<tr>
<td>p-value vs. Robot</td>
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<td>Imputed % CR-POPF (Mean ± SE)</td>
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<tr>
<td>% CR-POPF</td>
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<tr>
<td>p-value vs. Robot</td>
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</table>

**Background:** Hepatocellular carcinoma (HCC) is the most common primary liver cancer, and current therapies include liver transplantation or liver resection. Minimally invasive approaches are often avoided due to concerns regarding the patient's underlying liver function or tumor location. We present the case of a 68-year-old female with moderate steatosis and a 3.2 cm HCC of segment 7/8 treated by laparoscopic liver resection.

**Methods:** The patient was found on surveillance imaging to have a 3.2 cm mass in segment 7/8 of the liver, consistent with a HCC. This tumor was close to both the right hepatic vein (RHV) and segmental branches draining to the middle hepatic vein (MHV), and located posterior in the liver. Transplantation was discussed with the patient given her underlying liver dysfunction and tumor location, but the patient elected for primary resection. This video shows the laparoscopic exposure and resection of her HCC. We begin by lysing adhesions from her prior cholecystectomy followed by mobilization of the right lobe of the liver to allow for appropriate positioning to obtain an adequate deep margin. Next ultrasound is used to identify an adequate 2 cm margin around the tumor, and the liver parenchyma is dissected through with an energy device and bipolar cautery. Pringle maneuver is applied throughout the case to assist with hemostasis. Bleeding is encountered twice, due to injury of a branch of the MHV draining segment 8 and to the RHV, both of which are repaired primarily with prolene suture. Reassessment of the resection margin is made throughout the case, including one portion of the video where the deep margin is modified to ensure an adequate margin of non-neoplastic liver. A hepatic pedicle going to segment 7 is stapled as the remaining parenchyma is transected for removal. The last part of the video shows the removal of the specimen and closure of the port sites.

**Results:** The operative time was 300 minutes and blood loss was 150 ml. Pathology noted a 2.9 cm HCC, moderately differentiated, with a negative resection margin of 1 cm. The patient had an uneventful recovery and was able to be discharged to home on post-operative day 4. At present, the patient has returned to her normal function and has recovered well after surgery.

**Conclusion:** Primary resection of a HCC in segment 7/8 can be safely performed with laparoscopic surgery even in patients with moderate steatosis and unfavorable tumor location due to vasculature.
**Background:** This is the case of a 67-years old male with a past surgical history of laparoscopic right hemicolectomy for a pT4aN2 colic cancer treated with subsequent 6-cycles of adjuvant chemotherapy (Xelox). One and a half year later, during the follow up, a single 18 mm liver metastases in segment 7 was seen at the CT scan. Diagnostic work up was completed with liver-specific contrast-enhanced MRI that allowed a characterization of the lesion and the exclusion of further smaller metastases. The proximity of the nodule to a RHV branch and to a ventral branch of S7 portobiliary pedicle was noted.

**Methods:** A laparoscopic atypical resection of S7 was planned. Patient was placed in a standard French position and 5-operative 12 mm trocars were placed in the abdomen, resembling a reverse J shaped letter. During surgery the table is turned left and in reverse anti-Trendelenburg tilt. The extracorporeal Pringle manouvre was prepared by encircling the hepatic pedicle with an umbilical tape, extracted through a chest tube from the left flank. Mobilization of the right hemiliver is crucial for the exposure of the operative field and for this purpose the falciform, posterior coronary and right triangular ligaments were interrupted. The right lobe was lifted up through the incision of the hepatocaval ligament with a caudal approach and following the IVC axis. The liver was examined by intraoperative ultrasonography that allowed to identify the lesion, the relation with the portobiliary pedicle and hepatic vein branch and to mark the transaction plane and vessels direction on the glissonian surface. Transection margins were checked under ultrasound guidance. The parenchymal transaction was performed using a combination of an ultrasonic dissector and an energy device.

**Results:** Exposure of S7 becomes effortless as the segment can be lowered and anteriorized, no permanent retraction is needed and the first assistant instruments have a 90° angle, the camera in line with the transaction plane. The aim of the mobilization of the right hemiliver is in fact to turn a postero-superior segment into an antero-inferior position, allowing an easier laparoscopic resection.

**Conclusion:** The final histopathology showed a KRAS-mutated colorectal liver metastasis with negative margins.
**Background:** Several randomized controlled trials have shown reduced risk of surgical site infection with use of wound protectors, including a recent trial showing its benefit in Whipple procedures with preoperative biliary stent. We aimed to examine, at a national level, the effect of wound protector utilization on surgical site infection and other outcomes following pancreatoduodenectomy (PD).

**Methods:** The American College of Surgeons National Surgical Quality Improvement Program pancreatectomy procedure targeted participant use file was queried from 2016-2017, when use of a wound protector was captured. Planned open PD procedures were extracted with emergent cases excluded. Univariable and multivariable analyses were conducted to examine the association between wound protector use and infectious complications as well as other surgical outcomes.

**Results:** N = 7,595 patients undergoing PD were evaluated. On univariate analysis, wound protectors decreased superficial and deep surgical site infection (SSI) risk (5.9% vs. 9.5%, P < 0.001), organ space SSI (14.9% vs. 17.1%, P=0.03), sepsis (8.0% vs. 10.3%, P=0.003), and need for percutaneous drain placement (10.9% vs. 12.7%, P=0.04). There was no significant difference in pancreatic fistula, delayed gastric emptying, postoperative C. difficile colitis, prolonged length of stay, or death when comparing patients who underwent PD with or without a wound protector. When stratifying analyses by presence of preoperative biliary stent, wound protectors decreased superficial and deep SSI in patients who had a biliary stent (6.9% vs. 11.9%, P < 0.001) and also those who did not have a biliary stent (4.6% vs. 6.8%, P=0.02). Multivariable analyses controlling for age, sex, race, obesity, diabetes, smoker status, peri-operative transfusion, biliary stent, neoadjuvant chemotherapy / radiation therapy, chronic obstructive pulmonary disease, unintentional weight loss, systemic inflammatory response syndrome, wound class, pancreatic duct size, pancreas texture, pancreatic reconstruction, peri-operative antibiotic class, incision type, bilirubin, sodium, albumin, aspartate transaminase, alkaline phosphatase, and operative time confirm that wound protectors decrease risk of superficial and deep SSI in patients undergoing PD (adjusted odds ratio, OR=0.61, P < 0.001). Other independent predictors for incisional infections include: age greater than 70 years (OR=0.77, P=0.01), male sex (OR=0.80, P=0.02), pre-operative biliary stent (OR=2.1, P < 0.001), operative time greater than 420 minutes (OR=1.3, P=0.01), pancreatic duct size < 3mm (OR=1.5, P=0.02), and soft pancreas texture (OR=1.3, P=0.02).

**Conclusion:** Wound protectors represent a simple and non-invasive intervention that appears to reduce the risk of SSI in patients undergoing elective PD. This protective effect is seen whether patients have had preoperative biliary stenting or not. Routine use of wound protectors should be considered when performing PD to reduce SSI risks.
P 43. IMPROVED OUTCOMES WITH MINIMALLY INVASIVE PANCREATICODUODENECTOMY IN PATIENTS WITH DILATED PANCREATIC DUCTS: A PROSPECTIVE STUDY

S Srinivasa, MT LeCompte, A Khan, CA Woolsey, G Williams, S Patel, RC Fields, MB Doyle, WC Chapman, SM Strasberg, WG Hawkins, C Hammill, DE Sanford

Presenter: Sanket Srinivasa MD, PhD | Washington University, St. Louis

Background: There is little known about what factors predict better outcomes for patients who undergo minimally invasive pancreaticoduodenectomy (MIPD) versus open pancreaticoduodenectomy (OPD). Identifying such characteristics may guide patient selection in MIPD. We hypothesized that patients with dilated pancreatic ducts have improved postoperative outcomes with MIPD compared to OPD.

Methods: All patients undergoing pancreaticoduodenectomy between April 2016 and July 2019 were prospectively followed, and perioperative and pathologic covariates and outcomes were compared. Patients with dilated pancreatic ducts (≥3mm) who underwent MIPD (Robotic/ Laparoscopic) were propensity score matched to patients with dilated ducts who underwent OPD and outcomes compared. Likewise, patients with non-dilated pancreatic ducts (<3mm) who underwent MIPD were 1:3 propensity score matched to patients with non-dilated ducts who underwent OPD and outcomes compared. Multivariate logistic regression analysis was used to control for potential confounders and the primary outcome was a composite measure termed the ideal outcome (IO) which required patients to achieve negative margins; experience no complications or readmission and be discharged within seven days.

Results: 312 patients underwent PD– 51 (16.4%) MIPD and 212 (83.7%) OPD. Patients who underwent MIPD had significantly longer operative times, less intraoperative blood loss, less postoperative urinary retention, and a lower rate of 90-day readmission. After 1:3 propensity score matching, patients with dilated pancreatic ducts who underwent MIPD (n=30) had significantly increased intraoperative times, less intraoperative blood loss, less postoperative bleeding/anemia complications, lower overall complication rate, and were discharged from the hospital 3.5 days faster compared to matched OPD patients (n=90) with dilated ducts. Among propensity score matched patients with non-dilated pancreatic ducts, patients undergoing MIPD (n=21) had significantly less intraoperative blood loss compared to matched patients undergoing OPD (n=63) with non-dilated ducts, but there were no other significant differences in outcomes. In total, 39 (14.9%) patients had IO with OPD and 11 (21.6%) patients had IO with MIPD (p=0.276). With multivariate analysis, there was a significant interaction between operative approach (MIPD vs OPD) and pancreatic duct size (non-dilated [<3mm] vs dilated [≥3mm]) with respect to these variables’ association with IO (p=0.042). MIPD in patients with dilated pancreatic ducts was independently associated with increased IO (OR= 3.04, p=0.021) (Table 3). However, MIPD in patients with non-dilated pancreatic ducts was not associated with IO (OR=0.82, p=0.802).

Conclusion: MIPD is safe with comparable perioperative and oncologic outcomes to OPD. Patients with pancreatic ducts ≥3mm appear to derive the most benefit from MIPD in terms of less complications and shorter hospital stay.
<table>
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<td>Age ≤65</td>
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</table>

*Ideal outcome defined as patients having no complications (including no death and no readmission), a length of hospital stay equal to or less than the overall median length of stay (7 days), and negative (R0) margins.
P 44. PERSISTENT LYMPHOPENIA FOLLOWING PANCREATICODUODENECTOMY PREDICTS CLINICALLY RELEVANT PANCREATIC FISTULA FORMATION
JT Cohen, KP Charpentier, TJ Miner, WG Cioffi, RE Beard
Presenter: Joshua Cohen MD | Rhode Island Hospital

**Background:** Post-operative pancreatic fistulas (POPF) are a major source of morbidity following pancreaticoduodenectomy (PD). The need for surgical drains and the timing of removal has evolved, with recent data suggesting longer drain duration is associated with worse outcomes. Drain amylase levels are diagnostic and routine checks can help guide drain removal, but this parameter lacks specificity for clinically relevant POPF. The aim of this study is to investigate if persistent lymphopenia, a known marker of sepsis, can act as an additional marker of POPF with clinical implications that could help direct drain management.

**Methods:** A retrospective chart review of all patients who underwent PD at a tertiary care center from 2008 to 2018 was performed. Patients were considered to have POPF only if they met the ISGPS criteria for grade B or C.

**Results:** Of the 201 patients who underwent PD during the study period, 161 patients had daily complete blood counts with differentials for three or more days post-operatively and 81 had persistent lymphopenia beyond post-operative day #3 (50.3%) (Figure 1). Patients with persistent lymphopenia were more likely to be male (63.0% vs 46.3%, p=0.033) and more likely to have pre-operative lymphopenia (17.2% vs 2.0%, p=0.009). 17 patients (21.0%) with persistent lymphopenia went on to develop a POPF, compared to 7 patients (8.8%) without. Using persistent lymphopenia as an indicator of POPF yielded a negative predictive value of 91.3%. Univariate and multivariate analysis revealed only persistent lymphopenia as being independently associated with POPF (HR 2.57, 95% CI 1.07-6.643, p=0.039). Intraoperative transfusion, estimated blood loss over 400 mL, multiorgan resection, neoadjuvant therapy, pre-operative stenting, and tumor type were not found to be independently associated with POPF. Patients with persistent lymphopenia had a significantly longer hospital length of stay (9 days vs 8 days p=0.013) and were more likely to have a complication requiring intervention, including higher rates of antibiotic use (34.6% vs 17.5% p=0.014) and need for re-operation (12.3 vs 2.5%, p=0.017).

**Conclusion:** Persistent lymphopenia is a readily available early marker of POPF with the potential to identify clinically relevant POPF and help guide drain management.
Figure 1. Flow chart of pancreatic leak patterns with sensitivity, specificity, positive predictive value and negative predicted value calculated.

<table>
<thead>
<tr>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Negative predictive value (%)</th>
<th>Positive predictive value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistent Lymphopenia</td>
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<td>91.3</td>
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</table>
P 45. ALTERNATIVE FISTULA RISK SCORE IS A BETTER PREDICTOR OF IDEAL OUTCOME IN PATIENTS UNDERGOING MINIMALLY INVASIVE PANCREATICODUODENECTOMY

UY Panni, S Srinivasa, A Khan, CA Woolsey, G Williams, S Patel, RC Fields, MB Doyle, WC Chapman, SM Strasberg, WG Hawkins, CW Hammill, DE Sanford

Presenter: Usman Panni MD | Washington University, St. Louis

Background: The benefit of minimally invasive pancreaticoduodenectomy (MIPD) versus open pancreaticoduodenectomy (OPD) to patients is controversial. The major driver of morbidity and mortality after pancreaticoduodenectomy is postoperative pancreatic fistula (POPF) - not wound complications. However, MIPD is unlikely to reduce the incidence of POPF. Fortunately, most patients do not experience POPF. The alternative fistula risk score (aFRS) is a validated prognostic tool used to estimate patients’ risk of POPF after pancreaticoduodenectomy using three variables (pancreatic duct size, pancreatic gland texture, and patient BMI). We hypothesized that pancreaticoduodenectomy patients who are not at high risk for POPF benefit most from a minimally invasive approach.

Methods: All patients undergoing pancreaticoduodenectomy were prospectively followed over a period of 40 months, and perioperative and pathologic covariates and outcomes were compared. MIPD was defined as pure laparoscopic, robotic-assisted, or laparoscopic/robotic-assisted converted to open. Patients were categorized as high risk of POPF (aFRS- high risk) as previously defined, i.e., risk of POPF >20%, or low/intermediate risk of POPF (aFRS-low/intermediate risk) as previously defined, i.e., risk of POPF ≤20% [Mungroop et al. Ann Surg. 2019]. Ideal outcome was defined as a postoperative course that met all three of the following criteria: 1) no postoperative complications (including no death and no readmission), a postoperative length of stay ≤ median overall length of stay (i.e., 7 days), and a negative (R0) resection margin. Multivariable logistic regression was used to test for independent associations with Ideal outcome.

Results: 312 patients underwent pancreaticoduodenectomy during the study period. Of these patients, 212 (83.7%) underwent OPD, and 51 (16.4%) underwent MIPD. OPD patients were more likely than MIPD patients to have received neoadjuvant chemotherapy (57.9% vs. 39.2%, p=0.014). Compared to OPD patients, MIPD patients had significantly increased overall operative times (462.8 min vs. 378.5 min, p<0.001) as well as significantly decreased intraoperative blood loss (280.5 ml vs. 436.0 ml, p=0.001) and a decreased rate of 90-day readmission (15.7% vs. 30.7%, p=0.030), but there were no other significant differences in outcomes between the two approaches. In total, 39 (14.9%) patients had an ideal outcome with OPD, and 11 (21.6%) patients had an ideal outcome with MIPD (p=0.276). MIPD patients were significantly more likely to be aFRS-high compared to OPD patients (56.9% vs. 40.2%, p=0.028). Ideal outcome was significantly more frequent in aFRS – low/intermediate-risk patients undergoing MIPD compared to aFRS – low/intermediate-risk patients undergoing OPD, aFRS – high risk patients undergoing MIPD, and aFRS – high risk patients undergoing OPD (40.9% vs 15.4% vs 6.9% vs 14.3%, p=0.007) [Figure 1]. In multivariate analysis, MIPD in aFRS – low/intermediate-risk patients was independently associated with an increased likelihood of ideal outcome (OR= 4.09, p=0.012).

Conclusion: Patients who are not at high risk for POPF are those most likely to benefit from a minimally invasive approach to pancreaticoduodenectomy. The aFRS could be a useful tool to aid the surgeon experience and expertise in selecting patients for MIPD.
Figure 1

"Ideal Outcome (ALL of the following):
1) No complications (including no readmission and no death)
2) Length of stay ≤ median (7 days)
3) R0 resection
Background: As a result of the ageing population, pancreaticoduodenectomy is increasingly being offered as curative therapy for periampullary tumours in patients 80 years of age and older. Our aim was to evaluate clinical outcomes and provide evidence on current UK practice in the elderly population after pancreaticoduodenectomy.

Methods: A multicentre retrospective case-control analysis of prospectively-maintained databases was performed. This included pancreaticoduodenectomies undertaken between January 2008 and December 2017. Octogenarians who underwent pancreaticoduodenectomy were matched with consecutively-operated younger patients with 1:1 ratio, based on extent of surgery (venous, arterial or additional resection). Pre-operative comorbidities, intra-operative variables, post-operative complications and mortality were compared. Chi-Square, Fisher’s Exact and Mann-Whitney U tests were used as appropriate to compare variables and outcomes between the two groups, with statistical significance set at p<0.05. A survival analysis, using Kaplan-Meier estimators, was also performed to determine overall survival as well as disease-free survival.

Results: Six UK specialist HPB centres participated in this study. 181 octogenarians (median age 81 years, range: 80 - 90) who underwent pancreaticoduodenectomy (either classical or pylorus-preserving) were compared to the same number of controls (median age 67 years, range: 31 - 79). Gender and ASA (octogenarians median grade 2 [range: 1 - 4] versus median grade 2 [range: 1 - 3] for controls) were comparable (p=0.75 and p=0.82 respectively). The distribution of performance status scores (octogenarian median score 0 [range: 0 - 3] versus median score 0 [range: 0 - 2] for non-octogenarians) was found to be significantly different (p=0.02). Similarly, Charlson Comorbidity Index scores were significantly higher overall for octogenarians (median 7 [range: 6 - 11] versus 5 [range: 2 - 9], p=0.001). Ninety-nine percent of octogenarians and 97% of controls were offered upfront resection. The remainder underwent neoadjuvant treatment prior to surgery. Median length of hospital stay was longer in octogenarians, 17 days (range: 3 – 120 days) compared to 13 days (range: 5 – 81 days) for controls (p=0.001). Negative resection margin (R0) rates were comparable for the two groups, 61% for octogenarians and 58% for controls (p=0.57), as were lymph node ratios, median 0.1 (range: 0 – 0.8) for octogenarians and 0.095 (range: 0 – 1) for controls, p=0.77. Complication rates across the Clavien-Dindo classification categories were not statistically significant (p>0.05 in all categories). Thirty-day mortality was 3% for octogenarians and 2% for controls (p=0.54). Ninety-day mortality was 7% for octogenarians versus 3% for controls. This difference was not statistically significant (p=0.1). A survival analysis revealed that, while median overall survival was significantly longer for controls, 59 months versus 23 months for octogenarians, (p=0.006); disease-free survival was not statistically different between both groups, with a median of 19 months for octogenarians and 28 months for controls (p=0.22). Median follow-up was 13 months (range: 0 – 100) for octogenarians and 17 months (0 – 111) for controls.

Conclusion: Despite the higher ninety-day mortality, pancreaticoduodenectomy outcomes in octogenarians are comparable to their younger counterparts. Pancreaticoduodenectomy should therefore be offered as a curative surgical option in this cohort, in specialised centres after meticulous preoperative assessment.
P 47. PROGNOSTIC SIGNIFICANCE OF OSTEOCLAST-LIKE GIANT CELLS IN UNDIFFERENTIATED CARCINOMA OF PANCREAS

R Misawa, A Masi, Z Moghadamyeghaneh, N Fung, A Gruessner, F Serafini, S Suresh, R Gruessner

Presenter: Ryosuke Misawa MD, PhD | SUNY Downstate Medical Center Brooklyn

**Background:** Undifferentiated carcinoma of the pancreas (UDC) is defined as containing large eosinophilic pleomorphic cells and/or ovoid-to-spindle-shaped cells and has a poor prognosis. On the other hand, undifferentiated carcinoma with osteoclast-like giant cells of the pancreas (UCOG) comprises osteoclast-like giant cells (OGCs) is suggested to have a better prognosis. However, the number of cases are limited and only case reports and their reviews are available in English literature. The aim of this study was to evaluate the prognostic significance of OGCs using the national cancer database.

**Methods:** A retrospective analysis investigated the US National Cancer Data Base and evaluated patients who were diagnosed with UDC or UCOG from 2004 to 2014. Prognosis, demographic, and clinical features were compared between the two groups.

**Results:** The study identified 1681 patients, 255 were in the UCOG group and 1426 were in the UDC group. The two groups were well matched in demographic profile including age (67.3 year-old vs 66.3 year-old, p = 0.146), sex (male 56.9 % vs 57.4 %, p = 0.834), race distribution, and co-morbidities (Charlson/Deyo Score). The location of the UCOG group tumor were more common in the body and tail of the pancreas compared to the UDG group (32.0% vs 24.9%, p = 0.045), and as a consequence, more distal pancreatectomies were performed in the UCOG group (13.7% vs 7.2%, p = 0.011). Institution of chemotherapy (32.6% vs 29.3%, p = 0.12) and radiotherapy (20.0% vs 20.4%, p = 0.678) were similar in both groups. The size of the tumor at the time of diagnosis was larger in the UDC group (18.7 cm vs 19.7, p = 0.018). Lymph node metastasis were far more evident in the UDC group (61.7% vs 28.2%, p < 0.01). Kaplan-Meier analysis demonstrated superior survival for the UCOG group when compared to the UDC group (mean OS 16.15 months vs 31.95 months, p = < 0.01).

**Conclusion:** The clear prognostic significance of OGC is evident in undifferentiated carcinoma of the pancreas. Continual accumulation of UDC and UCOG cases in a database would clarify the effectiveness of surgical and neoadjuvant/adjuvant treatments in the future.

Kaplan-Meier analysis demonstrated superior survival for UCOG group when compared to UDC group (Mean OS 16.15 months vs 31.95 months, p = < 0.01).
P 48. ROBOTIC REDO PANCREATICOJEJUNOSTOMY FOR STENOSIS FOLLOWING PANCREATICODUODENECTOMY: AN ALTERNATIVE TECHNIQUE

**FF Makdissi, MC Machado, RC Surjan, MA Machado**

**Presenter:** Fabio Makdissi MD | Hospital Nove de Julho

**Background:** Pancreaticoduodenectomy is the procedure of choice for several diseases from benign or premalignant lesions to malignancy. Although mortality has reduced significantly over the last decade, operative complications are still common. One of the most frequent late complications is the stenosis of the pancreatico-enteric anastomosis. This complication is observed in 25-60% of radiological images during follow-up. Although frequent, this stenosis is often asymptomatic but in certain circumstances this stenosis may lead to recurrent acute pancreatitis, pain and pancreatic exocrine insufficiency. About 2% of all patients will develop a symptomatic pancreaticojejunal stricture needing treatment. We present an alternative technique for the surgical revision of pancreaticojejunalostomy using robotic approach.

**Methods:** A 60-year-old woman underwent laparoscopic Whipple procedure 2 years ago. After 6 months, she presented with acute pancreatitis. MRI showed mild dilation of the main pancreatic duct and the patient was conservatively treated. However, since then, she presented several episodes of acute pancreatitis. MRI showed a complete stenosis of the pancreaticojejunalostomy with pronounced dilation of the main pancreatic duct. Multidisciplinary team decided for revision surgery. Robotic redo pancreaticojejunalostomy was indicated. A new technique was used. After adhesiolysis from previous operation, the pancreatico-enteric anastomosis is completely free. Previous interrupted anterior sutures are identified and divided with scissors. Distal pancreas is then detached from the jejunal loop with scissors from anterior towards posterior interrupted sutures. The duct-to-mucosa anastomosis area, which is stenotic is divided with scissors. However, it is completely fibrotic, and the previous anastomosis cannot be identified. The posterior layer interrupted suture is kept intact. Next step is to remove a part of the proximal pancreas in a pyramidal shape towards the posterior layer. This maneuver removes the fibrotic area and the dilated pancreatic duct is opened. A small opening in the jejunum is performed and a duct-to-mucosa anastomosis is performed using absorbable continuous suture. Anastomosis is completed with interrupted seromuscular-pancreatic sutures. Operation is completed with drainage of the abdominal cavity.

**Results:** Operative time for docking of the robotic system was 4 minutes. Redo pancreaticojejunalostomy took one hour. Estimated blood loss was minimum, and recovery was uneventful. Patient was discharged on the 3rd postoperative day. No pancreatic fistula was observed and drain was removed on the 5th postoperative day. Patient presented no recurrence of acute pancreatitis during 1 year of follow-up.

**Conclusion:** Robotic redo pancreaticojejunalostomy is feasible and safe. This alternative technique maintains this anastomosis assembled thus reducing the operative time and technical difficulties to perform this complex operation.
P 49. TRANSPLANT VS RESECTION FOR INTRAHEPATIC CHOLANGIOCARCINOMA—POTENTIAL FOR BENEFIT WITH TRANSPLANT?
P 49. TRANSPLANT VS RESECTION FOR INTRAHEPATIC CHOLANGIOCARCINOMA—POTENTIAL FOR BENEFIT WITH TRANSPLANT?

Background: Complete tumor extirpation for intrahepatic cholangiocarcinoma (iCCA) represents the only chance for long-term survival. However, due to the insidious nature of the tumor margin nearly 25-35% of patients with iCCA have R1 resections in comparison to only 10% of patients with other liver tumors. Additionally, the majority of these tumors recur with 50% of these being initially isolated to the liver—likely from de-novo or intrahepatic metastasis present at the time of initial operation. Historically, transplantation (OLT) in the setting of iCCA did not achieve good outcomes and was abandoned. In the recent decade there has been a renewed interest in transplant for intrahepatic cholangiocarcinoma with small retrospective studies demonstrating reasonable outcomes following transplants either done incidentally or in the setting of cirrhosis. However, the oncologic outcome for transplant vs. resection for intrahepatic cholangiocarcinoma has not been well described.

Methods: From a database of over 2000 liver transplants at our institution, we identified 10 patients who had undergone incidental transplant for iCCA. Additionally we identified 74 patients in the same time period who had undergone resection for iCCA. The iCCA patients who had undergone OLT and had over 30 days of follow-up (n=7) were matched 1:3 for iCCA patients undergoing resection based on explant pathology—matching for most significant oncologic risk factors first. Patient demographics, date of diagnosis, date of surgery, and site of recurrence and death were obtained. Statistical analysis was performed using Chi Square, Student’s T test, Cox-proportional Hazard, Kaplan –Meier curves as needed using SAS software.

Results: Average age of all patients was 62 +/- 11 years. Lymph node invasion was present in 57% of entire cohort and lymphovascular invasion in 68%. Additionally, moderate to poor differentiation was present in 93% of the cohort. Of the patients undergoing liver transplant all but one had a presumed diagnosis of HCC. Following diagnosis the time to resection was 94 +/- 86 days vs. 214 +/- 160 for patients undergoing transplant. Resection margin was positive in 14% of patients undergoing resection vs none in the transplants. Eighty one percent of the resection patients had a recurrence vs. 43% of transplanted patients. Additionally, in the resection group liver was the first site of recurrence in 43% of patients. No differences were noted in overall survival in transplant vs. resected patients {403(1110 +/- 1359) days vs 529(841 +/- 748) days; p=0.8}. Recurrence free survival is depicted below.

Conclusion: These data show that even in an oncologically high risk cohort, with 57% lymph node invasion, patients with intrahepatic cholangiocarcinoma undergoing transplant have a comparable survival with patients undergoing resections for cholangiocarcinoma. Our data reinforce that in a substantial proportion of patients the first site of recurrence after resection is the liver. Moreover, there is a suggestion of longer recurrence free survival in transplanted patients. Therefore, we conclude that transplant for intrahepatic cholangiocarcinoma can provide similar overall survival to resection and may even benefit with a longer recurrence free survival by abrogating the liver as a source of de-novo or early recurrence following resection.
Kaplan-Meier analysis demonstrated superior survival for UCOG group when compared to UDC group (Mean OS 16.15 months vs 31.95 months, $p = < 0.01$).
Background: Pancreatectoduodenectomy (PD) is a complex surgical procedure that requires attentive perioperative care. Enhanced Recovery After Surgery (ERAS) protocols have emerged to enhance functional recovery, decrease complications, and reduce hospital length of stay (LOS). We successfully implemented an ERAS pathway for PD to optimize patient care; however, our current mean LOS is still over the proposed ERAS target of 7 days. This study focuses on detailing those patients that fell “off pathway” to determine causes of failure and areas of ERAS improvement.

Methods: Four surgeons worked closely with the hospital quality team to develop our own institutional ERAS pathway for pancreatic resections. The ERAS pathway for PD was implemented in 2017. This study period includes all PD procedures that utilized the ERAS pathway over 2 years (May 2017 - May 2019). Robotic PD procedures were excluded. We specifically reviewed all medical records pertaining to those patients that failed to meet target LOS.

Results: A total of 142 PD procedures utilized the ERAS pathway over two years. We observed a LOS reduction from pre-ERAS vs post-implementation (mean LOS 10.5 vs 8.4 days, p<0.05); but still failed to achieve our target LOS for the whole cohort. There were 65 patients (46%) that failed to meet the 7 day LOS. The most common reason to fail pathway LOS was for either ileus or delayed gastric emptying (36/65, 55%), leading to a longer LOS of 12 days. Within this subgroup, patients who required a nasogastric tube during any time of admission had longer LOS (13 vs 9 days, p<0.05). Additional reasons for the remaining “off pathway” patients (29/65, 45%) not meeting target LOS are in Table 1. These primarily included non-gastrointestinal reasons for stay with the top three including work-up based on leukocytosis and/or concern for pancreatic leak (9/29, LOS 12), desire for additional “night” of observation (7/29, LOS 8), and orthostatic hypotension (3/29, LOS 9). Of these additional 29 patients, 9 patients underwent computed tomography (on or after POD 7) and only 2 patients received an inpatient intervention during the extra LOS (1 drain study, 1 percutaneous drain manipulation). ERAS implementation did not increase perioperative complications, 30-day readmission, or mortality. Renal, respiratory, cardiac, and superficial site infections all remained below NSQIP benchmarks.

Conclusion: The most common reasons for PD pathway failure included slow return of gastric or bowel function which are perhaps inevitable in some patients undergoing PD. The remaining patients not meeting ERAS target were often kept for observation without additional intervention. This group represents an actionable cohort to target for improving LOS through surgeon awareness rather than pathway modification.
Kaplan-Meier analysis demonstrated superior survival for UCOG group when compared to UDC group (Mean OS 16.15 months vs 31.95 months, p = < 0.01).
Background: Choledochal cysts (CC) are rare congenital anomalies characterized by dilation of extra and/or intra-hepatic bile-ducts. Cyst excision with biliary reconstruction is the recommended treatment of choice because of risk of subsequent biliary malignancy which can persist even after resection. Limited data is available on natural history and long term outcomes in patients diagnosed and treated for CC.

Methods: A single center retrospective review of patients diagnosed with CC between 2008 and 2018 was preformed. Patients were identified through institutional databases, and data pertaining to demographics, presenting symptoms, management, malignant transformation and long term outcomes was reviewed. Post-operative complications were classified using Clavien-Dindo scale.

Results: Seventy-nine patients were diagnosed with CC during study period. 54 (68%) were type 1, 5 (6%) were type 2, 2 (2.5%) were type 3, 8 (10%) were type 4, 3 (4%) were type 5, and in 7 (8.5%) patients the cyst type was unknown. Sixty-one (77%) were female, and mean age at diagnosis was 27.2 years (SD= 24.21). The most common presenting symptoms were abdominal pain (29; 36.5%) and jaundice (10; 12.7%) Sixty-four (81%) patients underwent definitive surgical resection, 4 (6%) patients required endoscopic or percutaneous biliary decompression for symptoms, and 11 (14%) had no intervention and were followed with surveillance cross sectional imaging. In the surgery group, 59 (92%) had surgical resection of the extrahepatic bile duct with a cholecystectomy and Roux-En-Y hepaticojejunostomy. 4 (6.25%) patients had cholecystectomy for stone related symptoms. 1 (1.5%) had a Whipple. Thirty (48%) patients developed 49 postoperative complications. Twenty-six significant complications (Clavien-Dindo >3) were seen in 18 (28.5%) patients; 8 (26%) required PTC, 6 (16%) required ERCP, and 10 (30%) required an additional operation. There were no surgery related deaths. The average length of time with a PTC drain was 8.4 months (SD=10.2). The median length of follow up was 8.02 years (SD=3.47). Biliary malignancy was seen in 2 (2.5%) patients. One patient had an incidental diagnosis of T2 gallbladder cancer at age 55. One patient developed cholangiocarcinoma 12 years post-operatively at age 45. None of the resected patients had high grade dysplasia or invasive carcinoma present in excised cyst.

Conclusion: The risk of developing cancer related to CC is low, especially in children and adolescents. Due to high surgery-associated morbidity and low cancer risk, it may be favorable to follow patients with imaging if they are asymptomatic.
<table>
<thead>
<tr>
<th>Severe Complications</th>
<th>n (%)</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stricture</td>
<td>12 (19%)</td>
<td>4 ERCP, 6 PTC, 1 Operative, 1 Non-operative</td>
</tr>
<tr>
<td>Small Bowel Obstruction</td>
<td>7 (7.9%)</td>
<td>5 Operative, 2 Non-operative</td>
</tr>
<tr>
<td>Hernia</td>
<td>3 (4.8%)</td>
<td>3 Operative</td>
</tr>
<tr>
<td>Biliary leak/abscess</td>
<td>6 (3.2%)</td>
<td>4 Operative, 2 PTC</td>
</tr>
<tr>
<td>Chronic Pancreatitis</td>
<td>1 (3.2%)</td>
<td>1 ERCP</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>2</td>
<td>1 Operative, 1 ERCP</td>
</tr>
<tr>
<td>Number of patients with each</td>
<td></td>
<td></td>
</tr>
<tr>
<td>complication grade (Clavien-Dindo)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>IIIa</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>IIIb</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>IV/V</td>
<td>0</td>
<td></td>
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</tbody>
</table>
Background: Positive results of randomized trials led to the introduction of FOLFIRINOX in 2012 and gemcitabine with nab-paclitaxel in 2015 for patients with metastatic pancreatic ductal adenocarcinoma. It is unknown to which extent these new chemotherapeutic regimens have been implemented in clinical practice and what the impact has been on overall survival.

Methods: Patients diagnosed with metastatic pancreatic ductal adenocarcinoma between 2007-2016 were included from the population-based Netherlands Cancer Registry. Multilevel logistic regression and Cox regression analyses, adjusting for patient-, tumor- and hospital characteristics, were used to analyze variation of chemotherapy use.

Results: In total, 8726 patients were included. The use of chemotherapy increased from 31% in 2007-2011 to 37% in 2012-2016 (P < 0.001). Variation in the use of any chemotherapy between centers decreased (adjusted range 2007-2011: 12-67%, 2012-2016: 20-54%, Figure 1). In all patients, overall survival increased slightly from 3.3 months to 3.4 months (P < 0.001) whereas overall survival increased from 5.6 months to 6.4 months (P < 0.001) for patients treated with chemotherapy. Use of FOLFIRINOX and gemcitabine with nab-paclitaxel varied widely in 2015-2016, but both showed a more favorable overall survival compared to gemcitabine monotherapy (median 8.0 vs. 7.0 vs. 3.8 months, respectively). In the period 2015-2016, FOLFIRINOX was used in 60%, gemcitabine with nab-paclitaxel in 9.7% and gemcitabine monotherapy in 25% of patients receiving chemotherapy.

Conclusion: Nationwide variation in the use of chemotherapy decreased after the implementation of FOLFIRINOX and gemcitabine with nab-paclitaxel. Still a considerable proportion of patients receives gemcitabine monotherapy. Overall survival did improve, but not clinically relevant. These results emphasize the need for a structured implementation of new chemotherapeutic regimens.
Figure 2. Mean adjusted probability of receiving chemotherapy per hospital of diagnosis in 2007-2011 and 2012-2016 respectively for patients diagnosed with metastatic pancreatic ductal adenocarcinoma. Hospitals of diagnosis are sorted by probability of receiving chemotherapy. Red indicates university hospitals and blue indicates non-university hospitals.
P 54. HEPATIC ARTERIAL INFUSION PUMP CHEMOTHERAPY COMBINED WITH SYSTEMIC THERAPY FOR PATIENTS WITH ADVANCED COLORECTAL LIVER METASTASES: OUTCOMES IN A NEWLY ESTABLISHED PROGRAM


Presenter: Brett Walker MD | Oregon Health and Science University

Background: Metastatic disease to the liver is a leading cause of morbidity and mortality in patients with colorectal cancer, with the majority of patients presenting with initially unresectable disease. Although hepatic resection offers the best chance of cure for colorectal liver metastases (CRLM), 40% of patients will develop intrahepatic recurrence not amenable to additional hepatic resection. Hepatic arterial infusion (HAI) chemotherapy with floxuridine has been demonstrated to improve survival in patients with resected CRLM and can be integrated with systemic therapy to convert patients with technically unresectable disease to a resectable status. Herein, we describe the experience of a recently established multidisciplinary hepatic arterial infusion program for the treatment of patients with advanced CRLM at an NCI Comprehensive Cancer Center.

Methods: Between 2016 and 2018, n=22 consecutive patients had a HAI pump placed as part of their multidisciplinary treatment plan for advanced CRLM. All patients received systemic chemotherapy perioperatively and concurrently with HAI. A multidisciplinary tumor board reviewed each HAI candidate before pump placement and throughout their therapy. Clinicopathologic data were collected and patient overall (OS) and progression-free (PFS) survival was assessed using the Kaplan-Meier method.

Results: Over the 30-month period, 7 patients with resected CRLM and 15 patients with unresectable CRLM had an HAI pump operatively placed at a median of 6 months after diagnosis. The median age was 55 years (range: 32-67) and 59% (n=13) were women. The majority of patients had a high hepatic tumor burden (76% with >10 metastases) and received a median of 8 (range: 4-18) cycles of systemic chemotherapy, mostly commonly FOLFOX, prior to HAI pump placement (Table). Of the 12 patients with an intact primary cancer, 11 had simultaneous HAI pump placement with resection of their primary cancer. Only 1 patient experienced a major complication (Clavien-Dindo ≥ 3) within 30 days of their operation (small bowel obstruction from prior loop ileostomy procedure). 21 patients received at least one HAI cycle of floxuridine and had a median of 5 cycles (range: 1-10) before HAI therapy was discontinued or held after clearance of intrahepatic disease. In total, 32% (n=7) of patients developed pump related complications, with biliary sclerosis being the most common (n=5/21, 24%). Of the 13 patients treated to convert their initially unresectable disease, 3 patients (23%) underwent hepatic resection with curative intent after a median of 7 HAI cycles (range: 4-10) and achieved complete clearance of their hepatic disease. For all patients treated with HAI and systemic therapy, the median OS from diagnosis was 52 months (95%: IQR 43-64 months) and the median PFS from pump placement was 21 months (95%: IQR 17-31 months).

Conclusion: HAI pump therapy with floxuridine can be used in combination with modern systemic chemotherapy for patients with advanced CRLM, both in the adjuvant setting and to facilitate conversion of unresectable disease in more than 20% of patients presenting with high liver disease burden. When implemented in a multidisciplinary program, HAI therapy is safe with low of peri-operative morbidity and promising outcomes in patients with limited treatment options.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total patients</strong></td>
<td>22</td>
</tr>
<tr>
<td><strong>Age, years; median (IQR)</strong></td>
<td>55 (47-62)</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>13 (59%)</td>
</tr>
<tr>
<td><strong>Unresectable CRLM</strong></td>
<td>15 (68%)</td>
</tr>
<tr>
<td><strong>Primary tumor</strong></td>
<td></td>
</tr>
<tr>
<td>Colon</td>
<td>13 (59%)</td>
</tr>
<tr>
<td>Rectal</td>
<td>9 (41%)</td>
</tr>
<tr>
<td><strong>N stage of primary tumor</strong></td>
<td></td>
</tr>
<tr>
<td>N0</td>
<td>2 (9%)</td>
</tr>
<tr>
<td>N1</td>
<td>11 (50%)</td>
</tr>
<tr>
<td>N2</td>
<td>9 (41%)</td>
</tr>
<tr>
<td><strong>KRAS mutation</strong></td>
<td>8 (36%)</td>
</tr>
<tr>
<td><strong>BRAF mutation</strong></td>
<td>1 (5%)</td>
</tr>
<tr>
<td><strong>Synchronous disease</strong></td>
<td>22 (100%)</td>
</tr>
<tr>
<td><strong>Largest liver metastasis</strong></td>
<td></td>
</tr>
<tr>
<td>≥ 5 cm</td>
<td>13 (59%)</td>
</tr>
<tr>
<td>Mean, cm (SD)</td>
<td>6.3 (3.3)</td>
</tr>
<tr>
<td><strong>Number of liver metastases</strong></td>
<td></td>
</tr>
<tr>
<td>1 - 10</td>
<td>6 (27%)</td>
</tr>
<tr>
<td>11 - 20</td>
<td>6 (27%)</td>
</tr>
<tr>
<td>21 - 30</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>&gt; 30</td>
<td>9 (41%)</td>
</tr>
<tr>
<td><strong>Liver tumor burden</strong></td>
<td></td>
</tr>
<tr>
<td>≤ 25%</td>
<td>11 (50%)</td>
</tr>
<tr>
<td>26-50%</td>
<td>6 (27%)</td>
</tr>
<tr>
<td>51-75%</td>
<td>4 (18%)</td>
</tr>
<tr>
<td>&gt; 75%</td>
<td>1 (5%)</td>
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<tr>
<td><strong>Clinical Risk Score</strong></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9 (41%)</td>
</tr>
<tr>
<td>4</td>
<td>8 (36%)</td>
</tr>
<tr>
<td>5</td>
<td>5 (23%)</td>
</tr>
<tr>
<td><strong>Preoperative systemic chemotherapy</strong></td>
<td>22 (100%)</td>
</tr>
<tr>
<td>Cycles; median (IQR)</td>
<td>8 (6-12)</td>
</tr>
<tr>
<td><strong>Received systemic therapy with HAI</strong></td>
<td>21 (100%)</td>
</tr>
<tr>
<td><strong>Therapy included an EGFR inhibitor</strong></td>
<td>11 (50%)</td>
</tr>
</tbody>
</table>

* 1 point for each: Node-positive primary; Disease free interval < 12 months; >1 liver metastasis; Liver metastasis > 5 cm; Preoperative CEA > 200 ng/ml.

* One patient did not receive any HAI cycles after pump placement.

IQR = Interquartile Range; CRLM = Colorectal liver metastasis; SD = Standard deviation; EGFR = Epidermal growth factor inhibitor
P 55. ROLE OF DEFINITIVE SURGERY ON SURVIVAL IN T2 GALLBLADDER CANCER


Presenter: Breanna Perlmutter MD | Cleveland Clinic Foundation

Background: Despite expert guidelines recommending definitive surgery for T2 disease, there is inconsistent surgical management. This study aims to evaluate the role of radical resection with portal lymphadenectomy on survival in patients with T2 gallbladder cancer.

Methods: A retrospective review was conducted at a large academic multi-center institution. All patients with a diagnosis of gallbladder cancer from 2001-2017 were identified. Patients with T2 cancers diagnosed on final pathology were included. Patients with metastatic disease were excluded. Data regarding demographics and operative details were collected. Patients were classified into two groups based on surgical management. “Definitive surgery” was defined as those patients undergoing a radical resection with portal lymphadenectomy whereas “non-definitive surgery” was defined as those patients only undergoing cholecystectomy with no further surgical management. Patients who underwent an en bloc radical cholecystectomy with portal lymphadenectomy at the initial surgery were included in the definitive surgery group. Kaplan-Meier estimates were used to calculate overall median survival.

Results: Forty-seven patients met study criteria with 24 (51%) undergoing definitive surgery. Patients who underwent definitive surgery were younger than those who did not (mean age 64.8 v. 74.7 years, p=0.004). The majority of patients were Caucasian (n=36, 76.6%) and female (n=30, 63.8%), with no significant difference in gender distribution or race between the two groups. Eleven patients (23.4%) had gallbladder polyps or masses noted prior to initial surgery, eight of whom underwent definitive surgery. Sixteen patients (69%) in the non-definitive surgery group as opposed to 18 (75%) in the definitive surgery group underwent laparoscopic cholecystectomy at initial operation (p 0.61). The majority of patients (91%) in the definitive surgery group had a cholecystectomy as the initial operation followed by radical resection with portal lymphadenectomy a median delay of 30 days (IQR 22-52 days) later. Overall pathologic TNM staging was comparable between the two groups and was predominantly stage II disease (82% in the non-definitive group vs. 79% in the definitive group). The grade of differentiation was also comparable between the two groups with the majority of patients being moderately differentiated. Final margins were considered after the last surgery the patient underwent. Overall 31.8% of patients in the non-definitive surgery group had a positive margin at the cystic duct. The final margin was positive in one patient (4.2%) undergoing definitive surgery (p=0.02). Median overall survival was significantly better in patients undergoing definitive surgery (4.3 v. 1.9 years, p=0.02).

Conclusion: In this study, half of patients with T2 gallbladder disease underwent definitive surgical resection, which was associated with a significantly improved survival. The importance of radical resection with portal lymphadenectomy for T2 gallbladder cancer must continue to be emphasized to improve outcomes in patients who are otherwise candidates for surgery.
P 56. CONSTRUCTION OF NOMOGRAM TO PREDICT POSTOPERATIVE PANCREATIC FISTULA AFTER DISTAL PANCREATECTOMY UTILIZING THE ACS-NSQIP PANCREATECTOMY TARGETED DATABASE

J Pastrana Del Valle, D Mahvi, P Wu, M Fairweather, J Wang, T Clancy, S Ashley, R Urman, E Whang, J Gold

Presenter: Jonathan Pastrana Del Valle MD | Beth Israel Deaconess Medical Center

Background: Distal pancreatectomy is widely employed in the treatment of benign and malignant conditions of the body and tail of the pancreas. Postoperative pancreatic fistula is a frequent and potentially morbid complication after this operation, occurring in up to 20% of distal pancreatectomy patients. Effective methods for predicting and preventing postoperative pancreatic fistula are still sought. While effective risk assessment models have been developed for postoperative pancreatic fistula after pancreaticoduodenectomy, to our knowledge, a similar model for distal pancreatectomy does not exist. The aim of this study was to investigate factors associated with postoperative pancreatic fistula following distal pancreatectomy and to create a risk model to predict this complication using data from the ACS-NSQIP database.

Methods: Patients who underwent distal pancreatectomy from 2014 to 2017 were selected from the ACS-NSQIP pancreatectomy targeted database. Clinically relevant (grade B or C) fistulas were identified using the 2016 ISGPS definitions. We utilized chi square tests on categorical variables and logistic regression on continuous variables to assess associations of preoperative and intraoperative variables with postoperative fistula. Variables with a p<0.10 on univariable analysis were then included in a multivariable logistic regression model, and a nomogram was constructed from this model. The predictive ability of the nomogram was assessed using the concordance statistic (c-statistic), and its calibration was tested using the Hosmer-Lemeshow test.

Results: A total of 7,088 patients who underwent distal pancreatectomy from 2014 to 2017 were identified in the ACS-NSQIP database. Clinically relevant postoperative pancreatic fistula were identified in 1,174 (16.6%) of the patients. Univariable analysis identified male sex, higher BMI, smoking history, congestive heart failure, disseminated cancer, low pre-operative albumin, chemotherapy within 90 days of surgery, radiation within 90 days of surgery, intra-operative drain placement, vascular resection, and histology were associated with pancreatic fistula (all p<0.05). Gland texture, pancreatic duct size, and presence of chronic pancreatitis were not significantly associated with fistula. Variables independently associated with pancreatic fistula in the multivariable model were male sex, higher BMI, smoking history, congestive heart failure, higher preoperative platelet count, intraoperative drain placement, vascular resection, and histology (all p<0.01). The nomogram constructed from this analysis is shown in panel A. The concordance statistic of the nomogram is 0.625 (ROC curve shown in panel B). The nomogram appeared well calibrated (panel C) with a Hosmer-Lemeshow p=0.723 consistent with a good fit.

Conclusion: Male sex, higher BMI, smoking history, congestive heart failure, higher pre-operative platelet count, intra-operative drain placement, vascular resection, and histology are independently associated with risk of developing postoperative pancreatic fistula after distal pancreatectomy. A nomogram based on these risk factors yielded a c-statistic of 0.625 suggesting that other variables not accounted for may contribute to the risk of pancreatic fistula and/or there is some inherent unpredictability in the development of this complication. The nomogram does provide a well calibrated prediction of risk based on easily determined pre-operative and intra-operative variables, and thus may be useful in post-operative management. Further study to externally validate this nomogram is warranted.
Background: Neoadjuvant therapy for pancreatic cancer decreases the risk of post-operative pancreatic fistula (POPF). However, there is a paucity of published data specifying which neoadjuvant regimen is most protective against POPF development. We evaluated the differences between neoadjuvant chemotherapy (CT), radiation therapy (RT), and chemotherapy/radiation therapy (CRT) in regard to effect on POPF rates. We hypothesize combined therapy decreases POPF.

Methods: The main and targeted pancreatectomy National Surgical Quality Improvement (NSQIP) registries for 2014-2016 were retrospectively reviewed. Cases that did not contain information on the use of neoadjuvant therapy or POPF development were excluded. Additionally, cases that did not identify a malignant etiology were excluded. Linear regression analysis of NSQIP factors that have previously been shown to be associated with or suspected to be associated with POPF was performed. Factors included neoadjuvant therapy, sex, age, BMI, diabetes, smoking, steroid therapy, preoperative weight loss, preoperative albumin level, perioperative blood transfusions, wound classification, ASA classification, duct size (6mm), gland texture (soft, intermediate, hard), and anastomotic technique. Factors identified to be statistically significant with the development of POPF were then compared between cases that received neoadjuvant CT, RT, and CRT.

Results: 10,117 cases were analyzed. Development of POPF was significantly associated with lack of neoadjuvant therapy, male sex, higher BMI, non-diabetic status, post-operative blood transfusion, decreased duct size, and soft gland texture. Neoadjuvant therapy, BMI, duct size, and gland texture had the strongest associations with development of POPF (all p values < 0.0001). Overall, 1,765 cases (17.45%) underwent neoadjuvant therapy. 1,031 cases underwent CT, 62 cases underwent RT, and 672 cases underwent CRT. The POPF rates were 20.1%, 11.15%, 4.84%, and 8.18% for cases that received no neoadjuvant therapy, CT, RT, and CRT respectively (p value < 0.0001). Comparison of POPF rates between groups receiving only neoadjuvant therapy demonstrated persistent significant differences with the inclusion of radiation therapy (p value 0.039). Decreasing POPF rates correlated significantly with firmer gland texture with the hard gland rates being 54.84%, 54.17%, 42.48%, and 29.01% in the RT, CRT, CT, and no therapy groups respectively (p value < 0.001). Comparison of the neoadjuvant treatment groups revealed no statistically significant differences between duct size, diabetic status, post-operative transfusions, and BMI.

Conclusion: To our knowledge this is the largest analysis of specific neoadjuvant regimens in regard to the development of POPF following pancreaticoduodenectomy. The addition of radiation therapy to neoadjuvant regimens provides the strongest protective effect. This is potentially due to increased fibrosis in the pancreatic parenchyma from the radiation therapy resulting in a firmer gland. These findings provide additional support to alleviate concerns the use of neoadjuvant therapy with radiation will increase adverse outcomes after pancreaticoduodenectomy.
Background: The recurrence rate after liver transplant (LT) for hepatocellular carcinoma (HCC) is high as 15-20% nevertheless of complete removal of tumor and carcinogenic liver. Inevitable immunosuppression after LT is one of the causes of high tumor recurrence, however optimal immunosuppression management strategy after LT for HCC is still unknown.

Methods: 524 patients were involved in this study. The time-weighted average (TWA) tacrolimus level at 1-, 3-, and 6-months after LT were collected. In our institute, post-LT immunosuppression is basically controlled by tacrolimus and target level is around 10. mTOR inhibitor is added to patients with risk factor of recurrence such as vascular invasion or outside Milan criteria. The hazard ratios (HRs) of tumor recurrence according to the level of tacrolimus were estimated using Fine-Gray model competing risk regression. The risk of immunosuppression was adjusted with AFP, use of mTOR inhibitor, use of induction therapy, and tumor and patient factors. Spline analysis was used to find optimal cut-off and done in the standard way to assess the linearity of risk over tacrolimus intervals.

Results: HCC recurrence was seen in 74 patients and 117 patients died without recurrence. The median time-weighted average tacrolimus levels at 1-, 3-, and 6-months after LT were 9.4, 8.7, and 8.4 respectively. Induction therapy was performed in 65 patients and 10, 62, and 138 patients received mTOR inhibitor addition to tacrolimus at 1-, 3-, and 6-month after LT. The graft rejection required treatment within 6 months after LT was seen in 53 patients. The HRs of tumor recurrence according to TWA tacrolimus were plotted as restricted cubic spline curves in Figure A. The slopes were linearly decreased in 1- and 3-months and the curve in 6-months showed increase slope around 8.4. The cumulative recurrence and overall survival rate according to TWA tacrolimus level at 6-months were shown in Figure B. Lower TWA group showed significant lower recurrence rate (P=0.03), although survival curves were not different statistically (P=0.45).

Conclusion: TWA Tacrolimus level after LT for HCC should keep lower as possible in early period after LT to prevent tumor recurrence.
Figure A

1 month after transplant

3 month after transplant

6 month after transplant

Log HR

Time weighted average FK level

Figure B

Time weighted average FK level at 6 months < 8.4

Time weighted average FK level at 6 months ≥ 8.4

Log-rank P = 0.03

Log-rank P = 0.45
P 62. IMPACT OF AGEING ON SHORT TERM OUTCOMES IN LIVER SURGERY. THE EXPERIENCE OF AN EMERGING CENTER
P Germani, P Tarchi, D Cosola, S Cortinovis, M Trojan, T Cipolat Mis, M Bortul, N de Manzini
Presenter: Paola Tarchi  | University Hospital of Trieste

Background: The number of liver resections has increased over time due to greater incidence of liver malignances and to technological and pharmacological improvements. More, surgeons have to deal with an increase of life expectancy and population aging. In this setting, it’s difficult to stratify the morbidity and mortality risk in the elderly population and define which patients benefit from surgery. Aim of the study was to evaluate the impact of ageing on short term outcomes in liver surgery in order to better select older patients.

Methods: All patients who underwent liver resection in our Unit in the last 10 years were reviewed. Patients were divided into three age groups: < 65, 65–74 years, and ≥75 years. Baseline and intraoperative characteristics as well as postoperative morbidity and mortality were compared between all groups.

Results: Overall 178 patients were included with 57 (32%), 71 (40%) and 50 (28%) in < 65, 65–74 years, and ≥75 years subgroups. Baseline characteristics were similar between all 3 groups except for the incidence of ischemic heart disease, ASA score and Charlson Comorbidity Index, which were higher in the elderly, and different according to the disease etiology. Major hepatectomy and minor resection were performed in 51 (28.7%) and 127 (71.3%) patients, respectively: no significant differences were observed between groups. Overall morbidity (49.1% vs 46.5% vs 54%, p 0.7) and severe complications (14% vs 15.5% vs 16%, p 0.9) were similar between groups. 30-day mortality (0 vs 1.4% vs 6% p 0.09) was higher in the oldest cohort. Length of hospital stay was similar between the three groups but discharge to rehab facility was higher in the third group. Results are summarized in the table.

Conclusion: Ageing is not an absolute contraindication for liver resection. Although associated with a slight increase in postoperative mortality, liver resection may be performed safely in carefully selected elderly patients.

<table>
<thead>
<tr>
<th></th>
<th>Total 178 pzt</th>
<th>&lt; 65 yo: 57 pzt</th>
<th>65-74 yo: 71 pzt</th>
<th>≥75 yo: 50 pzt</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any complication</td>
<td>88 (49.4%)</td>
<td>28 (49.1%)</td>
<td>33 (46.5%)</td>
<td>27 (54%)</td>
<td>0.7</td>
</tr>
<tr>
<td>Dindo ≥ 3</td>
<td>27 (15.2%)</td>
<td>8 (14%)</td>
<td>11 (15.5%)</td>
<td>8 (16%)</td>
<td>0.9</td>
</tr>
<tr>
<td>Liver failure</td>
<td>4 (2.2%)</td>
<td>1 (1.8%)</td>
<td>2 (2.8%)</td>
<td>1 (2%)</td>
<td>0.9</td>
</tr>
<tr>
<td>Ascitis</td>
<td>20 (11.2%)</td>
<td>6 (10.5%)</td>
<td>5 (7%)</td>
<td>9 (18%)</td>
<td>0.16</td>
</tr>
<tr>
<td>Biliary leakage</td>
<td>8 (4.5%)</td>
<td>2 (3.5%)</td>
<td>4 (5.6%)</td>
<td>2 (4%)</td>
<td>0.8</td>
</tr>
<tr>
<td>Grade A</td>
<td>3 (1.7%)</td>
<td>0</td>
<td>2 (2.8%)</td>
<td>1 (2%)</td>
<td>/</td>
</tr>
<tr>
<td>Grade B</td>
<td>3 (1.7%)</td>
<td>0</td>
<td>1 (1.4%)</td>
<td>0</td>
<td>/</td>
</tr>
<tr>
<td>Grade C</td>
<td>2 (1.1%)</td>
<td>0</td>
<td>1 (1.4%)</td>
<td>1 (2%)</td>
<td>/</td>
</tr>
<tr>
<td>Collection</td>
<td>18 (10.1%)</td>
<td>5 (8.8%)</td>
<td>8 (11.3%)</td>
<td>5 (10%)</td>
<td>0.8</td>
</tr>
<tr>
<td>Sepsis</td>
<td>11 (6.2%)</td>
<td>4 (7%)</td>
<td>3 (4.2%)</td>
<td>4 (8%)</td>
<td>0.6</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>47 (26.4%)</td>
<td>16 (28.1%)</td>
<td>20 (28.2%)</td>
<td>11 (22%)</td>
<td>0.7</td>
</tr>
<tr>
<td>Cardiac complications</td>
<td>10 (5.6%)</td>
<td>1 (1.8%)</td>
<td>5 (7%)</td>
<td>4 (8%)</td>
<td>0.29</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>7 (3.9%)</td>
<td>1 (1.8%)</td>
<td>4 (5.6%)</td>
<td>2 (4%)</td>
<td>0.5</td>
</tr>
<tr>
<td>Other complications</td>
<td>35 (19.7%)</td>
<td>9 (15.8%)</td>
<td>14 (19.7%)</td>
<td>12 (24%)</td>
<td>0.5</td>
</tr>
<tr>
<td>Reoperation</td>
<td>10 (5.6%)</td>
<td>3 (5.3%)</td>
<td>1 (1.4%)</td>
<td>6 (12%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Lenght of hospital stay (median)</td>
<td>10 (2-70)</td>
<td>8(2-70)</td>
<td>10 (2-66)</td>
<td>11 (3-53)</td>
<td>0.33</td>
</tr>
<tr>
<td>Discharge to rehab facility</td>
<td>12 (6.9%)</td>
<td>1 (1.8%)</td>
<td>2 (2.9%)</td>
<td>9 (19.1%)</td>
<td>0.0005</td>
</tr>
<tr>
<td>30 day mortality</td>
<td>4 (2.2%)</td>
<td>0</td>
<td>1 (1.4%)</td>
<td>3 (6%)</td>
<td>0.09</td>
</tr>
<tr>
<td>90 day mortality</td>
<td>2 (1.2%)</td>
<td>0</td>
<td>2 (2.9%)</td>
<td>0</td>
<td>0.2</td>
</tr>
</tbody>
</table>
P 63. RADIOFREQUENCY ASSISTED HEPATIC RESECTION FOR PROVIDING COST-EFFECTIVE HEPATECTOMIES IN A NATIONAL HEALTH CARE SYSTEM IN A FINANCIAL CRISIS

C Christou, A Tooulias, A Mitsas, A Tsolakidis, G Tsoulfas, V Papadopoulos

Presenter: Chrysanthos Christou | Aristotle University of Thessaloniki

Background: Hepatectomy or hepatic resection is indicated in a plethora of liver and biliary tract conditions. Minimally invasive hepatectomies (laparoscopic and robotic), are superior to open hepatectomies in terms of blood loss and length of hospitalization. However, they are associated with significantly higher cost. As a result, countries suffering from a financial crisis and extensive health care system budget cuts, fail to afford these procedures. Our aim is to provide an alternative operational option based on radiofrequency assisted hepatic resection that does not compromise the surgical outcome and remains affordable for lower income countries.

Methods: We created a highly standardized open hepatic resection protocol, which was implemented on every patient admitted in our department for a hepatectomy since 2010. Our protocol regulates the preoperative care, the surgical procedure and the postoperative management of the patients. Regarding the surgical procedure, our team has used surgical diathermy and a radiofrequency device to carve and dissect the liver. Data regarding the cost of our protocol was collected from the electronic medical records of the hospital, the pharmacy department and the economic department. The cost of each stage of our protocol was calculated separately. The statistical analysis of our data was performed using SPSS software.

Results: We included 80 hepatectomies performed for the treatment of benign (n=6, 7.5%) or malignant (n=74, 92.5%) tumors. We performed 35 major (≥3 Couinaud segments) and 45 minor (≤2 Couinaud segments) hepatectomies. Postoperatively, 18 patients (22.5%), were admitted to the ICU. The mean ICU stay of the admitted patients was 2.22±2.32 days. The mean postoperative length of hospitalization was 11.12±7.48 days. Regarding postoperative complications, based on Clavien – Dindo scale, our patients developed the following complications: 10 patients of scale I, 16 patients of scale II, 2 patients of IIIb and 6 patients of scale IV. Our 30-day mortality rate (Clavien-Dindo V) was 8.8% (7 patients). Regarding cost, the mean overall cost of preoperative care was €634.89±531.17, of the surgical procedure was €4082.08±1443.9 and of the postoperative care was €2971.25±1916.28. The total mean cost was €7683.48±2942.04. Specifically, €2976.49±1238.37 (38.74%) was allocated for surgery materials, €1329.43±1058.25 (17.30%) for ward and ICU stay, €551.75±173.60 (7.18%) for staff salaries, €573.86±391.38 (7.47%) for the administrated drugs, €955.13±1266.32 (12.43%) for transfusion, €1112.47±619.90 (14.48%) for laboratory tests and finally €184.35±214.26 (2.40%) for imaging.

Conclusion: Minimally invasive techniques tend to gain ground against traditional open laparotomies. However, due to lack of financial resources, many countries fail to follow this tendency. Development of treatment protocols is crucial in providing a cost-effective treatment. Our protocol provides a cost-effective open laparotomy alternative with comparable postoperative complications and mortality rates with other studies.
P 64. MINIMIZING BLOOD LOSS DURING ROBOTIC HEPATECTOMY: TECHNICAL DESCRIPTION AND INITIAL EXPERIENCE

J Hawksworth, P Radkani, N Llore, M Holzner, E Meslar, E Winslow, R Mateo, R Satoskar, R He, N Haddad, T Fishbein

Presenter: Jason Hawksworth MD | MedStar Georgetown University Hospital

Background: Minimally invasive techniques in liver surgery continue to evolve and robotic surgery technology has increased the capability of hepatobiliary surgeons to perform safe liver resections.

Methods: Initial experience on 20 consecutive robotic hepatectomies from September 2018 to September 2019 at 2 institutions were analyzed. Extrahepatic inflow control and CUSA application during parenchymal transection were utilized to minimize blood loss during hepatectomy. Clinical characteristics and surgical outcomes were maintained in a prospective database.

Results: There were 10 major hepatectomies, 4 bisegmentectomies, and 6 segmentectomies performed robotically. Extrahepatic inflow control was achieved in 12 cases. The laparoscopic CUSA was used in all cases and median blood loss was 275 mL (50-700). No patient required conversion to open procedure. One patient required blood transfusion. Median OR time was 383min (213-622). Median length of stay was 3 days (1-6). Major morbidity included 1 Clavien dindo IIIa bile leak requiring ERCP. There was no 90-day mortality.

Conclusion: Advanced techniques to reduce blood loss in robotic hepatectomy may optimize safety and minimize morbidity in these complex minimally invasive procedures.
P 65. VIDEO PRESENTATION: ROBOTIC RIGHT HEPATECTOMY FOR METASTATIC COLORECTAL CANCER
RS Meltzer, BI Meyer, MM Shah, DA Kooby
Presenter: Rebecca Meltzer BA | Emory University

Background: We present the case of a 77-year old male with a history of colorectal cancer who presented with a new liver mass found on positron emission tomography (PET) scan. He had previously resected sigmoid adenocarcinoma with adjuvant chemotherapy. Triple phase CT-scan revealed a solitary liver lesion in the right lobe adjacent the right hepatic vein. We opted for minimally invasive robotic approach to right hepatectomy.

Methods: A total robotic right hepatectomy was performed using the DaVinci Xi Robot. Intraoperatively, indocyanine green (ICG) fluorescence was used to aid in identification of the right hepatic duct, and ultrasound was used to visualize the right hepatic lobe lesion. A Pringle maneuver was utilized twice during parenchymal transection. Critical steps are outlined in the video.

Results: The procedure was performed successfully and tolerated well by the patient. The specimen was extracted through a Pfannenstiel incision. No significant bleeding was encountered, estimated blood loss was less than 200 cc. The postoperative course was uncomplicated. Pathology confirmed a 3cm lesion in the right lobe with negative margins, consistent with metastatic adenocarcinoma from colon primary.

Conclusion: Robotic right hepatectomy is a safe approach for colorectal cancer with liver metastases with minimal blood loss or complications. Use of intraoperative ICG improves visibility during transection of the right hepatic duct and ultrasound aids evaluation for liver metastases to ensure appropriate resection margins.
Background: Delayed gastric emptying (DGE) is a major source of morbidity after pancreaticoduodenectomy (PD), occurring in up to 20% of patients. Patients with type I or II diabetes mellitus (DM) have a propensity for gastric dysmotility, however the exact relationship between DGE and DM is not clearly established. The aim of this study was to determine the incidence of DGE in patients with and without DM after PD.

Methods: The American College of Surgeons National Quality Improvement Project (ACS-NSQIP) procedure-targeted pancreatectomy database was queried from 2014 to 2017 for patients undergoing PD and combined with the main ACS-NSQIP database. Patient demographic, clinical and perioperative variables were compared by DM status. The primary outcome was rate of DGE. A subset analysis of insulin-dependent DM (IDDM) and non-insulin-dependent DM (non-IDDM) patients was also performed. Statistical analyses were performed using chi-square, Mann Whitney-U tests, and logistic regression.

Results: A total of 14,735 patients met inclusion criteria, including 10,930 non-DM patients (74.2%) and 3805 DM patients (25.8%). Median cohort age was 66 years and 53.7% were male (n=7918). DGE occurred in 17.1% of patients overall (n=2519); 17.2% in non-DM and 16.8% in DM patients (p=0.60). DM patients had a higher ASA class, increased rates of hypertension, increased proportion of pancreatic adenocarcinoma, larger duct size, harder gland texture, and required more frequent vascular resection (p<0.001). DM patients had equivalent rates compared to non-DM patients of post-operative superficial surgical site infection (7.8% in both; p=0.89), deep surgical site infection (1.4 vs 1.5%; p=0.56), urinary tract infection (3.2 vs 2.8%; p=0.23) and pneumonia (4.3 vs 3.6%; p=0.19), and lower rates of organ space infection (11.5 vs 14.0%; p<0.001) and pancreatic fistula (14.9 vs 19.0%; p<0.001). On subset analysis, IDDM had better outcomes compared to non-IDDM patients in organ space infections (8.8 vs 14.2%; p<0.001) and pancreatic fistula (11.7 vs 18.3%; p<0.001). Rates of DGE were 18.0% (n=337) in non-IDDM and 15.7% in IDDM patients (p=0.162). There were no significant differences in rates of reoperation, hospital length of stay, readmission rates or 30-day mortality. On multivariable logistic regression, male sex, advanced age, history of smoking, pancreatic fistula, and organ space infection were associated with DGE. DM status was not predictive of DGE.

Conclusion: No differences in rates of DGE between DM and non-DM patients after PD were found, strengthening the hypothesis that DGE is a separate physiologic entity from diabetic gastroparesis. IDDM patients demonstrated better postsurgical outcomes compared to non-IDDM patients in terms of intra-abdominal infection and pancreatic fistula, suggesting a potential role of monitored insulin or hyperglycemia regulation in the development of these complications.
Background: Bilateral erector spinae fascial plane blocks (ESPB) are a novel method of regional analgesia. The use of ESPB in abdominal surgery has sparked interest as an adjunct to opioid-sparing post-operative pain regimens. In this study, we describe our initial experience of ESPB in open pancreatectomy procedures.

Methods: A retrospective analysis of a prospectively-maintained database was performed of all patients from August 2018 to March 2019 who received bilateral-ESPB for post-operative pain control after open pancreatectomy. Ultrasound-guided ESPB at the T7 or T8 level was performed in a cranial to caudal direction with infiltration of liposomal bupivacaine. Patient demographics, intraoperative and postoperative factors, including quality end points and intravenous morphine milligram equivalent (MME) requirements, were examined.

Results: Twenty-nine patients met inclusion criteria, including 21 pancreaticoduodenectomy and 8 distal pancreatectomy patients. All incisions were via midline laparotomy. Diagnosis in 15 patients (52%) was ductal adenocarcinoma. Mean patient age was 66 years, and 48% were male (n=14). Average patient BMI was 28.7. Mean anesthesia preparation time was 82 minutes. Return of bowel function was a mean of 3.5 days post-operatively and urinary catheter removal was 1.8 days. Median hospital length of stay was 6.5 days. Seven patients were readmitted within 30 days of surgery (24%) and there were no deaths. Ten patients (34%) had complications within 30 days of surgery which included 3 superficial site infections, 2 organ space infections, 1 patient with atrial fibrillation, 1 patient with bleeding and 3 other causes. There were no recorded adverse events related to the ESPB procedure. No patients required rescue thoracic epidural catheter placement or intravenous patient controlled analgesia (PCA). Mean MME for first 72 hours after surgery was 40 mEq and 82 mEq for the entire inpatient stay. Nine patients received a mean of 18 mEq of opioid medications in the first 24 hours after surgery, followed by no further opioids. Three patients did not require any opioids after surgery.

Conclusion: ESPB presents an effective and safe mode of regional analgesia in patients undergoing open pancreatectomy and shows promise as a key element in opioid-sparing post-operative pain regimens. The expanded role of ESPB in major abdominal surgery warrants further investigation.
Background: The impact of the type of drainage system on outcomes following pancreatic surgery is yet to be robustly studied. Specifically, the impact of passive gravity (PG) versus closed suction (CS) drainage on the rate of clinically relevant post-operative pancreatic fistula (CR-POPF) remains unknown. The objective of this systematic review was to identify and compare the incidence of adverse events and resource utilization between PG and CS drains following pancreatic resections.

Methods: The PRISMA guideline was followed and a PROSPERO protocol was registered (CRD42019123647). Medline, Embase, and Central databases were searched from inception to April 2019. All published studies comparing PG and CS drains following elective pancreatic resections in adult patients were identified. The primary outcome was CR-POPF. Secondary outcomes included delayed gastric emptying (DGE), surgical site infections (SSI), post pancreatectomy hemorrhage (PPH), hospital length of stay (LOS), major complications, and mortality. Where appropriate, data was pooled using the random-effects model or difference in means for dichotomous and continuous variables, respectively. Results were reported as odds-ratios (OR) with 95% confidence intervals (CI).

Results: One randomized control trial (RCT) and four high quality cohort studies involving 1127 patients were included. One study (n=181) independently reported a significant decrease in CR-POPF with CS, while remaining studies found no differences. Considerable between-study variability was identified, namely differences in the model of drain employed, drain removal protocols, and the use of perioperative adjuncts to mitigate CR-POPF. Meta-analysis (n=5 studies) found no difference in the odds of developing CR-POPF between CS and PG systems (OR 0.59 [0.25, 1.40], p=0.23, i²=84%). Subgroup analysis (n=4 studies) for pancreaticoduodenectomy (PD) markedly reduced heterogeneity to i²=0% while subgroup analysis (n=3 studies) for distal pancreatectomy (DP) maintained high heterogeneity. In both subgroup analyses, no difference between the groups with regards to CR-POPF was maintained. There were also no significant differences between groups for secondary outcomes, including DGE in PD (OR 0.90 [0.54, 1.53], p=0.71, i²=0%), wound infections (OR 0.92 [0.48, 1.77], p=0.80, i²=0%), PPH (OR 1.18 [0.66, 2.09], p=0.58, i²=0%), LOS [-0.22 days [-1.42, 0.98], p=0.72, i²=11%], major complications (OR 1.10 [0.67, 1.79], p=0.71, i²=0%), and mortality (OR 1.05 [0.39, 2.82], p=0.71, i²=0%).

Conclusion: Current evidence suggests that the selection between a CS or PG drain following pancreatic resection may not impact the risk of CR-POPF development or affect other outcomes including DGE, wound infections, PPH, LOS, major complications, or mortality. However, due to the mostly observational evidence, small sample size and heterogeneity between studies, interpretation of these results are limited. Therefore, high quality RCTs are required to draw more robust conclusions.
P 70. NECROTIZING PANCREATITIS FROM HYPERTRIGLYCERIDEMIA: MORE SEVERE DISEASE?
JA Westfall-Snyder, TK Maatman, EP Ceppa, MG House, A Nakeeb, CM Schmidt, NJ Zyromski
Presenter: Jamaica Westfall-Snyder BSN | Indiana University

Background: Necrotizing pancreatitis (NP) is caused by hypertriglyceridemia (HTG) in up to 10% of patients. Clinical experience suggests that HTG-NP is associated with increased clinical severity compared to NP caused by other etiology; however, the available literature is sparse and mixed. Therefore, the aim of this study was to critically evaluate outcomes in HTG-NP. We hypothesized that patients with HTG-NP had significantly increased severity, morbidity, and mortality compared to patients with NP from other etiologies.

Methods: A case-control study of all NP patients treated at a single institution between 2005-2018 was performed. Diagnostic criteria of HTG-NP included a serum triglyceride level >1,000 mg/dL and the absence of another clear pancreatitis etiology. To control for differences in age, sex, and comorbidities, non-HTG and HTG patients were matched at a 4:1 ratio using propensity scores. Evaluated outcomes included computed tomography severity index (CTSI), degree of pancreatic glandular necrosis, index hospital admission length of stay (LOS), organ failure, infected necrosis, disconnected pancreatic duct syndrome (DPDS), readmission, total hospital LOS, intervention, disease duration, and mortality. Where applicable, independent groups t-test (continuous variables) or Pearson’s chi-squared test (categorical variables) were used to detect differences between non-HTG and HTG patients. P values < 0.05 were accepted as statistically significant.

Results: A total of 676 NP patients were treated during the study period. The incidence of HTG-NP was 5.8% (n = 39). The mean peak triglyceride level at diagnosis was 2,923 mg/dL (SEM, 417 mg/dL). No association was observed between peak triglyceride level and severity of NP. Treatment for elevated TG included supportive care only in 23 patients (59%), insulin infusion in 13 patients (33%), and plasmapheresis in three patients (8%). With 4:1 propensity matching, no differences were present in age, sex, or comorbidities between the non-HTG cohort (n = 156) and the HTG cohort. Compared to non-HTG etiology, patients with HTG-NP had no differences in CTSI, degree of glandular necrosis, organ failure, infected necrosis, DPDS, necrosis intervention, index admission LOS, readmission, total hospital LOS, or disease duration (Table 1). No difference in mortality was observed between non-HTG-NP (7.1%) and HTG-NP (7.7%), P = 1.0.

Conclusion: In this large, single-institution series, necrotizing pancreatitis caused by hypertriglyceridemia had similar disease severity, morbidity, and mortality as necrotizing pancreatitis caused by other etiologies.
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Non-HTG (n = 156)</th>
<th>HTG (n = 39)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTSI, mean (SEM)</td>
<td>7.4 (0.6)</td>
<td>6.8 (0.3)</td>
<td>0.6</td>
</tr>
<tr>
<td>Degree of glandular necrosis, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>22 (14)</td>
<td>5 (13)</td>
<td></td>
</tr>
<tr>
<td>&lt;30%</td>
<td>27 (17)</td>
<td>7 (18)</td>
<td></td>
</tr>
<tr>
<td>30-50%</td>
<td>64 (41)</td>
<td>21 (54)</td>
<td></td>
</tr>
<tr>
<td>&gt;50%</td>
<td>43 (28)</td>
<td>6 (15)</td>
<td>0.4</td>
</tr>
<tr>
<td>Organ failure (any), n (%)</td>
<td>55 (35)</td>
<td>17 (44)</td>
<td>0.3</td>
</tr>
<tr>
<td>Respiratory failure, n (%)</td>
<td>48 (31)</td>
<td>11 (28)</td>
<td>0.8</td>
</tr>
<tr>
<td>Renal failure, n (%)</td>
<td>37 (24)</td>
<td>14 (36)</td>
<td>0.1</td>
</tr>
<tr>
<td>Cardiovascular failure, n (%)</td>
<td>20 (13)</td>
<td>5 (13)</td>
<td>1.0</td>
</tr>
<tr>
<td>Infected necrosis, n (%)</td>
<td>86 (55)</td>
<td>22 (56)</td>
<td>0.9</td>
</tr>
<tr>
<td>DPDS, n (%)</td>
<td>79 (51)</td>
<td>18 (46)</td>
<td>0.7</td>
</tr>
<tr>
<td>Necrosis intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None, n (%)</td>
<td>30 (19)</td>
<td>9 (23)</td>
<td></td>
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<tr>
<td>Percutaneous drain only, n (%)</td>
<td>6 (4)</td>
<td>3 (8)</td>
<td></td>
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<tr>
<td>Endoscopic only, n (%)</td>
<td>5 (3)</td>
<td>1 (3)</td>
<td></td>
</tr>
<tr>
<td>Operative only, n (%)</td>
<td>58 (37)</td>
<td>10 (26)</td>
<td></td>
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<tr>
<td>Combination, n (%)</td>
<td>56 (36)</td>
<td>16 (41)</td>
<td>0.6</td>
</tr>
<tr>
<td>Index LOS, mean days (SEM)</td>
<td>27.6 (2)</td>
<td>24.3 (3)</td>
<td>0.5</td>
</tr>
<tr>
<td>Readmission, n (%)</td>
<td>119 (76)</td>
<td>31 (79)</td>
<td>0.7</td>
</tr>
<tr>
<td>Readmissions/patient, mean (SEM)</td>
<td>2.3 (0.2)</td>
<td>2.6 (0.5)</td>
<td>0.4</td>
</tr>
<tr>
<td>Total hospital LOS, mean days (SEM)</td>
<td>47.3 (4)</td>
<td>45.9 (6)</td>
<td>0.9</td>
</tr>
<tr>
<td>Disease duration, mean months (SEM)</td>
<td>7.7 (0.7)</td>
<td>5.4 (0.5)</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Abbreviations: HTG – hypertriglyceridemia; CTSI – computed tomography severity index; SEM – standard error of the mean; DPDS – disconnected pancreatic duct syndrome, LOS – length of stay.
P 71. UNDERUTILIZATION OF PALLIATIVE CARE IN METASTATIC PANCREATIC CANCER PATIENTS IS ASSOCIATED WITH SOCIOECONOMIC DISPARITIES
M Ju, S Paul, MR Porembka
Presenter: Michelle Ju MD | University of Texas Southwestern Medical Center

Background: Approximately half of pancreatic cancer patients present with metastatic disease at initial diagnosis. Metastatic disease is frequently associated with debilitating symptoms that have significant negative impact on patients' quality of life. Palliative care is effective in mitigating disease-, psychosocial-, and treatment-related effects. However, palliative care remains heavily underutilized in patients with metastatic pancreatic cancer. Our aim was to determine factors associated with receipt of palliative care. Our main outcome of interest was the rate of palliative care utilization in patients with metastatic pancreatic cancer. Secondary outcomes were determining the impact of various clinicopathologic and socioeconomic factors associated with likelihood of receiving palliative care.

Methods: We conducted a retrospective review of National Cancer Database patients 18 years of age or older diagnosed with metastatic pancreatic cancer between 2004-2013. Chi-squared tests were used to analyze the differences between the two cohorts: those who received palliative care and those who did not. Logistic regression was performed to assess the impact of various clinicopathologic factors on the likelihood of receiving PC. Overall survival was estimated using the Kaplan-Meier method and compared using log-rank tests.

Results: Palliative care utilization rates increased over time (23.9% between 2004-2006 vs. 39.6% between 2007-2010 vs. 36.5% between 2011-2013). Medicaid insurance status, median income < $46,000/year, higher Charlson/Deyo Score, and later year of diagnosis were associated with increased likelihood of palliative care interventions. Patients 75 years of age or older, with private insurance, or living in areas with the lowest average education level (≥29% of residents without a high school degree) were less likely to receive palliative care. When receipt of palliative care was stratified by race, Hispanics (OR 0.69, 95% CI 0.64-0.75), African Americans (OR 0.88, 95% CI 0.83-0.92), and Asians (OR 0.86, 95% CI 0.77-0.97) were all significantly less likely to have undergone palliative care interventions compared to non-Hispanic whites. Patients with private insurance were less likely to receive palliative care than uninsured patients (OR 0.88, 95% CI 0.81-0.96).

Conclusion: Differences in palliative care receipt rates exist with regards to racial/ethnic and socioeconomic factors such as insurance status, median household income, and education level. Further studies are needed to delineate why these racial/ethnic and socioeconomic disparities exist with regards to palliative care utilization in metastatic pancreatic cancer patients.
P 72. FORMAL ROBOTIC TRAINING REDUCES THE LEARNING CURVE OF ROBOTIC PANCREATICODUODENECTOMY
BR Harris, KA Musgrove, ME Hogg, JW Marsh, HJ Zeh, AH Zureikat, CR Schmidt, BA Boone
Presenter: Britney Harris MD | West Virginia University, Morgantown

Background: The safety and feasibility of robotic pancreaticoduodenectomy (RPD) has been demonstrated, resulting in increased utilization due to improved range of instrument articulation, elimination of surgeon tremor, and enhanced three-dimensional visualization. The learning curve associated with RPD, established at 80 cases (1), is a recognized hurdle to implementing a new program. Since the initial learning curve analysis, robotic training has expanded, and the RPD approach has been refined. The purpose of this study is to determine if the required learning curve to optimize proficiency of RPD is reduced for surgeons who received formal RPD training.

Methods: The first twenty consecutive patients undergoing RPD at a single tertiary referral institution from October 2018 to July 2019 were analyzed. The only exclusion criteria for attempting a robotic approach was anticipated need for vein resection. Two surgical oncologists with formal training in RPD performed these cases with one serving as the bedside assistant and one at the console. Patient demographics, pathologic characteristics, and 90-day post-operative outcomes were collected. Outcomes were compared to optimal RPD benchmarks from a previously reported learning curve analysis (1). Data is reported as mean ± standard deviation or median (range).

Results: Mean age was 62 ± 15.8 years, and 65% of patients were female. Mean BMI was 27.7 ± 5.6. Median Charlson Comorbidity Index (CCI) was 3 (range 0-6) with diabetes in 30%, COPD and CAD with MI in 25%, current smoking in 20%, former smoking in 45%, and prior abdominal surgery in 70% of patients. Eight RPDs were performed for pancreatic adenocarcinoma with mean tumor size of 2.6 ± 1.4 cm. One patient underwent conversion related to involvement of the portal vein requiring resection and end-to-end reconstruction. Mean operative time was 375 ± 59 minutes, and median estimated blood loss was 300 ml (range 50-1000 ml). Median length of stay was 7 days (range 5-22), and a median of 23 lymph nodes were harvested (range 7-38). Morbidity occurred in 40% of patients with pancreatic fistula (ISGPF grade B/C) noted in 2 patients (10%). Readmission occurred in 5 patients (25%). Operative time, the best measure of proficiency, was stable during the course of our experience with no significant trends.

Conclusion: Following formal training in RPD, operating time, length of stay, and complication rates for RPD were similar to reported optimized outcomes after reaching an established learning curve (Table 1). These results suggest that formal robotic training facilitates safe and efficient adoption of RPD for new programs, reducing the learning curve. Further study of RPD outcomes from surgeons with formal training is required to validate these single institution findings.

Reference:
<table>
<thead>
<tr>
<th></th>
<th>Reported Optimized RPD Outcomes¹ (n=120)</th>
<th>Initial RPD w/ Formal Training (n=20)</th>
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</thead>
<tbody>
<tr>
<td>Operative time, mean (SD), min</td>
<td>417 (78)</td>
<td>375 (59)</td>
</tr>
<tr>
<td>Estimated blood loss, median (IQR), ml</td>
<td>250 (150-400)</td>
<td>300 (50-1000)</td>
</tr>
<tr>
<td>Rate No. (%)</td>
<td></td>
<td></td>
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<tr>
<td>Conversion</td>
<td>3.3</td>
<td>5</td>
</tr>
<tr>
<td>Transfusion</td>
<td>21.7</td>
<td>5</td>
</tr>
<tr>
<td>Pancreatic Fistula (ISGPF grade B/C)</td>
<td>6.9</td>
<td>10</td>
</tr>
<tr>
<td>Readmission</td>
<td>29.2</td>
<td>25</td>
</tr>
<tr>
<td>Mortality</td>
<td>3.3</td>
<td>0</td>
</tr>
<tr>
<td>R0 resection</td>
<td>91.4</td>
<td>90</td>
</tr>
<tr>
<td>Clavien-Dindo classification rate (%)</td>
<td></td>
<td></td>
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<tr>
<td>&lt;3</td>
<td>43.2</td>
<td>15</td>
</tr>
<tr>
<td>≥3</td>
<td>23.3</td>
<td>25</td>
</tr>
<tr>
<td>Length of stay, median (IQR)</td>
<td>9 (7-14)</td>
<td>7 (5-22)</td>
</tr>
<tr>
<td>Lymph node harvest, median (IQR)</td>
<td>26 (19-32)</td>
<td>23 (7-38)</td>
</tr>
</tbody>
</table>

**P 73. LAPAROSCOPIC CENTRAL PANCREATECTOMY: RESULTS IN 81 PATIENTS**

**Presenter:** Safi Dokmak | Beaujon Hospital

**Background:** Low potential malignant diseases are more frequently discovered and when surgery is indicated, parenchymal sparing resection is recommended to avoid long term endocrine and exocrine insufficiency. For centrally located lesions, central pancreatectomy (CP) can be indicated; however this one is not frequently performed related to higher morbidity compared to distal pancreatectomy. When CP is indicated, the laparoscopic approach is a good indication as the technical applicability rate is very high related to the absence of oncological or vascular contraindication. The aim of this study was to analyze our monocentric experience.

**Methods:** Between 2008-2018, 540 laparoscopic pancreatic resections were performed in our department and 81 patients underwent laparoscopic CP. CP was indicated if enucleation was not feasible, in non-diabetic patients and if the distal pancreas was >5 cm. The laparoscopic approach compared to the open approach was applied according to the surgeon experience and was nearly 100% with laparoscopic surgeons. The pancreas was divided on the neck by stapler when possible, the distal pancreas was mobilized and sectioned 1 cm to the left of the tumor with frozen section when indicated. One layer Pancreateo-gastric anastomosis was fashioned and the nasogastric tube was left for 5 days with parenteral nutrition. All patients with pancreatic fistula were managed in the hospital until complete healing. All clinical, operative and postoperative data were recorded prospectively and were analyzed.

**Results:** The mean age was 50 (17-77), including 55 female (68%), with a mean BMI at 25 (16-36) and 17 (21%) were obese. Indications for resection were for neuroendocrine tumor (24; 30%), IPMN (16; 20%), solid pseudopapillary tumor (12; 15%), mucinous cystadenoma (11; 14%), pancreatitis with disconnected duct syndrome (5; 6%), adenocarcinoma (3; 4%) and other (10; 11%). In patients with adenocarcinoma, the diagnosis was made postoperatively and completion distal pancreatectomy was done few weeks later. The mean operative time was 183 (90-285), the mean blood loss 107 (0-800), one transfusion (1%), and one conversion (1%) in the early experience. The pancreas was hard in 37 patients (46%). No 90 days mortality and the overall morbidity was observed in 58 patients (72%) including grade B/C pancreatic fistula (21; 26%), bleeding (10; 12%) which was severe in 5 (6%), drained collection (2; 3%), delayed gastric emptying (2; 3%), re-intervention (5; 6%), and pulmonary complications (3; 4%). The mean hospital stay was 22 days (5-54) with readmission in 2 (2%). The mean number of harvested lymph nodes was 3 (0-19) including 18 (22%) patients with zero harvested lymph nodes. Lymph nodes were only invaded in patients who turned to have adenocarcinoma. Resection was R0 in 71 (88%) patients.

**Conclusion:** The applicability of laparoscopic central pancreatectomy is high and the morbidity is acceptable. There is a real advantage on the preservation of the pancreatic function and abdominal wall in these young patients with no malignancy.
P 74. PREOPERATIVE SKELETAL MUSCLE INDEX PREDICTS POSTOPERATIVE SUPPLEMENTAL NUTRITION NEEDS IN PATIENTS UNDERGOING PANCREATODUODENECTOMY
A DeAtkine, EW Box, DE Morgan, M Heslin, T Wang, S Vickers, S Reddy, JB Rose
Presenter: Andrew DeAtkine | University of Alabama - Birmingham

Background: Significant loss of skeletal muscle mass, or sarcopenia, is a common sequela of pancreatic cancer. Sarcopenic patients often exhibit decreased overall survival and major postoperative complications following pancreatoduodenectomy (PD). Few studies have investigated postoperative nutritional requirements for sarcopenic patients compared to non-sarcopenic patients following PD. We hypothesized that preoperative skeletal muscle index (SMI) may predict postoperative supplemental nutrition needs in patients undergoing PD.

Methods: A retrospective review of all patients with preoperative CT imaging within 3 weeks of an elective PD from 2013 to March 2019 were identified by billing codes. The skeletal muscle area was measured at the third lumbar vertebra (L3) on CT imaging and indexed to patient height to calculate SMI. Sarcopenia was based on gender-specific cutoffs of SMI (≤52.4 cm²/m² in men and ≤38.5 cm²/m² in women).

Results: We identified 159 patients in the study period undergoing PD with appropriate imaging for analysis. Median SMI of males (n=71) was 49.6 cm²/m² and females (n=88) was 37.2 cm²/m². The median SMI of female patients who required tube feeds at discharge (dTF) compared to females who did not was lower (32.0 [IQR 28.4-36.8] vs. 38.2 [IQR 34.7-45.7] cm²/m²; p = 0.019). The median SMI of male patients who required dTF compared to patients who did not was also lower (42.9 [IQR 38.5-50.0] vs. 51.0 [IQR 45.3-56.4] cm²/m²; p = 0.023). Receiver operating characteristic (ROC) curve analysis suggested SMI may be used to predict dTF for both females (AUC = 0.748) and males (AUC = 0.702). Youden’s index analysis of these curves suggested a SMI cut-off of ≤32.5 cm²/m² for females and ≤42.9 cm²/m² for males as prognostic of dTF. Standard cutoffs for sarcopenia did not show a significant association with dTF by univariate logistic regression; however, the above proposed SMI cutoffs did correlate with dTF for both female (OR: 6.76, 95%CI 1.08-42.88) and male (OR: 4.54, 95%CI 1.01-20.45) patient populations.

Conclusion: A significant association exists between very low SMI and postoperative enteral nutrition requirements, suggesting that the patients with severe sarcopenia undergoing PD may benefit from the placement of a feeding tube at the time of resection.
Background: Central pancreatectomy (CP) and subtotal pancreatectomy (SP) are two optional surgical treatments employed for low grade or benign pathology focally located in the neck of the pancreas. CP requires isolated resection of the neck with reconstruction to the left sided remnant pancreas. By contrast, SP involves the resection of the tail and body of the pancreas, leaving only the head. As CP leaves more of the parenchyma intact compared to SP, it can be associated with less endocrine and exocrine insufficiency, namely the prevalence of post-operative onset of insulin dependent diabetes and steatorrhea. However, CP more commonly incurs anastomic leakage. Our hypothesis was that CP was associated with improved long term outcomes compared to SP. Therefore, we performed a retrospective matched comparison of the short and long term outcomes of CP versus SP.

Methods: A retrospective review was performed of all patients undergoing pancreatectomy from October 2010 to April 2019 at the department of General Surgery. 809 patients underwent pancreatectomy and of these, 10 patients (1.2%) underwent CP. These patients were matched by age, sex, BMI, date of surgery, and underlying pathology to 10 patients undergoing SP. Patient demographics, operative variables, short term postoperative outcomes, and long-term endocrine and exocrine insufficiency outcomes were assessed. Short term postoperative complications were defined as occurrence within 90 days of surgery including Postoperative Pancreatic Fistula (POPF), Postoperative Pancreatic Hemorrhage (PPH), delayed gastric emptying, and morbidity assessed through the Clavien scale. Short term postoperative complications were graded according to standard international consensus definitions. Long-term insufficiency was occurrence greater than six months post-operation. Endocrine insufficiency was assessed through diabetic status pre-op and post-op. Exocrine insufficiency was assessed through use of Pancreas Enzyme Replacement Therapy (PERT) and incidence of steatorrhea.

Results: There was no significant difference in mean age (CP=54.1, SP=57.1, p=0.5127), BMI (CP=32.5, SP=27.3, p= 0.686), estimated blood loss (CP=52 mL, SP=138 mL, p= 0.1409) nor in average length of stay (CP=8 days, SP=4.4 days, p = 0.1397). There was a significant difference in current BMI (SP=26.89, CP=33.27, p= 0.0418) and operative time (CP=312 min, SP=206, p= 0.0170). CP patients had a significantly higher rate of POPF (CP=80%, SP=0%, p= 0.007) and major morbidity (CP=50%, SP=0%, p= 0.0325). No advantage was observed with either operations concerning long-term outcomes. There was no significant difference between incidence of new onset diabetes (CP=20%, SP=40%, p= 0.6285), incidence of steatorrhea (CP=10%, SP=0%, p= 1.000), nor use of PERT enzymes (CP=0%, SP=20%, p= 0.4737). It must be noted that one CP patient was previously a diet-controlled diabetic but became a non-diabetic post-operation. Long-term outcomes are summarized in the table below.

Conclusion: Consideration for CP can be given to those patients who are young, obese, and have a higher risk of developing DM in the long term. Due to its significant high morbidity and incidence of complication, it is best served by younger, fitter patients. Older patients who may not be able to tolerate the increased short-term morbidity may best be served by SP.
<table>
<thead>
<tr>
<th></th>
<th>Pre-op</th>
<th>Post-op long term</th>
<th>P-value</th>
</tr>
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<tr>
<td></td>
<td>Central (n=10)</td>
<td>Subtotal (n=10)</td>
<td>P-value</td>
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<tr>
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<tr>
<td>Endocrine Insufficiency</td>
<td>DM</td>
<td>3 (30%)</td>
<td>1 (10%)</td>
</tr>
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<td>Pre-DM*</td>
<td>2 (20%)</td>
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<td></td>
<td>DM with Oral Med</td>
<td>0</td>
<td>1 (10%)</td>
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<td></td>
<td>Insulin Dependent DM</td>
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<tr>
<td>Exocrine Insufficiency</td>
<td>Steatorrhea</td>
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<td>0</td>
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<tr>
<td></td>
<td>Use of PERT*</td>
<td>0</td>
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P 76. OPEN PANCREATIC DEBRIDEMENT IN NECROTIZING PANCREATITIS: CONTEMPORARY APPROACH (VIDEO)

TK Maatman, NJ Zyromski
Presenter: Thomas Maatman MD | Indiana University

Background: In recent years, the management of necrotizing pancreatitis (NP) patients requiring intervention has seen a significant paradigm shift favoring minimally invasive approaches as initial therapy. Open pancreatic debridement (OPD) is now considered the final step in the modern treatment algorithm of NP. While minimally invasive approaches offer definitive treatment in select NP patients, a significant proportion of patients that will require OPD remain. This video outlines the critical steps of open pancreatic debridement for necrotizing pancreatitis.

Methods: A case review and intraoperative video outlining the contemporary approach to OPD in a patient with NP treated in 2019.

Results: A 69-year-old female developed acute biliary NP involving greater than 50% of the gland. She was initially managed medically and discharged home with nasojejunal tube feeds after a two-week hospital stay. During the ensuing 12-week follow-up, the patient experienced symptomatic necrosis and significant weight loss (~130 pounds). Endoscopic ultrasound was performed; however, the necrosis was 95% solid and deemed unamenable to endoscopic transgastric stenting and debridement. The patient underwent OPD, distal pancreatectomy, cholecystectomy, and placement gastrojejunostomy feeding tube 14-weeks after NP onset. Her postoperative course was uncomplicated, and she was discharged home on postoperative day seven tolerating tube feeds. At one-month follow-up, the patient was asymptomatic, tolerating oral diet and supplemental tube feeds, and demonstrated significant improvement in nutritional parameters.

Conclusion: Open pancreatic debridement remains an important tool for surgeons in the contemporary treatment of necrotizing pancreatitis.
Background: Pancreatic cancer is a highly aggressive malignancy, which carries a poor prognosis even after surgical treatment of early disease. Patients commonly recur with distant metastases, but a minority of patients develop a lesion in the remnant pancreas. Cases of new lesions in the remnant pancreas are not always due to recurrence of the initial primary cancer but may be due to a new primary malignancy. We present the case of a new primary pancreatic malignancy in the remnant pancreas, managed by a robot-assisted distal pancreatectomy in a patient who previously underwent an open Whipple procedure for pancreatic ductal adenocarcinoma.

Methods: The patient is a 75-year-old male diagnosed with pancreatic cancer and underwent an open Whipple procedure for ductal adenocarcinoma. Pathology revealed a margin negative 1.9cm moderately differentiated ductal adenocarcinoma with 0/29 lymph nodes being positive for malignancy. Findings resulted in a final pathologic staging of T2N0. The patient had an uneventful postoperative course and began an adjuvant chemotherapy regimen with FOLFIRINOX. 4-month postoperative imaging showed a hypo-attenuating lesion in the pancreatic tail, concerning for a recurrence. Fine needle aspiration (FNA) was suggestive of undifferentiated carcinoma. Follow-up imaging at 6-months showed that the lesion did not progress, and the patient underwent a robot-assisted distal pancreatectomy and splenectomy.

Results: The procedure was completed without complications in 253 minutes. There was no evidence of metastatic disease, and negative margins at the transected pancreas were obtained on frozen section. Histopathologic analysis revealed a diagnosis of sarcomatoid carcinoma of the pancreas, negative microscopic margins and 0/10 lymph nodes positive for malignancy. This was consistent with a T2N0. Immunohistochemistry staining revealed positivity for keratin and vimentin. The patient had an uneventful postoperative course and was discharged on POD 4. On 1-month follow up, the patient presented with no complaints and reported no insulin use.

Conclusion: Pancreatic remnant tumors are commonly a recurrence of the original primary, but new primary malignancies have been reported. This case describes a Spindle Cell Carcinoma of the pancreas (SCP) which is extremely rare and developed during surveillance following resected pancreatic adenocarcinoma. The literature surrounding SCP is limited, but surgery is recommended when the tumor appears resectable and the patient has a good preoperative functional status. Due to improved visualization and precision in dissection, robotic-assisted pancreatectomy is feasible and can be safely and effectively performed for lesions in the remnant pancreas in patients with prior pancreatic resection.
**Background:** Peri-operative infections are a major source of morbidity in patients undergoing pancreatic head resection and recent data suggests bactobilia is a leading cause. Studies have shown correlation between organisms identified with intraoperative bile duct cultures (BDC) and surgical site infections and BDC is one of the techniques currently utilized to help guide postoperative antimicrobial prophylaxis. Traditionally, BDC’s are obtained using swab cultures (BDS) only allowing for aerobic organism speciation and sensitivities. BDC’s using fluid aspirates (BDA) may improve culture yields. The aim of this study is to evaluate differences in microbiology culture yields and sensitivities between these two techniques (BDS vs. BDA) in prospectively collected intraoperative samples.

**Methods:** Patients undergoing pancreatic head resection by a single surgeon over a 14-month period were identified. We included only those patients who had both BDS and BDA cultures obtained intraoperatively. BDS and BDA culture results were reviewed for total number of organisms, types of organisms, and organism resistance to various antimicrobials. Any growth of bacteria or fungal organisms was considered a positive culture. Quantitatively, BDA yield was compared to BDS based on number of organisms. Matched student-t and McNemar tests were used to determine statistical significance.

**Results:** Fifty patients were identified and included in the study. Median age was 60 (IQR 55-70). Operation types included total pancreatectomy (n=19) and pancreaticoduodenectomy (n=31). Mean number of organisms identified on BDA culture was 4 and mean number on BDS culture was 2 (p-value < 0.001). Thirty-eight patients had positive BDA cultures compared to thirty-four in BDS cultures (p-value < 0.05). Anaerobic cultures from BDA were positive in 11 patients, 5 of which grew resistant organisms. Fungal organisms were identified more often in BDA (n=19) than in BDS (n=4) (p-value < 0.001). BDA identified numerous resistant organisms in 11 patients that were not detected in concurrent BDS cultures, two of which were vancomycin-resistant enterococcus. BDS identified resistant organisms in 5 patients that were not detected on BDA.

**Conclusion:** BDA has a significantly higher organism yield, is more likely to identify fungal organisms, and captures organisms that would otherwise not be identified with BDS. Routine use of BDA for intraoperative bile duct cultures may improve tailoring of antibiotics and reduce infectious complications in patients undergoing pancreatic head resection.
Background: The extent of liver resection in non-cirrhotic patients, excluding other underlying liver disease, is a future liver remnant to total liver volume ratio (FLR/TLV) > 20%. Larger resections are associated with small-for-size liver syndrome and portal hypertension. This is the first description of non-cirrhotic post-hepatectomy portal hypertension despite adequate FLR/TLV.

Methods: From 2011 to 2017, within this tertiary care university hospital, patients with non-cirrhotic post-hepatectomy portal hypertension despite adequate FLR/TLV were identified. Patient demographics and clinical courses were compared.

Results: Out of the 137 major hepatectomies performed during this study period, 3 patients with non-cirrhotic post-hepatectomy portal hypertension were identified. Diagnosis, demographics, FLR/TLV, and time to portal hypertension are described in Table 1. None of the patients had evidence of fibrosis on pathologic examination. Postoperatively, patients 1 and 2 did well, while patient 3 was treated for spontaneous bacterial peritonitis. All patients developed initial signs of portal hypertension within 1 year (Table 1) with significant associated prolonged morbidity. Patient 1 requires regular esophagogastroduodenoscopy (EGD) with esophageal varices banding (EVB). Patient 2 has recurrent upper gastrointestinal bleeding requiring EGDs with EVB and frequent hospital admission. Patient 3 was anticoagulated for a partial portal vein thrombosis, required medical management of his ascites, and underwent multiple EGDs with EVB before eventually expiring.

Conclusion: This is the first description of non-cirrhotic post-hepatectomy portal hypertension despite an adequate FLR/TLV. This is poorly described in current literature despite significant and prolonged associated morbidity and mortality. Future studies are needed to understand the etiology and incidence of this phenomenon in order to enhance preoperative patient counseling and potentially surgical planning.
Table 1: Patient demographics, treatment, FLR/TLV ratios, time to portal hypertension

<table>
<thead>
<tr>
<th>Patient</th>
<th>Diagnosis</th>
<th>Systemic Therapy</th>
<th>Procedure and Date (mm/yy)</th>
<th>FLR/TLV</th>
<th>Time to portal hypertension</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Stage IV colon cancer</td>
<td>NEO FOLFOX Cetuximab 2 cycles</td>
<td>10/14: Open segment IVb resection, segment VII-VIII wedge resection, cholecystectomy, right hemicolecotomy 1/16: Completion right hepatectomy for recurrent disease</td>
<td>39%*</td>
<td>Thrombocytopenia 12 months Varices 25 months**</td>
</tr>
<tr>
<td>#2</td>
<td>Stage IV colon cancer</td>
<td>ADJ FOLFOX 4 cycles (1st treatment 11/14)</td>
<td>10/14: Open segment II wedge resection, cholecystectomy 11/14: Right portal vein embolization 12/14: Open segments IVb, V - VIII resection 2/15: Low anterior resection</td>
<td>32%*</td>
<td>Varices 5 months</td>
</tr>
<tr>
<td>#3</td>
<td>Cholangio carcinoma</td>
<td>ADJ XELOX/XELODA 2 cycles (1st treatment 3/15)</td>
<td>3/11: Open segments V-VIII resection and roux-en-y hepaticojejunostomy</td>
<td>26%</td>
<td>Ascites postoperatively Varices 12 months</td>
</tr>
</tbody>
</table>

FOLFOX (leucovorin, 5-FU, and oxaliplatin); XELOX (capecitabine and oxaliplatin); XELODA (capecitabine); NEO (neoadjuvant chemotherapy); ADJ (adjuvant chemotherapy); yo (years old)
*FLR/TLV Ratio calculated relative to second liver resection, remaining ratios calculated for index surgery
**Time to symptoms relative to 2nd surgery, otherwise time to symptoms relative to index surgery
Background: Since the development of the robotic platform, the number of robotic-assisted surgeries has significantly increased. Robotic surgery has gained growing acceptance in recent years, expanding to liver resection. We report a robotic left hepatectomy using intrahepatic Glissonian approach. To our knowledge there is no description of this technique using the robotic platform.

Methods: A 59-year-old man with colorectal liver metastasis is referred for treatment. In 2017, he underwent laparoscopic anterior resection followed by neoadjuvant chemotherapy. After objective response, 3 metastases were resected by laparoscopy. One year later, a single recurrence between segment 6 and segment 7 is detected and treated with robotic resection. During follow-up a new 5 cm metastasis is found in segment 4. Preoperative imaging showed involvement of the middle hepatic vein. The left glissonian pedicle is also compromised. Multidisciplinary team decided for a left hepatectomy. Robotic approach was proposed, and consent was obtained from the patient. Future liver remnant volumetry was 58%. Xi Da Vinci system was used. Abdominal cavity inspection showed adhesions on the liver area. Liver is firmly attached to the diaphragm. Intraoperative ultrasound is performed to check for new lesions and assure surgical margins. Operation begins with division of adhesions, using robotic scissors. Cholecystectomy is performed. Two incisions are needed for the intrahepatic Glissonian approach. The first one is performed at the basis of segment 4b and the second is performed above the Arantius ligament, to preserve the pedicle from caudate lobe. The pedicle is encircled with robotic forceps. Temporary clamping of the left pedicle is performed resulting in ischemic delineation of the left liver. Fluorescence imaging after infusion of indocyanine green confirms the limits between right and left liver and preservation of the perfusion of the caudate lobe. The left Glissonian pedicle is divided with stapler. After division of the Arantius ligament, the trunk of middle and left hepatic veins is identified and divided with stapler. Liver is then divided with bipolar forceps and robotic scissors, under saline irrigation until completion of left hepatectomy. Pringle maneuver was not necessary.

Results: The total operation time was 272 minutes. The docking time was 8 minutes, robotic left hepatectomy time was 280 minutes. Robotic intrahepatic access to the left pedicle took 6 minutes. The postoperative period was uneventful, and patient was discharged on the 4th postoperative day. The final pathological report revealed colorectal metastasis with free surgical margins.

Conclusion: Robotic intrahepatic Glissonian approach is feasible and is a useful technique for rapid and safe control of the left liver pedicle, facilitating robotic left hemihepatectomy. The special strategy described may help HPB surgeons to safely perform this challenging procedure.
P81. GLISSONIAN PEDICLE APPROACH IN ROBOTIC ASSISTED LAPAROSCOPIC LEFT HEPATECTOMY

T Uemura, L Machado, K Tabar, R Tindall, N Thai

Presenter: Tadahiro Uemura MD, PhD | Allegheny Health Network

**Background:** Major liver lobectomy is challenging in minimal invasive manner. Glissonian pedicle approach (GPA) has benefit that any variation of vascular and bile duct elements does not need to be considered. GPA is simpler and faster than individual dissection of hepatoduodenal ligament.

**Methods:** In this video, we demonstrate robot left hepatectomy with GPA to a 75 year-old male with metachronous metastatic colorectal carcinoma. GPA was applied to control vascular inflow. Dissections was performed at bifurcation on the right glissonian and left glissonian pedicles. Dissection direction to the left side was above hepatogastric ligament. The tunnel was created including all left glissonian sheath and a vessel loop was taped. Left glissonian pedicle was encircled and divided en-bloc with endoscopic GIA stapler after confirmation of demarcation line. Hepatic parenchymal dissection was performed via anterior approach. No Pringle method was used. The left hepatic duct with hilar plate was divided with an endoscopic GIA stapler. The left hepatic vein was also divided using an endoscopic GIA stapler.

**Results:** The operative time was 260 min. He had no postoperative complication and discharged on postoperative day 7.

**Conclusion:** GPA can be useful for robotic major hepatectomy.
P 83. PURE LAPAROSCOPIC RIGHT HEPATECTOMY FOR MULTIPLE AND COMPLICATED HEPATOCELLULAR ADENOMAS

P Barros Schelotto, D Ramisch, F Pattin, S Almanzo, S Niveiro, P Farinelli, G Gondolesi

Presenter: Pablo Barros | Favaloro Foundation

**Background:** Hepatocellular adenoma (HCA) is a benign liver tumor with the potential risk for bleeding or developing malignancy. If acute hemorrhage occurs, a non-operative or endovascular management is preferred because an urgent surgical approach might have a higher mortality rate.

**Methods:** The video presentation shows the case of a 21 year-old female, who presented an acute abdominal bleeding for two complicated HCAs, in December 2018. On admission an angio-CT showed lesions on segment 5/8 (11 cm) and segment 7 (9 cm), with intra-tumoral hemorrhage. She was initially treated by performing a trans-arterial embolization, to be referred to our institution for definitive treatment thereafter. Three months later, a follow-up angio-CT showed a significant size reduction for both HCAs, with an adequate left lobe liver volume to perform a safe laparoscopic right hepatectomy.

**Results:** The procedure was performed by positioning the patient on her left side. A laparoscopic mobilization of the right ligaments, was followed by a cholecystectomy and hilar dissection. The right hepatic artery was dissected, clipped with Haemolok and sectioned, and then the right portal vein was transected with an endovascular stapler. The parenchymal transection was performed using the Harmonic and CUSA, and Pringle maneuver. Small branches of suprahepatic veins and right biliary duct were clipped with Haemoloks and transected. Right hepatic vein was dissected at the end of liver parenchymal transection and sectioned with endovascular stapler. Operative time was 370 minutes. No transfusion was needed. There were no postoperative complications, being discharged on day 3. Final pathologic report confirmed the diagnosis of complicated HCAs.

**Conclusion:** Pure laparoscopic liver resection can be currently proposed as surgical approach for complicated HCA in experienced centers.
P 84. INITIAL EXPERIENCE OF PURELY LAPAROSCOPIC DONOR HEPATECTOMY FOR ADULT LIVING DONOR LIVER TRANSPLANTATION

CHD Kwon, K Sasaki, K Hashimoto, C Quintini, F Aucejo, T Diago, M Fujiki, TS Kim, B Eghtasad, C Miller

Presenter: CH David Kwon MD, PhD | Cleveland Clinic Foundation

Background: With the development of surgical techniques and accumulation of experience, increasing number of institutions are performing laparoscopic hepatectomy for living donors. However, very few institutions in America have a purely laparoscopic donor program for adult recipients.

Methods: We herein present our initial experience of purely laparoscopic approach for living donors for adult liver transplant recipients. All patients were approved by the donor advocate committee of the procedure and they were informed that laparotomy will be considered in any situation that may jeopardize the donor’s safety during the procedure, and that purely laparoscopic approach for liver donors was still in its developmental stage.

Results: Total of 4 cases using a left liver including the middle hepatic vein and the caudate lobe was done since the first case on August 19, 2019. Two were altruistic donors, one was the husband and one was the patient’s mother. The range of age of donors was 29-46 years and BMI was 23.5-31.7kg/m2. Four 12mm trocar ports and one 5mm port was used. All cases were performed using 3D flexible scope and indocyanine green cholangiogram, and the liver transection was done using combination of ultrasonic shear, cavitron ultrasonic surgical aspirator, monopolar and bipolar electrocautery. Double clips were used for the hepatic artery and bile duct and staplers were used for portal and hepatic veins. The weight of the liver was 491-669g which was retrieved from the abdomen through a 8-10cm suprapubic transverse incision. Operative time was 382-405minutes and estimated blood loss was 50-200mL. No one received any transfusion, nor any had complication. All patients started diet on postoperative day 1 and was discharged on postoperative hospital day 4-5. All recipients recovered with functioning graft without any mortality or graft failure. There was one patient with grade 3 complication manifested as postoperative bile leak.

Conclusion: Purely laparoscopic liver donor hepatectomy using left liver with middle hepatic vein and caudate lobe for adult liver recipients seems to be a relatively safe procedure in experienced hands.
P 85. CAN INTRAOPERATIVE FLUID CAUSE COMPLICATIONS AFTER PANCREATIC SURGERY OR IS IT AN EFFECT OF COMPLICATIONS THEMSELVES?

K Pineda-Solis, PR Burchard, A Loria, L Schoeniger, E Galka, R Hernandez-Alejandro, DC Linehan, PA Prieto

Presenter: Karen Pineda-Solis MD | University of Rochester

Background: Pancreatoduodenectomy (PD) is a complex operation where morbidity remains between 30-50%, even in highly specialized centers. Certain perioperative parameters, including intraoperative blood transfusion have been linked to an increased mortality. However, links to more ubiquitous metrics including perioperative over resuscitation are less clear. Recent studies have suggested that an overload of peri-operative fluids (pIVF) is associated with worse outcomes after major pancreatic surgery, however evidence is discordant.

Methods: We retrospectively reviewed all patients undergoing PD at our institution between January 2017-December 2018. Perioperative and clinicopathologic data were recorded longitudinally through postoperative day (POD) 3 including rate and total pIVF per patient. Postoperative complications were recorded and stratified by Clavien-Dindo (C-D) classification. Serial and cumulative pIVF administration was then compared with incidence of post-operative adverse events and 30-day mortality.

Results: 96 patients underwent PD. Mean age was 67 years with 37 patients (39%) being female. Overall morbidity for the cohort was 48%. The most common morbidity class was C-D 2 (53%). Higher intraoperative fluid (iIVF) administration was correlated with incidence of all complications (6650ml vs 5,300ml, p=0.04). Complications were also significantly higher in those receiving additional fluid in the postoperative period, namely POD 2 (1843ml vs 2164ml; p=0.008) and POD 3 (276ml vs 900ml; p=0.003), respectively. There was no relationship between severity of complication and intraoperative IVF amount. However, postoperative IVF was correlated with incidence of severe complications at POD 1 (2408 ml vs 3281ml; p=0.02), POD 2 (2011ml vs 4592 ml; p=0.002) and POD 3 (779ml vs 2509ml; p=0.01). Similarly, mortality was not affected by intraoperative IVF volume but did show significance longitudinally in the postoperative period [POD 1 (2386ml vs 7484ml; p=0.005), POD 2 (1989 vs 5333; p=0.001), and POD 3 (501 vs 3071ml; p=0.02)]. Multivariable analysis showed that over resuscitation on POD 2 was an independent risk factor of both morbidity and mortality.

Conclusion: PD remains a challenging surgical procedure with variable, but clinically significant postoperative morbidity. Despite the improvement in perioperative outcomes with pancreatoduodenectomy, it is still associated with longer operative times than other oncologic resections, resulting in high insensible and third space losses in the postoperative period. The association of perioperative fluid overload appears most clinically significant during the postoperative period, especially at 48-72 hrs. Special attention and judicious IVF administration during this critical window could potentially abate severe complications and/or mortality. Adherence to strict peri-operative fluid pathways for these challenging and complex patients could help reduce complications and in turn hospital stay and ultimately outcome.
**P 86. MACHINE LEARNING AND REMOTE TELEMONITORING OF PREOPERATIVE ACTIVITY AMONG PANCREATECTOMY PATIENTS PREDICTS SURGICAL OUTCOMES**  
*J Chininis, GA Williams, D Li, R Dai, C Lu, CW Hammill*  
**Presenter:** Chet Hammill MD, MCR | Washington University, St. Louis

**Background:** Pancreatectomy is a specifically morbid and complex operation with post-operative complications ranging from 40-60%. Innumerable pharmacological and surgical interventions have been implemented to reduce the rate of complications; however, none of them have had a significant impact. Novel innovative approaches are urgently needed to address this stagnate rate of morbidity associated with pancreatectomies. To improve these outcomes we have implemented a clinical trial leveraging bioengineering and machine learning technologies via off-the-shelf remote telemonitoring devices to predict poor surgical outcomes. Herein we report our preliminary results of preoperative metrics ability to predict postoperative complications.

**Methods:** From March 2019 to August 2019 patients undergoing pancreatectomy were provided a remote telemonitoring device to be worn for 2 weeks before surgery, during their hospital stay, and 30 days post-discharge. Following our ERAS protocol all patients were educated on the importance of prehabilitation. Postoperative complications were prospectively collected using the Modified Accordion Grading System (MAGS). Remote telemonitoring devices collected 32 activity metric features (i.e. step, heart rate, etc.) that were applied to machine learning models and traditional statistical analyses to predict complications.

**Results:** 21 patients underwent pancreatectomy (18 Pancreaticoduodenectomy, 3 Distal Pancreatectomy) during the study period. The median age of participants was 61 (IQR 57–71) years with a majority being female (71%). Patients wore the remote telemonitoring device for a median of 17 (IQR 14–17) days before surgery, walked a median of 2.5 (IQR 2–3) miles per day, and were active a median of 36 (IQR 16–48) minutes per day. The median post-operative length of stay was 6 (IQR 4–11) days with 4 (19%) of the patients being readmitted. Post-operative morbidity included 13 (62%) patients experiencing a complication with 3 (14%) being severe (MAGS ≥3). Four types of machine learning and traditional statistical analyses were performed on the data set (see Table 1.) Support Vector Machine Learning algorithms outperformed all other analyses showing high accuracy (75%) and specificity (86%) in this preliminary training data to predict the onset of a surgical complication.

**Conclusion:** This preliminary analysis demonstrates that remote patient activity metrics can be effectively tracked. Using machine learning analysis we have efficaciously demonstrated the ability of this novel technology to predict surgical outcomes. Future refinement of our machine learning models can provide healthcare teams evidence based decisions to (1) determine preoperatively which patients are fit for surgery and (2) identify complications early in their course alerting healthcare providers to intervene.
<table>
<thead>
<tr>
<th>Model</th>
<th>Specificity</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support Vector Machine Learning</td>
<td>86%</td>
<td>75%</td>
</tr>
<tr>
<td>Random Forest</td>
<td>79%</td>
<td>55%</td>
</tr>
<tr>
<td>Logistical Regression</td>
<td>79%</td>
<td>55%</td>
</tr>
<tr>
<td>K-Nearest Neighbor</td>
<td>71%</td>
<td>60%</td>
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</tbody>
</table>
P 87. VASCULAR RESECTION IN MINIMALLY INVASIVE VS OPEN PANCREATICODUODENECTOMY
RZ Panni, C Hammill, RC Fields, WG Hawkins, DE Sanford
Presenter: Roheena Panni MD, MPHS | Washington University, St. Louis

Background: Pancreaticoduodenectomy is associated with high morbidity and the complexity of the procedure increases with vascular resection. Vascular resection during pancreaticoduodenectomy is associated with increased operative time, perioperative transfusion, DVT, septic shock, and length of stay, but the overall mortality is similar. With the advancement in minimally invasive surgical techniques, laparoscopic and robotic pancreatic surgery is becoming more common. A growing body of evidence exists demonstrating the equivalence or benefit of minimally invasive pancreaticoduodenectomy (MIPD) when compared to open pancreaticoduodenectomy (OPD) regarding the short term outcomes and safety. The purpose of this study is to determine the postoperative outcomes of patients undergoing vascular resection with OPD or MIPD approach using a large, multicenter cohort.

Methods: All patients undergoing elective pancreaticoduodenectomy, including OPD and MIPD (robotic and laparoscopic, including open-assisted and unplanned open conversion), with vascular resection in the ACS NSQIP database were included in the study. Patients were stratified into those who underwent OPD vascular resection and those who underwent MIPD vascular resection. Patient covariates and outcomes were compared using standard statistical methods.

Results: 2233 patients underwent OPD with vascular resection (17.8%) and 149 patients underwent MIPD with vascular resection (13.8%). The frequency of artery, vein, and combined artery and vein resection was (10.3%, 69.9%, and 19.6%) in OPD and (16.1%, 62.4%, and 21.47%) in MIPD, respectively. Patients undergoing MIPD vascular resection were more likely to have BMI < 25 (34.2% vs 42.5%, p-value 0.0143). The mean OR time was significantly longer in patients undergoing MIPD and vascular resection compared to OPD and vascular resection (485.4 ± 13.30 vs. 427 ± 152.90, p-value < 0.0001). We next compared postoperative complications and found that patients undergoing OPD vascular resection were more likely to have postoperative sepsis compared to MIPD vascular resection (10.17% vs. 4.70%, p-value= 0.0299). There was a trend towards a decrease in superficial surgical site infection, organ space infection and length of stay and an increase in 30-day readmission in the MIPD vascular resection group; however, these differences were not statistically significant. On multivariate analysis, postoperative sepsis was independently associated with OPD (p-value= 0.0446).

Conclusion: MIPD with vascular resection is safe and feasible. Future studies are needed to determine the effect of MIPD with vascular resection on long term outcomes and survival.
Vascular resection in OPD vs MIPD

OPD

MIPD

- Artery
- Vein
- Artery and Vein
P 88. ADJUSTING DRAIN FLUID AMYLASE CONCENTRATION FOR EFFLUENT VOLUME DOES NOT ADD DISCRIMINATORY VALUE IN PREDICTING POST-OPERATIVE PANCREATIC FISTULA FORMATION

C Blunck, S Reddy, M Heslin, T Wang, S Vickers, JB Rose

Presenter: Conrad Blunck | University of Alabama - Birmingham

Background: Post-operative pancreatic fistulae (POPF) are common complications following pancreatic resection and contribute substantially to increased perioperative morbidity. Traditionally, post-operative drain fluid amylase (DFA) concentration has been used to define POPF. Various DFA concentration thresholds have been proposed as predictors of safe post-operative drain removal. The aim of this study was to assess whether adjusting DFA for volume and time (vDFA) served as a better independent predictor of POPF than conventional DFA measurement since post-operative fluid shifts could theoretically dilute drain effluent and artificially decreased DFA.

Methods: A retrospective cohort study of patients who underwent elective pancreatic resections between 2013 and 2019 was performed. Patient clinicopathologic data, POPF status, and DFA values were collected. All grades of POPF, as defined in the 2016 ISGPS consensus guidelines, were included as endpoints. vDFA was determined by multiplying DFA by the volume of total effluent during sample collection divided by the time since last collection. Receiver operator characteristic (ROC) analyses were used to determine the discriminatory ability of DFA and vDFA to correctly diagnose POPF. Logistic regression was used to evaluate the prognostic ability of the DFA cutoff values, generated by Youdends estimation of the ROC curves, in predicting POPF.

Results: There were 248 patients undergoing pancreatic resection during the study period with 43 (17%) developing a POPF. The value of the first post-operative DFA checked had similar discriminatory ability to diagnose a POPF compared to the corresponding vDFA (Fig1). To adjust for variances in timing of first checked amylase, DFA and vDFA values were stratified into 0-48, 49-96, and >97 hour cohorts. DFA and vDFA were not statistically different from each other in the ability to diagnose POPF except in the >97 hour cohort (AUC: DFA = 0.835, vDFA = 0.770; p = 0.020). ROC curve generated optimal cutoff values of DFA correctly predicting POPF for the first recorded DFA value, 0-48, 49-96, and >97 hour cohorts were 353, 1091, 484, and 152 U/L respectively. DFA greater than these respective cutoffs were associated with 12 [95%CI 6 -26], 126 [95%CI 7-2328], 9 [95%CI 4-23], and 37 [95%CI 4-378] fold increased risk of developing a POPF by logistic regression. ROC curves using only volume as the predictive variable under the same aforementioned time cohorts was found to have worse discrimination for POPF than DFA.

Conclusion: Drain fluid volume nor adjusting DFA for volume over time is more predictive of POPF development after pancreatic resection than standard DFA analysis.

![ROC analysis of first checked drain fluid amylase](image-url)
P 89. THE HIGH READMISSION BURDEN FOLLOWING TPIAT MAY BE A MARKER FOR LONG-TERM ISLET DYSFUNCTION
LM Yoder, SH Patel, SA Ahmad, K Wima, JE Brunner, JS Sussman, GC Wilson
Presenter: Lauren Yoder BA | University of Cincinnati

**Background:** Total pancreatectomy with islet cell auto-transplantation (TPIAT) is an emerging treatment option in the management of chronic pancreatitis. The complexity of this procedure and its postoperative care require significant clinical resources. In this current study we examine the nature of postoperative readmissions after TPIAT and the potential downstream clinical effects.

**Methods:** All patients undergoing TPIAT for chronic pancreatitis from 2007-2018 at a single, high-volume center were examined. Readmissions within 90 days were captured. Postoperative complications were categorized according to their Clavien-Dindo grade. Insulin requirements were reported as units per day and narcotic requirements were analyzed as daily morphine equivalents at the time of last follow up. Statistics including Chi-Square and Wilcoxin Score were performed using SAS.

**Results:** A total of 111 patients were included in this study with a median follow-up of 31 months (range 1-141 months). 73% (n=81) were female and median BMI was 24.5kg/m2. 43% (n=45) of patients were readmitted within 90 days of TPIAT. Major complications (CD-III or higher) occurred in 32% of patients (n=36) prior to postoperative day 90. Postoperative complications were associated with higher rates of readmission (p<0.001) with a readmission rate of 36% for patients that had a major postoperative complication. 46.7% of readmitted patients (n=21) required greater than 20 units of insulin per day or were on an insulin pump at time of last known follow up.

**Conclusion:** TPIAT is associated with a high burden of hospital readmissions. This likely represents the multidisciplinary nature of their disease, which includes narcotic dependence and surgically induced diabetes. The association between readmissions and long-term insulin function likely represents the importance of strict postoperative glucose control and its absence may have significant long term ramifications on islet function. This series represents the first report associating readmissions and long-term insulin function.
Background: The hepatic artery lymph node (HALN; station 8a lymph node) is often identified during surgical resection for periampullary cancers. Practice varies as to whether or not this node is specifically evaluated for evidence of cancer. It is not fully understood whether cancerous spread to the HALN is an independent predictor of survival.

Methods: A retrospective review of all patients undergoing resection of periampullary malignancies at a single institution from 2003-2018 was conducted. Patients who underwent a pancreaticoduodenectomy with a pathological diagnosis of pancreatic ductal adenocarcinoma and had a HALN specimen sent for separate pathologic evaluation were identified. Data regarding demographics and operative details were collected.

Results: A total of 113 patients met inclusion criteria. Seventeen patients (15%) were found to have a positive HALN. There was no significant difference between the median age (66.0 years v. 66.0 years, p=0.95), gender (male 44.8% v. 52.9%, p=0.72), or race (Caucasian 89.5% v. 86.7%, p=0.67) between patients who had a negative or positive HALN. There was no significant differences whether the pathology showed perineural invasion (88.3% v. 94.1%, p=0.69) or lymphovascular invasion (74.0% v. 82.4%, p=0.56) in those with negative versus positive HALN status. However, those with a positive HALN were more likely to have Stage III disease (82.4% v. 20.8%, p&lt;0.001) as well as a positive surgical margin (64.7% v. 26.0%, p=0.004). Positive HALN status directly positively correlated with number of positive main specimen lymph nodes identified in the main specimen (correlation coefficient=0.47, p&lt;0.05). The median number of positive main specimen lymph nodes was 6.0 (5.0-10.0, 25%-75% quartile range) in those with a positive HALN, versus 1.0 (0-3.0, 25%-75% quartile range) in those with a negative HALN (p&lt;0.001). Furthermore, a ratio of positive to total lymph nodes &gt;0.2 was found in significantly more patients with a positive HALN compared to those with a negative HALN (82.4% v. 20.0%, p&lt;0.001). Although not statistically significant, the median overall survival was worst for patients with positive HALN (1.52 years) compared to multiple different groups including negative HALN node (2.11 years), any positive peripancreatic lymph node (2.09 years), and no positive lymph nodes (2.23 years) (all p values over 0.05).

Conclusion: In this study, HALN positivity was shown to be strongly predictive of having a greater number of positive main specimen lymph nodes as well as a positive lymph node ratio &gt;0.2. Furthermore, positive HALN was associated with more advanced stage of disease and positive margin following resection. HALN, which can be readily identified and accessed during endoscopic ultrasound, may be a predictor of aggressive biology and used to identify patients that may benefit from neoadjuvant chemotherapy.
Background: Neoadjuvant therapy (i.e. chemotherapy or radiation therapy prior to surgical resection) is increasingly being utilized in patients with pancreatic cancer. The benefits of minimally invasive pancreaticoduodenectomy (MIPD) over open pancreaticoduodenectomy (OPD) are controversial, and MIPD after neoadjuvant therapy has not been studied. We sought to compare the perioperative outcomes of pancreatic cancer patients undergoing MIPD versus OPD after neoadjuvant therapy.

Methods: The pancreatectomy-targeted American College of Surgeons National Surgery Quality Improvement Program (NSQIP) database was used to examine the outcomes of patients with pancreatic adenocarcinoma who underwent MIPD and OPD between 2014 and 2017. MIPD was defined as pure laparoscopic, robotic-assisted, or laparoscopic/robotic converted to open. Pancreatic cancer patients who received neoadjuvant therapy and underwent MIPD were propensity score matched to pancreatic cancer patients who received neoadjuvant therapy and underwent OPD based on ages, sex, race, BMI, comorbidities, T stage, operative drain use, vascular resection, multivisceral resection, pancreatic duct size, and pancreatic gland texture. Perioperative outcomes were compared between MIPD and OPD patients.

Results: A total of 2,313 patients with pancreatic cancer received neoadjuvant therapy and underwent pancreaticoduodenectomy during the study period. 197 (8.5%) underwent MIPD. MIPD patients were significantly more likely to have a drain left at the time of surgery (97.0% vs 86.9%, p<0.01), have histological chronic pancreatitis (12.7% vs 6.2%, p<0.01), and less likely to have a history of weight loss (11.2% vs 18.5%, p=0.01) or undergo a vascular resection (21.8% vs 37.1%, p<0.01). MIPD patients were also more likely to have soft pancreatic gland texture (22.3% vs 17.5%, p=0.03) and less likely to receive neoadjuvant radiation (29.4% vs 42.3%, p<0.01). Compared to OPD, MIPD patients had a significantly decreased rate of perioperative blood transfusions (15.2% vs 26.3%, p<0.01), overall complication rate (47.2% vs 54.7%, p=0.04), and postoperative length of stay (7.9 days vs 9.7 days, p<0.01); however, MIPD patients had a higher rate of 30-day readmission (20.8% vs 14.7%, p=0.02). There was no significant difference in 30-day mortality between MIPD and OPD patients (2.0% vs 1.4%, p=0.49). After 1:3 propensity score matching 197 MIPD patients to 591 OPD patients, MIPD patients had a significantly decreased rate of blood transfusion (15.2% vs 23.0%, p=0.02) and postoperative length of stay (7.9 vs 9.5, p<0.01), but a significantly increased rate of 30-day readmission (20.8% vs 13.4%, p=0.01) compared to matched OPD patients. There was no significant difference in 30-day mortality between matched MIPD and OPD patients (2.0% vs 1.7%, p=0.76).

Conclusion: Among pancreatic cancer patients who receive neoadjuvant therapy, MIPD is safe with comparable perioperative outcomes to OPD. Further study is needed to examine the oncologic and long term results of MIPD in pancreatic cancer patients who receive neoadjuvant therapy.
**P 94. ONCOLOGIC OUTCOMES OF LAPAROSCOPIC VERSUS ROBOTIC HEPATECTOMY FOR HEPATOCELLULAR CARCINOMA**  
*M Al-Temimi, C Trujillo, J Lee, A DiFronzo  
**Presenter:** Mohammed Al-Temimi MD, MPH | Kaiser Permanente, Los Angeles Medical Center

**Background:** The safety of minimally invasive hepatectomy is well established; however, there is limited information about the oncologic results of robotic hepatectomy for hepatocellular carcinoma (HCC) in comparison to the laparoscopic approach.

**Methods:** Patients undergoing laparoscopic (LH) or robotic hepatectomy (RH) for HCC at Kaiser Permanente Los Angeles Medical Center between Jan 2019 and March 2018 were included. All patients had complete follow up through Sept 2019. Actuarial three-year overall survival and recurrence-free survival were calculated using the Kaplan-Meir method. Multivariate cox regression analysis was used to adjust for confounders that could potentially affect survival.

**Results:** Out of 106 cases, 32 (30%) were performed robotically and the remaining were performed laparoscopically. Tumor T stage for the whole cohort was T1a (13.2%), T1b (44.3%) and T2 (40.6%) with a 3-year overall survival of 100%, 79%, 69% respectively. The mean duration of follow up for the entire cohort was 41 months; however, that was different between LH (46 months) and RH (27.5 months) *P*=0.001 due to later adoption of the robotic approach. Bilirubin (mean, 0.99+/-0.45 vs. 0.81+/-0.36 mg/dl), AST (56.5+/-37.7 vs. 41.1+/-19) and preoperative AFP (198+/-708 vs. 128+/-403) were higher in the LH group (*P* < 0.05). Tumors in segments (7 or 8) were more common in the RH group (12.5% vs. 1.35%, *p*=0.013) while tumor size ≥ 5 cm was more common in the LH group (18.9% vs. 3.2%, *p*=0.036). The number of lesions, presence of microvascular invasion, margin status and cancer stage were not different between the two groups (*p*>0.05). Three-year overall survival (79% vs. 83%, *p*=0.426) and recurrence-free survival (50% vs. 51%, *p*=0.123) were not different between the two approaches. In multivariate analysis, the risk of death (HR=0.64, 95% CI=0.19-2.12, *p*=0.48) and risk of recurrence (HR=0.62, 95% CI=0.29-1.32, *p*=0.21) were comparable between the two groups.

**Conclusion:** Robotic and laparoscopic hepatectomy for early-stage HCC have equivalent oncologic results. Further studies with longer duration of follow-up are needed to confirm these findings.
**Background:** Laparoscopic liver resection (LLR) is increasingly common worldwide but its suitability in patients with cirrhosis is not clearly defined. There is minimal data in the western literature on this topic and previous work has compared LLR to open hepatectomy rather than to LLR in non-cirrhotics. This study compared short term outcomes of LLR in cirrhotics to LLR in non-cirrhotics.

**Methods:** Retrospective review of minor LLR at our institution from Jan 2006-2018. Patients were stratified by whether they had cirrhosis- defined as per radiological appearances and liver function tests. Variables of interest included baseline clinicopathological information with short term outcomes (Length of stay (LOS), complications) regarded as the primary outcome of interest and secondary survival analysis conducted.

**Results:** Out of 1207 liver resections in the study period, there were 120 LLR with 30 patients having cirrhosis. Patients with cirrhosis were more likely to be male and have higher median ASA scores (3 vs. 2; p< 0.01). The commonest operation was left lateral sectionectomy (n=67). There was no difference in duration of surgery (Cirrhosis: 88 mins vs. No Cirrhosis: 99 mins; p=0.64) and patients in the cirrhosis arm had no conversions to open (0% vs 12%; P= 0.06). There was no difference in complications (12% vs 13%; p=0.75) or median LOS (4 vs. 4 days; p=0.14) and no difference in survival between both groups.

**Conclusion:** With careful patient selection, LLR is feasible in patients with cirrhosis and provides comparable outcomes to non-cirrhotic patients undergoing LLR.
Background: Approximately 10-40% of patients undergoing pancreatectomy develop postoperative pancreatic fistula (POPF). Currently, conservative management focusing on nutritional optimization is widely applied in the setting of POPF. However, there is no consensus on the most effective route for administration of nutrients in this setting. We aimed to compare the efficacy of parenteral nutrition (control) versus enteral nutrition (intervention) in the rate of POPF closure.

Methods: Medline, EMBASE, CENTRAL, and Web of Science databases were searched for randomized controlled trials comparing enteral to parenteral nutrition in the conservative management of POPF and reported time to POPF closure. Quality was assessed using the Cochrane Risk of Bias Tool and quality of pooled evidence was assessed using GRADE.

Results: From 2,682 relevant citations, three studies including a total of 167 patients were analyzed (85 patients in the enteral group and 82 patients in the parenteral group. The mean time to POPF closure was 3.46 days shorter in the enteral group (experimental) than the parenteral group (control), which failed to reach statistical significance (95% CI -1.39 to 8.31, P = 0.30, I2). The complication rates in both groups were low and there were no significant differences in complication rate (OR 1.69, 95% CI 0.52 to 5.47, P = 0.38) or length of stay (95% CI -9.21 to 10.74, P = 0.88).

Conclusion: The rate of POPF closure is equivalent in patients receiving enteral feeds compared to those receiving parenteral feeds. The choice between enteral and parenteral feeds in the conservative management of POPF should be determined by individual patient factors.
**P 97. ANALYSIS OF OUTCOMES OF MINIMALLY INVASIVE LIVER RESECTIONS WITH OPEN APPROACH USING NATIONAL READMISSION DATABASE**

*K Hanna, Y Genyk, R Selby, MR Sheikh*

**Presenter:** Hassan Aziz MD | Keck Hospital of USC

**Background:** Majority of the liver resections performed in the US are open. With the ever-increasing role of robotic and minimally invasive surgery; the role of our study is to assess national outcomes based on surgical approach.

**Methods:** We performed a retrospective analysis of 2015 National readmission database. We selected patients undergoing open, laparoscopic, and our primary outcome was readmission rates and associated cost. Secondary outcomes were in-hospital complications.

**Results:** 3872 patients were included in the analysis. Robotic liver resection has lower readmission rates (19%) compared to the laparoscopic (30%) and open (30%) counterparts. Robotic approach was more cost effective ($127,716) compared to open and laparoscopic approach in terms of total cost which include cost per readmission.

**Conclusion:** There is a financial benefit of use of robotics in terms of cost, hospital length of stay, and readmission rates in patients undergoing liver resection.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Open N = 3420</th>
<th>Laparoscopic N = 343</th>
<th>Robotic N = 109</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6M-Readmission</td>
<td>30.20%</td>
<td>30%</td>
<td>19.30%</td>
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</tr>
<tr>
<td>Cost Index Operation</td>
<td>78273</td>
<td>76643</td>
<td>73301</td>
<td>&lt;0.01</td>
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<tr>
<td>Cost Per Readmission</td>
<td>79607.83</td>
<td>51073.41</td>
<td>78759</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Total Cost</td>
<td>157880.82</td>
<td>152060.0</td>
<td>127716.4</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Complications Rate</td>
<td>17.50%</td>
<td>13.10%</td>
<td>7.30%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Length of Stay</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Angioembolization</td>
<td>9.10%</td>
<td>10.80%</td>
<td>10.10%</td>
<td>0.562</td>
</tr>
<tr>
<td>6M-Mortality</td>
<td>3.40%</td>
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<td>0%</td>
<td>0.02</td>
</tr>
<tr>
<td>Time-to-readmission</td>
<td>56</td>
<td>95</td>
<td>83</td>
<td>0.01</td>
</tr>
<tr>
<td>Failure-to-rescue</td>
<td>1.60%</td>
<td>2.30%</td>
<td>0</td>
<td>0.24</td>
</tr>
</tbody>
</table>
Background: The use of locoregional therapies such as laparoscopic tumor ablation or intra-arterial chemotherapy in hepatocellular carcinoma (HCC) to achieve local control, reduce transplant list dropout, downstage, or reduce recurrence is common practice. Assessing tumor response after treatment, however, remains difficult and unreliable without an explant specimen. We sought to determine the accuracy of imaging in treatment success after locoregional therapy in HCC.

Methods: Patients with HCC who underwent either microwave ablation (MWA) and/or transarterial chemoembolization (TACE) prior to hepatectomy or transplantation were retrospectively identified from 2008 to 2018. Computed tomography (CT) scans after treatment and prior to resection were evaluated for characteristics consistent with viable tumor. The explant specimen was identified, and tumor response was assessed through pathologic evaluation. The accuracy of the pre-operative CT scan readings was compared with the pathologic findings of the explant specimen.

Results: Ninety-one patients were identified who underwent locoregional treatment prior to resection or transplant. Of these, 14 patients underwent laparoscopic MWA, 46 underwent TACE, and 31 underwent both treatments in a neoadjuvant fashion. The ability of CT imaging to predict tumor viability was assessed by treatment modality. For MWA, CT scans demonstrated a 75% positive predictive value (PPV) and a 67% negative predictive value (NPV). This correlated with a 50% sensitivity and 86% specificity. For TACE, CT scans demonstrated an 87% positive predictive value (PPV) and a 25% negative predictive value (NPV). This correlated with an 82% sensitivity and 33% specificity. For MWA-TACE, CT scans demonstrated an 80% positive predictive value (PPV) and a 39% negative predictive value (NPV). This correlated with a 42% sensitivity and 78% specificity.

Conclusion: Imaging to guide response to locoregional therapies in HCC has variable accuracy. There is a high probability of finding tumor given a positive CT scan after all three treatment modalities, whereas a negative CT scan is unreliable. Specifically, CT imaging after MWA demonstrates a high specificity and will likely rule out any residual tumor and CT imaging after TACE is highly sensitive and will likely find residual tumor.
<table>
<thead>
<tr>
<th>Imaging: Viable tumor +</th>
<th>MWA</th>
<th>TACE</th>
<th>MWA-TACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>True positive</td>
<td>3</td>
<td>27</td>
<td>8</td>
</tr>
<tr>
<td>False positive</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Imaging: Viable tumor -</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>True negative</td>
<td>6</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>False negative</td>
<td>3</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

**Statistical values**

<table>
<thead>
<tr>
<th></th>
<th>MWA</th>
<th>TACE</th>
<th>MWA-TACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive predictive value</td>
<td>75%</td>
<td>87%</td>
<td>80%</td>
</tr>
<tr>
<td>Negative predictive value</td>
<td>67%</td>
<td>25%</td>
<td>39%</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>50%</td>
<td>82%</td>
<td>42%</td>
</tr>
<tr>
<td>Specificity</td>
<td>86%</td>
<td>33%</td>
<td>78%</td>
</tr>
</tbody>
</table>
**Background:** The increasing prevalence of bariatric surgery and the use of living donors for liver transplantation, could potentially face us with donors with this surgical history. Due to association between obesity and non-alcoholic liver disease, we must beware of some level of liver damage. Furthermore, it's been demonstrated that bariatric surgery decreases NASH progression and reverts simple steatosis cases. We present 3 cases of patients with prior bariatric surgery, who were selected as donors in our Living Donor Liver Transplant (LDLT) program.

**Methods:** Retrospective descriptive analysis of patients with previous bariatric surgery, who underwent right donor hepatectomy for LDLT at Pontifical Catholic University of Chile Clinical Hospital. The information was obtained from clinical reports and telephone interviews. Data analysis was made with descriptive statistic.

**Results:** Case 1: 53 years-old male, who underwent laparoscopic sleeve gastrectomy (LSG) in 2013 for BMI 33.1. In 2016, before hepatectomy, his BMI was 21.5. Normal liver function tests.

Case 2: 46 years-old female, she underwent LSG (2009) and conversion to gastric bypass (2011) for severe obesity, BMI max 39.7. In pre-transplant study to become a donor BMI was 35 (2016). Liver biopsy without steatosis and normal liver function tests. Case 3: 53 years-old female, LSG performed (2013), BMI max 31.5. Normal preoperative study with BMI 24.2 (2016). The three patients underwent successfully to right donor hepatectomy. No complications were observed and postoperative trend of liver function tests were in expected ranges. No transfusion requirements, mean operative time was 300 minutes (program average 325 min), hospital stay 6.3 days, with adequate liver function in the recipients.

**Conclusion:** The three patients underwent successfully to right donor hepatectomy. No complications were observed and postoperative trend of liver function tests were in expected ranges. No transfusion requirements, mean operative time was 300 minutes (program average 325 min), hospital stay 6.3 days, with adequate liver function in the recipients.
Friday, March 6 - Sunday, March 8, 2020 | ePoster Display, Kiosk #5

P 100. TOTAL PANCREATECTOMY FOR MULTIFOCAL PANCREATIC CANCERS
H Ito, H Ito, Y Ushida, Y Ono, T Sato, Y Inoue, Y Takahashi

Presenter: Hiromichi Ito | Cancer Institute Hospital, Japanese Foundation for Cancer Research

**Background:** It is not uncommon that intraductal neoplasm of the pancreas including intraductal papillary mucinous neoplasm (IPMN) and intraductal tubulopapillary neoplasm (ITPN) involves the entire pancreas, and total pancreatectomy is necessary for patients with such tumors to achieve cure. Herein, we illustrate the case of the patient with multifocal pancreatic cancers who underwent total pancreatectomy. The disease turned out to be derived from IPMN by histologic examination in the resected specimen.

**Methods:** The patient was an 82-year-old woman who presented with epigastric pain and CT showed large pancreatic body mass. The staging work-up revealed at least 5 PET-avid lesions throughout the entire pancreas without extra-pancreatic metastasis, and EUS-FNA confirmed them as adenocarcinoma. Thus, total pancreatectomy was recommended.

**Results:** Upon the exploration, there was no evidence of metastatic disease, and IOUS confirmed all pancreatic lesions identified by preoperative scans. Total pancreatectomy was completed uneventfully in 560 minutes with blood loss of 430 cc. Her postoperative course was uncomplicated. The pathology showed multifocal pancreatic cancers derived from IPMN. ITPN was ruled out by presence of MUC5AC expression on immunohistochemistry.

**Conclusion:** The video described the technical detail of our total pancreatectomy and some useful tricks including SMA-first approach and left kidney mobilization to minimize blood loss and to maintain good exposure for dissection plane in the left side.
P 101. RADIOGRAPHICALLY IDENTIFIED CHOLEDOCHAL CYSTS IN ADULTS; IS RESECTION NECESSARY?
C Gomes, S DeGeus, D McAneny, J Tseng, P Tivnan, J Tkacz, T Sachs
Presenter: Camilla Gomes BS, MS | Boston Medical Center

Background: Choledochal cysts (CC) are often diagnosed in the first few decades of life; due to the risk of malignancy, resection is advised. With the ever increasing number of patients undergoing abdominal imaging, a number of older patients have been radiographically diagnosed with choledochal cysts (rCC). The management in these patients is less well defined. We sought to better understand the nature of rCC in these patients.

Methods: We identified all patients over age 18 at our institution with a radiographic diagnosis of rCC, from 2008-2019. A retrospective chart review was performed. Demographics, comorbidities, complications, readmissions and follow up imaging were compared.

Results: We identified 15 patients with rCC, of whom 53.3% (n=8) underwent an operation. The remainder were observed. There were no significant differences in demographics between groups. Of those resected, none had evidence of high-grade dysplasia or invasive carcinoma on final pathology. However, 25% (n=2) had subsequent readmission for complications, including cholangitis and anastomotic stenoses that required stenting. In the observation group, 2 patients have had mild interval growth, but none has developed worrisome features to suggest malignant degeneration (median follow up = 47 months).

Conclusion: Radiographically diagnosed choledochal cyst in older patients may be a different entity than CC in children. Major operations carry the risk of significant long-term morbidity in these patients, and may not be preferable to close surveillance.
**Background:** Polycystic liver disease is characterized by 20 or more liver cysts, often with progressive growth. Patients are typically asymptomatic but may develop symptoms of hepatomegaly with compression of surrounding structures, including pain, early satiety, nausea and vomiting as well as dyspnea. Symptoms have a range of impact on quality of life, but can be quite debilitating. Surgery is reserved for those with medically refractory disease and high symptom severity. Surgical options range from cyst fenestration to partial heptectomy to total heptectomy with liver transplantation.

**Methods:** This is the case of a 48-year-old otherwise healthy female who presented with multiple episodes of right upper quadrant pain, as well as associated nausea and vomiting. Other symptoms included weight loss secondary to pain and dyspnea upon exertion. CT imaging demonstrated innumerable liver cysts, with a right-lobe predominance. Based on the patient’s symptomatology, right heptectomy was offered to reduce volume.

**Results:** The patient underwent laparoscopic right heptectomy with fenestration of left sided liver cysts. A 12 mm port was placed in the supraumbilical position and three 5 mm trocars to the left of the midline, right midclavicular line and right anterior axillary line. There was limited intraabdominal domain due to massive hepatomegaly. Fenestration of the left sided liver cysts was performed first in order to increase working room. Additional fenestration was performed on the right lobe to gain additional working space. The cystic structures were divided to gain exposure to the right pedicle. The right heptectomy was performed with a Glissonian approach along Cantlie’s line. Due to the diffuse distribution of numerous liver cysts, the typical anatomical planes and vascular anatomy were distorted. Because of this, hepatic vessels may be encountered at any time during division of liver cysts and parenchyma. Therefore, the surgeon must be prepared to control vessels during the dissection. After the right lobe was divided and entirely mobilized, the specimen was further decompressed with fenestration. The specimen was brought up to the skin and morcellated in order to extract through the 12 mm umbilical port site. The patient tolerated the procedure well and was discharged home on postoperative day 2. At her postoperative clinic visit, she reported that she was tolerating a regular diet without nausea or vomiting, and no longer experienced pain with performing her activities of daily living. The postoperative CT demonstrated approximately 60% reduction in volume, from approximately 3,000cc preoperatively to 1200cc postoperatively.

**Conclusion:** While minimally invasive methods have been gaining traction in the treatment of polycystic liver disease, challenges remain including limited intraabdominal domain as well as distortion of the vascular anatomy. In such cases, anatomy cannot be reliable in guiding dissection. Despite these difficulties, we have demonstrated that laparoscopic heptectomy can be performed safely for polycystic liver disease with good post-operative outcomes.
**P 103. CHALLENGING DISSECTION DURING A ROBOTIC WHIPPLE PROCEDURE EXTENDED TO THE PANCREATIC BODY**  
V Valle, R Bustos, G Aguiluz, A Mangano, E Fernandes, M Papamichail, PC Giulianotti  
**Presenter:** Valentina Valle | University of Illinois at Chicago

**Background:** Intraductal Papillary Mucosal Neoplasm (IPMNs) are lesions with malignant potential. The indication to resection is based on size of the lesion and symptoms. Minimally invasive robotic pancreatic surgery is expanding. Here we present a challenging case of a pancreaticoduodenectomy extended to the body of the pancreas for multiple IPMN lesions.

**Methods:** A 68 year-old female presented with epigastric pain radiating to the back and recurrent chronic pancreatitis. A MRI showed 3 cm pancreatic head lesion and 2 cm pancreatic body lesion concerning for main duct IPMN. Based on size of the lesion and patient symptoms, robotic assisted surgical resection was offered. Extensive adhesiolysis was required to expose the surgical area. Delicate maneuvers allowed a safe dissection of a very difficult uncinate process anatomy.

**Results:** The patient underwent elective surgery for her pancreatic cystic mucinous tumors. The operative time was 450 minutes. Blood loss was 150 cc. Post-operative course was uneventful and the patient was discharged on post-operative day 8.

**Conclusion:** Robotic platform is a valuable tool for complex pancreatic surgery even in the presence of adhesions and challenging scenarios.
P 104. UTILIZATION AND IMPACT OF SURGICAL TREATMENT FOR METASTATIC PANCREATIC DUCTAL ADENOCARCINOMA: AN ANALYSIS OF THE NATIONAL CANCER DATABASE

A Ejaz, J Underhill, A Hamad, D Ryoo, R El-Diwany, J Cloyd, M Dillhoff, A Manilchuk, A Tsung, T Pawlik

Presenter: Jennifer Underhill MD | The Ohio State University

Background: Patients with liver-only metastatic pancreatic adenocarcinoma (PDAC) have traditionally been offered palliative chemotherapy alone. Recent institutional studies, however, have explored the role of surgical resection among patients with limited metastatic disease. National practice patterns and the impact of surgery among these patients remains unknown.

Methods: The National Cancer Database was queried for all patients with PDAC between 2010-2015. The primary outcome was overall survival from the time of diagnosis.

Results: We identified 312,426 patients who met the study criteria. One-half of patients (n=140,043, 50.4%) had stage IV disease; metastatic sites included bone (n=5,499, 3.1%), brain (n=620, 0.4%), lung (n=16,580, 9.5%), or liver (n=62,444, 35.7%). Patients with stage IV disease were more likely to be younger (OR 1.31, 95%CI: 1.29-1.33; P < 0.001), male (OR 1.13, 95%CI: 1.12-1.15; P < 0.001), and have poorly (OR 2.16, 95%CI: 2.07-2.27; P < 0.001) or undifferentiated (OR: 2.20, 95%CI: 1.99-2.44; P < 0.001) tumors. Among stage IV patients with liver-only disease (n=46,542, 14.9%), 891 patients (1.9%) underwent pancreatic resection. Patients who underwent resection were more likely to be younger (OR 1.87, 95%CI: 1.57-2.22; P < 0.001) and treated at an academic/research center (OR 1.81, 95%CI: 1.34-2.45; P < 0.001). Median OS among patients who underwent resection was 10.74 months versus 3.4 months among patients who did not undergo resection. After controlling for patient and disease-related factors, patients who underwent surgical resection had a lower risk of death than those who did not undergo surgery (HR: 0.57, 95%CI: 0.50-0.64; P < 0.001).

Conclusion: Surgical resection in patients with liver-only metastatic PDAC is associated with improved overall survival. Further studies are needed to identify which patients benefit the most from surgical resection for liver-only stage IV PDAC.
P 105. CHARACTERISTICS OF PATIENTS WITH PANCREATIC ACINAR CELL CARCINOMA IN COMPARISON WITH PANCREATIC DUCTAL ADENOCARCINOMA

F Kunzler, N Lad, M Rubens, N Machado, R Jimenez, H Asbun

Presenter: Filipe Kunzler Maia | Miami Cancer Institute

Background: Acinar cell carcinoma is a rare subtype of pancreatic cancer, accounting for 1% to 2% of exocrine adenocarcinomas of the pancreas. The aim of this study is to evaluate the characteristics of patients with pancreatic acinar cell carcinoma (ACC) and compare their demographics and outcomes to patients with pancreatic ductal adenocarcinoma (PDAC) using the National Cancer Database (NCDB).

Methods: The NCDB was analyzed from 2004 to 2016. Demographic, clinical characteristics and postoperative outcomes of patients with ACC and their PDAC counterparts were assessed. Continuous variables are presented as median and interquartile ranges. Categorical variables are presented as frequencies and percentages.

Results: Between 2004 and 2016, 1,060 patients were diagnosed with acinar cell carcinoma (ACC) while 330,578 were diagnosed with pancreatic ductal adenocarcinoma (PDAC). ACC patients were significantly younger than PDAC patients (66; 56-75 vs. 70; 61-78 years of age, p<0.001). Additionally, most patients were white (86.0% and 83.0%) and there were more males in the ACC group (70% vs 50%, p<0.001). When considering health care, 38% ACC vs 30% PDAC (p<0.001) patients were privately insured and 50% vs 59% had Medicare (p<0.001). Charlson-Deyo comorbidity scores differed slightly between groups (70%, 23%, 5% and 2% vs 65%, 25%, 7% and 3% respectively, for scores 0, 1, 2 and 3, p=0.007). Significant differences were also noted concerning the anatomical location of the tumors with ACC being less common in the head (41% and 52%, p<0.001), and more common in the tail (23% and 12%, p<0.001) with similar rates in the body (10% and 12%, p=0.055). ACC presented more frequently with stage I disease than PDAC (17 vs 11%), with stage II comprising 20% and 17%, stage III 7% and 11%, and stage IV 39% and 43% (p<0.001). Frequency of liver metastasis was not significantly different between groups (4 vs 3%, p=0.70). A total of 41% of the ACC patients had surgery, in comparison with 19% in the PDAC group (p<0.001). Mortality within 30 days of the primary site surgery was 2.79% and 3.46% (p=0.41) and within 90 days 5.58% and 7.36% (p=0.16). Long term survival differs significantly with 5 years survival rates of 22.4% vs 5.25% (figure 1, p<0.001).

Conclusion: Patients with ACC were typically younger, more commonly male, presented at an earlier stage, and were more often submitted to surgical treatment. ACC and PDAC had similar postoperative mortality rates, but ACC patients had a significantly better overall survival.
Background: Gallbladder cancer is the most common biliary tract malignancy and has a poor prognosis. The clinical significance of the pathologic pattern for gallbladder cancer, focal versus diffuse, remains unclear. We hypothesized that diffuse gallbladder cancer will have a worse survival than focal gallbladder cancer.

Methods: A retrospective review was conducted on all patients with gallbladder cancer where pattern (focal including both visceral and liver sides, versus diffuse) was reported in pathology reports. Patient with metastatic disease were excluded. Demographics and operative details were collected. Pathology was reviewed, and gallbladder pattern was defined as “diffuse” if the tumor was multicentric or “focal” if the tumor was only in a single location. TNM staging was assessed in patients with definitive resection. Patients undergoing liver resection and portal lymphadenectomy were considered to have definitive surgery. The primary outcome was overall survival.

Results: Thirty-seven patients met study criteria with 19 (51%) having diffuse cancer. Of the 37 patients, the majority were female (n=28, 75.7%). Those patients with diffuse cancer were older in comparison to patients with focal cancer (70.3 vs 66.4 years, p=0.04). There was no difference in gender distribution or ethnicity among the groups. No difference was observed in utilization of definitive surgery between the groups (11 [61%] with focal cancer and 10 [56%] with diffuse cancer, p 0.73). Patients with diffuse gallbladder cancer were noted to have a higher T, N, and overall pathologic stage although not statistically significant. Additionally, poorly differentiated adenocarcinoma was significantly more common in patients with diffuse cancer (53% vs 18%, p=0.005). Six patients (33%) with diffuse disease had a positive cystic duct margin following initial cholecystectomy, while none with focal cancer had the margin positive (p=0.01). After definitive surgery there was no statistically significant difference in positive margin between the two groups. Overall median survival was significantly improved in those with focal cancer (6.93 vs 1.92 years, p=0.04). Although this difference persisted in patients who underwent definitive surgery (overall median survival of 6.9 years in patients with focal vs. 2.3 years in diffuse cancer) it was not statistically significant.

Conclusion: Patients with diffuse gallbladder cancer likely represent a subset with aggressive biology and worse overall survival compared to focal disease. When suspected on imaging, these patients may be considered for upfront neoadjuvant and/or aggressive adjuvant modalities.
P 107. LAPAROSCOPIC RESECTION OF LARGE HEPATIC ADENOMA IN A PREGNANT PATIENT
AD Wisneski, A Robles, CU Corvera
Presenter: Andrew Wisneski MD | University of California, San Francisco

Background: Hepatic adenoma is a rare, benign liver tumor typically found in reproductive aged women. Size >5cm is indication for resection given a risk of rupture/hemorrhage. The hormonal state of pregnancy, with elevated circulating maternal estrogens, heightens risk of hepatic adenoma rupture. Management of a large hepatic adenoma in a pregnant patient poses a challenging clinical dilemma. Removal is necessary prevent risk of rupture, which has been associated with extremely high risk of maternal-fetal mortality.

Methods: A 34-year-old female (G1P0) at 20 weeks gestational age had an incidental finding of a 10cm abdominal mass at routine pre-natal screening ultrasound. Abdominal MRI was equivocal for characterizing the mass’ origin and type, thus biopsy was performed with cytology suggestive of hepatic adenoma. Resection was strongly advocated given concern for the threat to maternal-fetal life if rupture were to occur.

Results: The mass was amenable to laparoscopic resection, given its exophytic nature emanating from liver segments 5 and 6. After detachment from the liver, the mass was morcellated for removal through the periumbilical gel-port site. Surgical pathology confirmed diagnosis of hepatic adenoma, inflammatory subtype. The patient was discharged on post-operative day 1 without issue.

Conclusion: Resection of hepatic adenoma should be performed in gravid patients to prevent devastating complications of rupture and hemorrhage. Treatment of hepatic adenoma in pregnancy with laparoscopic resection has been very rarely reported in the existing literature. For this case, laparoscopic resection in the second trimester of pregnancy contributed to an optimal outcome being achieved.
P 108. TREATMENT APPROACH FOR PATIENTS DIAGNOSED WITH HEPATOCELLULAR CARCINOMA IN THE NATIONAL CANCER CENTER IN NICARAGUA
W Valladares, L Bacon, S Sandino, S Lopez Torrez
Presenter: Sergio Lopez Torrez MD, MSc | Roberto Calderon University Hospital

Background: Hepatocellular carcinoma (HCC) is the second most common cause of cancer related deaths worldwide, it is estimated that it caused around 746,000 deaths in the year 2012. On the basis of annual projections, the World Health Organization registers that its incidence in Nicaragua rises to 10.5 per 100,000, with high mortality almost 100 per cent in this patients (MINSA). Although it has a multifactorial etiology it usually develops in the context of chronic liver disease. In its early stages curative treatments such as surgical resection or liver transplant are the mainstay treatments. In its intermediate stage the only treatment that has shown increased survival rates is transarterial chemoembolization (TACE). The objective of this study is to get to know the treatment approach to the patients diagnosed with HCC in the oncology department of the Roberto Calderon University Hospital (HERC) - National Cancer Centre in Nicaragua.

Methods: Retrospective, descriptive cross-sectional study in 64 patients with diagnosis of HCC, receiving treatment in HERC, in the period of 01 May 2012 to 31 December 2016.

Results: Our study revealed that the average age of the patients was 50.1 years, 54.7% were males and the median disease progression was 9.05 months (9 months SD). The average AFP level was 9322.39 IU (25819.07 SD) and neverthlees it was only registered in 36 patients. In most of the cases no known cause was detected, however, 18.8% had cirrhosis, 4.7% HBV, 3.1% HVC and 21.9% of the patients were alcoholics. 43.75% (28 patients) had co-morbidities. In regard to the BCLC score on presentation, 31.1% of patients presented at an intermediate stage, followed by advanced stage with 37.5%, and only 17.1% in an early stage. In relation to Child-Pugh score was 25%, 57.8% and 17.2% for A, B and C respectively. Multiple lesions were detected in 57.8% (37% patients). 20.3% of the patients received surgical treatment, 45.3% TACE, 28.1% received systemic chemotherapy and only 3.12% received sorafenib. The median overall survival (OS) was 22 months with a maximal survival of 40 months. The event free survival (EFS) median was 9 months with a maximum EFS of 35 months. Patients who underwent surgical resection has a OS median of 21 months and a maximum survival of 32 months; patients treated with loco-regional treatments had a maximum OS of 40 months with a median of 14 months; As for patients who received systemic treatment from the moment of diagnosis had a maximum survival of 22 months with a median of 10 months and those who did not received any treatment had a survival of 8 months.

Conclusion: The majority of patients were diagnosed in intermediate and advanced stages, the best survival rates were achieved with surgical resection, followed by TACE. The OS median was 12 months and the EFS median was 9 months, mainly for early stages. A strategical plan for the early diagnosis of HCC is needed in order to obtain better survival rates in patients with HCC.
GRAFICA 3. SUPERVIVENCIA GLOBAL SEGÚN TRATAMIENTO
Background: Among patients with pancreatic cancer, the association of mental illness with long-term outcomes remains unknown. We sought to analyze how preexisting mental illness before a pancreatic cancer diagnosis was associated with all-cause and cancer-specific mortality.

Methods: Individuals diagnosed with pancreatic adenocarcinoma were identified in the linked Surveillance, Epidemiology, and End-Results-Medicare database from 2004-2016. Patients were classified as having mental illness if an ICD9/10-CM code for anxiety, depression, bipolar disorder, schizophrenia or other psychotic disorder was recorded in at least one inpatient or two outpatient claims during the 3 years before cancer diagnosis.

Results: Overall 43,576 patients (median age: 73, IQR: 67-79; male: 49.0%) were identified. A total of 3,020 of 43,576 (6.9%) patients were diagnosed with a mental illness prior to pancreatic cancer diagnosis. Specifically, among individuals with pre-existing mental illness, 21.9% were diagnosed with anxiety only, 44.3% with depression only and 15.9% with depression and anxiety; a smaller subset (18.0%) was diagnosed with severe mental illness (schizophrenia or other psychotic disorder). There was a 33% increase in all-cause mortality among patients with pre-existing mental illness compared with individuals without mental illness after adjusting for age, race, gender, stage, and surgical intervention (adjusted hazard ratio: 1.33; 95% CI, 1.28 to 1.38, p<0.001) (FIGURE). In addition, patients with mental illness had a 30% increase in cancer-specific mortality (adjusted hazard ratio: 1.30; 95% CI, 1.25 to 1.36, p<0.001).

Conclusion: Roughly 7% of patients with pancreatic adenocarcinoma had a pre-existing mental illness diagnosis. Individuals with mental illness were more likely to have worse overall and cancer-specific long-term outcomes. Surgeons and cancer caregivers need to be aware of mental illness to address mental health concerns among cancer patients as part of their care coordination.
Friday, March 6 - Sunday, March 8, 2020 | ePoster Display, Kiosk #5

P 110. EVALUATION OF ICD CODES AND PHECODES FOR THE IDENTIFICATION OF PANCREATIC CYSTIC TUMORS IN A LARGE GENOMIC DATABASE
M Tan, C Isom, E Gamazon
Presenter: Marcus Tan MBBS | Academic Medical Center

Background: Large genomic databases linked to electronic health records promise to shed light on molecular mechanisms underlying rare diseases, such as pancreatic cystic tumors (intraductal papillary mucinous neoplasms (IPMN), mucinous cystic neoplasms). However, accurately identifying patients with the desired phenotype can be challenging. This is particularly the case for pancreatic cystic tumors, since ICD codes do not distinguish true pancreatic cysts from pseudocysts. Previous studies have shown that ICD codes aggregated by phenotype, known as “phecodes”, have a higher accuracy in identifying specific phenotypes than ICD codes themselves; however, their performance in distinguishing true cysts from pseudocysts has not been studied.

Methods: From a large deidentified genomic database, two queries were performed to identify all adults with pancreatic cysts for a GWAS study, one using ICD-9/10 codes and the other using phecodes. The medical records for all patients identified from both queries were then reviewed to confirm the presence and histologic type of pancreatic cyst.

Results: Of the 91,985 genotyped adults in the database, ICD-9/10 codes identified 725 patients with pancreatic cysts, compared with only 309 patients identified by the phecode query. All patients in the phecode cohort were also found in the ICD cohort. Of the 725 patients in the ICD cohort, 118 were confirmed to have a pancreatic cystic tumor on review of the health records (including 80 with IPMN) whereas in the phecode cohort, only 44 were confirmed to have a pancreatic cyst (21 with IPMN). The positive predictive value (PPV) for PDAC in the ICD query was 16%, compared with 14% for the phecode cohort.

Conclusion: In this large genomic database, the use of ICD-9/10 codes was able to identify more than twice as many patients with pancreatic cysts compared to using phecodes. The low PPV of both query methods indicates that until diagnosis codes can be refined more, manual review will be required to select patients with pancreatic cystic tumors for genomic studies.
**Background:** For patients with periampullary adenocarcinoma (PAC), pancreatoduodenectomy (PD) provides the best chance of cure. A subset of patients is taken to the operating room for planned PD that is subsequently aborted. We reviewed these cases to determine reasoning for aborted PD, subsequent operative management, and patient outcome.

**Methods:** Data from all patients between 2006-2019 who underwent exploratory laparotomy for planned PD for suspected or pathologically confirmed PAC were identified. From the operative notes, we identified the subset who were scheduled for PD with an intraoperative decision to abort and the reason why. Patient, treatment, and outcome data were analyzed. The subset with pancreatic ductal adenocarcinoma (PDAC) was analyzed for survival.

**Results:** 819 patients with PAC were taken to the operating room for PD in the specified interval, and 6.7% (n=55) of cases were aborted. Median age at diagnosis was 68 years in this cohort (range 43-85 years). 78% (n=43) had pathologically-confirmed diagnoses at time of surgery, and 18.2% (n=10) received preoperative chemotherapy. Reasons for aborted PD included: distant metastases (65.5%, n=36) and local invasion (34.5%, n=19). Of patients with metastatic disease, 75% (n=27) had liver metastases. 89% of patients underwent at least one palliative bypass procedure, including gastrojejunostomy (85.5%, n=47) or biliary bypass (87.0%, n=47), and 81.8% (n=45) had both gastric and biliary bypass. Patients who had only CT scans prior to surgery more commonly had missed metastatic disease (79.2% CT compared to 54.8% MRI, chi-squared = 3.54, p=0.059). The rate of postoperative complications was low, with surgical site infection being the most common (9.1%, n=5). The median length of stay was 7 days. Of 44 patients with a final diagnosis of PDAC, 62.8% (n=27) were aborted for metastatic disease and 37.2% (n=17) for local invasion. Median overall survival for all PDAC patients after aborted PD was 334 days, 212 days for patients with distant metastases, and 540 days for patients with local invasion.

**Conclusion:** With current imaging as a preoperative guide, the majority of pancreatoduodenectomies for periampullary adenocarcinoma are done to completion, with a 6.7% rate of aborted operations. Intraoperative discovery of liver metastases is the most common reason for aborting PD, and the majority of these patients undergo successful gastric and biliary bypass with low rates of postoperative complications and acceptable survival. MRI prior to PD for PAC may improve the yield of identifying hepatic metastases.
P 112. EFFECT OF HEPATIC CYST SIZE ON POSTOPERATIVE OUTCOMES: SIZE IS IRRELEVANT
M Watson, M Baimas-George, P Salibi, K Murphy, E Baker, L Ocuin, J Martinie, D Vrochides, D Iannitti
Presenter: Michael Watson MD | Carolinas HealthCare System

Background: Simple hepatic cysts may present with a wide range of sizes and symptomatology. There is no formal diagnostic schema for simple hepatic cysts, however previous studies have used various cut-offs to define a “giant” hepatic cyst. There have been few studies of the clinical implications of simple hepatic cyst size.

Methods: Patients undergoing treatment of simple hepatic cysts at our institution between January 2008 to July 2019 were identified by retrospective record review. Demographic data, preoperative symptoms, cyst characteristics, surgical details, and postoperative outcomes were determined from retrospective record review. Cyst size was defined as the greatest measured diameter on axial imaging. If multiple cysts were present, the largest cyst size was used for analysis. Linear regression for continuous variables and logistic regression for categorical variables was used to determine correlations between cyst size and postoperative outcomes.

Results: 120 patients with simple hepatic cysts were identified and included in our analysis. The average cyst size was 12.0±5.5 cm, 85.8% of patients were symptomatic, and pain (83.3%) was the predominant symptom. 114 (95%) of patients were treated with minimally invasive surgery, mean estimated blood loss (EBL) was 193±413 mL, mean operative time was 123±59 min, conversion to open rate was 1.8%, and the rate of simultaneous hepatectomy was 23.3%. Rate of reoperation for recurrence was 4.2%. Regression analysis considering size as a continuous variable demonstrated that cyst size was weakly correlated with operative time (R2=0.0683; p=0.0056), however it was not associated with EBL (p=0.4874), need for hepatectomy (p=0.4094), length of stay (p=0.1305), complications (p=0.2943), Clavien-Dindo grade of complications (p=0.4072), or reoperation for recurrence (p=0.2488). Regression analysis was then carried out to determine correlation between cyst percentile size and postoperative outcomes. Using cutoffs at the 10th, 25th, 50th, 75th, and 90th percentiles, there was no correlation between these cutoffs and operative time. There were no correlations between any percentile cut-offs and EBL, need for hepatectomy, length of stay, complications, or Clavien-Dindo grade of complications.

Conclusion: For surgical therapy of simple hepatic cysts there is a weak correlation with cyst size and operative time, however there is no correlation between clinically relevant patient outcomes and cyst size. This demonstrates that for patients with simple hepatic cysts, the size of the cyst does not predict patient outcomes. Traditional definitions of “giant” simple hepatic cysts are irrelevant.
P 113. IMPACT OF NEOADJUVANT THERAPY ON OUTCOMES OF PANCREATICODUODENECTOMY WITH CONCOMITANT VASCULAR RESECTION

SWL de Geus, SR Levin, SC Ng, JJ Siracuse, A Farber, D McAneny, JF Tseng, TE Sachs

Presenter: Susanna de Geus MD, PhD | Boston Medical Center

Background: Neoadjuvant therapy for pancreatic cancer is associated with increased vascular resections during pancreaticoduodenectomy. Whether neoadjuvant therapy increases complications of vascular resections is unclear. The present study compared the outcomes of pancreaticoduodenectomy with vascular invasion for patients who did and did not receive neoadjuvant therapy.

Methods: The National Surgical Quality Improvement Program (NSQIP) Pancreatectomy Demonstration Project (2014-2016) was queried for patients with pancreatic adenocarcinoma undergoing pancreaticoduodenectomy with concomitant vascular reconstruction. Propensity scores were created for the odds of having received neoadjuvant therapy. Patients were matched based on propensity score. After matching, outcomes between the cohorts were compared.

Results: A total of 791 patients underwent pancreaticoduodenectomy with concomitant vascular resection – arterial in 55 (7.0%), venous in 622 (78.6%), or both in 114 (14.4%). Overall, 368 (46.5%) received neoadjuvant therapy. Patients who received neoadjuvant therapy were more likely to have hard pancreatic texture (68.8% vs. 61.0%; p=0.023) and stage T0-2 disease (15.8% vs. 8.0%; p<0.001) than those who did not receive neoadjuvant therapy. Propensity matching yielded two similar groups (n=264 for each). Rates of postoperative hemorrhage (34.9% vs. 30.3%; p=0.265), delayed gastric emptying (14.4% vs. 17.4%; p=0.341), pancreatic fistulas (9.5% vs. 13.3%; p=0.170), thromboembolic events (4.6% vs. 7.6%; p=0.145), reoperation (7.6% vs. 4.2%; p=0.096), and major complications (51.1% vs. 53.4%; p=0.601) were similar between matched patients who did and did not receive neoadjuvant therapy.

Conclusion: Although vascular resection is associated with a slightly increased risk of morbidity, neoadjuvant therapy is not associated increased postoperative morbidity after pancreaticoduodenectomy with concomitant vascular resection.
**P 114. ASSESSMENT OF INFLAMMATION-BASED SCORES IN PDAC PATIENTS POST-PANCREATEICODUODENECTOMY**  
*R Takchi, GA Williams, WG Hawkins*  
**Presenter:** Rony Takchi md | Washington University, St. Louis

**Background:** Pancreatic ductal adenocarcinoma (PDAC) is the fourth leading cause of cancer mortality in the United States with 5-year survival rate of 9.5%. Surgical resection is the only potentially curable treatment, and the addition of a chemotherapy regimen mildly improved overall and disease-free survival. In addition, postsurgical complications are associated with worse cancer outcomes. Previous research has shown that there are molecular pathways that promote tumor development via “smoldering inflammation” in the tumor microenvironment. The clinical relevance of this cancer-inflammation association is evident in the studies which showed that neutrophil to lymphocyte ratios, platelet to lymphocyte ratios, systemic infection-inflammation index (SII= neutrophil x platelet / lymphocyte), are independent prognostic factors of overall survival in pancreatic cancer patients. Therefore, we investigated if infectious postoperative complications also lead to worse outcomes.

**Methods:** All pancreaticoduodenectomy (PD) patients between August 2011 and December 2018 were included. Clinical outcomes data were gathered from querying a prospectively maintained clinical database. Additionally, preoperative labs were extracted from the electronic medical record for analysis. Complications were classified according to the Modified Accordion Grading System (MAGS) classification.

**Results:** Several cut-offs from the literature were tested for validation and did not show any statistically significant difference neither in overall survival nor in disease-free survival. To further investigate this, we found that patients that received neoadjuvant chemotherapy had a significantly lower preoperative neutrophil count, platelet count, lymphocyte count and consequently significantly lower NLR and SII (P-value < 0.000). Upon further subclassification based on NLR, we found that the group of patients who received chemotherapy and had low NLR, had the lowest rate of infectious complications (X² 14.5, P = 0.025), with least MAGS severity (X² 12.8, P = 0.046). They also had better histologic grade (X² 23.8, P = 0.005), lower AJCC 8-T stage (X² 21.9; P = 0.039) and least node-positive rate (X² 28.7; P < 0.000). Interestingly, the worst outcomes were the patients who received chemotherapy but had high NLR and had the highest rate of infection, and the highest severity of infectious complications.

**Conclusion:** The clinical use of inflammatory based scores is still hindered by the lack of consensus on the cut-off values. We have found that neoadjuvant chemotherapy significantly alters these ratios. We also found that high NLR could be used to predict infectious complications. Further studies with higher power are needed to test the validity of high NLR with or without neoadjuvant chemotherapy.
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<td>101</td>
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<td>24 (77.4)</td>
<td>63 (88.1)</td>
<td>23 (54.8)</td>
<td>34 (54.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AJCC 8T-stage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1a</td>
<td>6 (2.4)</td>
<td>-</td>
<td>-</td>
<td>2 (4.0)</td>
<td>4 (6.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1b</td>
<td>2 (0.8)</td>
<td>-</td>
<td>-</td>
<td>1 (3.0)</td>
<td>2 (4.2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1c</td>
<td>59 (24.0)</td>
<td>11 (24.4)</td>
<td>18 (38.1)</td>
<td>10 (23.8)</td>
<td>13 (28.4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>49 (6.9)</td>
<td>17 (53.1)</td>
<td>72 (68.6)</td>
<td>28 (66.0)</td>
<td>32 (67.8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>30 (12.2)</td>
<td>4 (12.9)</td>
<td>13 (42.4)</td>
<td>1 (2.4)</td>
<td>12 (17.3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** *P* values are calculated for each variable.
Background: The advantages of minimally invasive techniques have been widely documented and include decreased post-operative pain, shorter hospital length of stay, and improved cosmesis. For complex cases the improved instrument dexterity of robotic vs. laparoscopic instruments is beneficial. Here we present a video of robotic pancreaticoduodenectomy highlighting the importance of recognizing and preserving aberrant anatomy.

Methods: The patient is a 31 year-old previously healthy male who presented with Pancreatitis. CT scan of the abdomen showed a 2cm mass in the head of the pancreas. A biopsy was performed which showed high-grade neuroendocrine tumor with Ki 67 of 55%. A dedicated pancreas protocol CT scan showed a replaced common hepatic artery arising from the SMA. Robotic resection of this PNET utilizes the benefits of robotic visualization, magnification, and improved instrument dexterity to safely dissect out and preserve the aberrant vasculature while maintaining oncologic margins.

Results: We started by mobilizing the transverse colon and hepatic flexure and then proceeded to perform a Kocher maneuver. The ligament of Treitz is taken down from the patients right side and the proximal jejunum delivered under the SMA/SMV. We then proceeded to dissect out the porta during which the variant anatomy becomes readily apparent as the common hepatic artery arises from the SMA behind the head of pancreas and runs parallel to the common bile duct. The inferior border of the pancreas is dissected free identifying the SMV and the tunnel posterior to the neck of pancreas is created. The pancreas is then divided. We then dissect out the uncinate process and the mesoappendix during which great care is taken to preserve the replaced common hepatic artery.

Standard reconstruction with a modified Blumgart duct to mucosa PJ anastomosis, end to side HJ anastosis and 2 layer GJ anastomosis are then performed.

Conclusion: Final pathology showed a 4 cm high-grade neuroendocrine carcinoma with Ki 67 > 90% and 132 mitoses per 10 HPF. 12/36 LN positive for carcinoma.
P 116. VIDEO OF THE BENEFITS ON LAPAROSCOPIC LIVER RE-RESECTION  
G Vitiello, V Molina Santos, D Sacoto Urgilez, A Moral Duarte, S Sanchez-Cabús  
Presenter: Giulia Vitiello | Hospital de la Santa Creu i Sant Pau

**Background:** About a quarter of patients with colorectal carcinoma develop colorectal liver metastases. Surgical treatment with curative intent by hepatic resection is the standard medical care. Frequently, new liver metastasis appear during the course of their disease. Liver re-resections are usually complicated, but they represent the treatment of choice for patients with recurrent liver metastases, survival rates being similar to those achieved after the first liver resection.

**Methods:** We present a case of a 61-year-old man with achondroplasia and history of colorectal sigmoid cancer (pT4bN0), treated with laparoscopic sigmoidectomy with and anastomosis. He was then reoperated for anastomotic leak via laparotomy and performing a terminal colostomy. Afterward, he received chemotherapy and four months later a lesion in segment 6 compatible with liver metastasis is detected.

**Results:** In the first video we show the laparoscopic intervention of the liver metastasis. A tourniquet is placed for the Pringle manoeuvre in case it’d be needed. A minimal mobilization of the liver was performed exclusively sectioning the round and falciform ligaments. The operation is guided with indocyanine green administration 24 hours before. That makes us possible to identify the lesion and discard the presence of others lesions. A partial resection of segment 6 is performed. The specimen was removed from an enlargement of the midline 12mm port. The intervention is completed in 80 minutes, achieving a negative margin, with minimal blood loss and without the need to execute the Pringle manoeuvre. The postoperative evolution was correct, without complications and the patient was discharged after 4 post-operative days. After 10 months, a new hepatic lesion is observed in segment 7, suggestive of metastasis. Presenting a volume reduction of the lesion in response to chemotherapy, it was decided a new intervention. The second video shows the atypical resection on segment seven. No important post-chirurgical adhesions are found except for some at the midline level and at the level of the preceding liver resection that can be easily removed. A tourniquet is easily placed through the foramen of Winslow to realize the Pringle manoeuvre in case it’d be needed. The right liver is partially mobilized for an optimal view of the lesion. The operation can be easily performed in 110 minutes, given the limited presence of postoperative adhesions, having previously been operated by laparoscopy. The Pringle manoeuvre is performed for 15 minutes, with minimal blood loss. The postoperative evolution is correct, discharging the patient 4 days later.

**Conclusion:** This video shows the advantages of laparoscopy in the treatment of colorectal liver metastases. The minimal adhesions with this approach, makes easier the re-interventions that this patients usually need with similar morbidity and faster recovery.
Background: Incidental cystic hepatic lesions are frequently diagnosed. Overlapping characteristics between hepatic cysts, premalignant biliary cystadenomas, and malignancies can lead to lengthy and exhaustive evaluations. The objective of this study was to examine clinical and imaging characteristics that distinguish between cystic hepatic lesions.

Methods: Consecutive patients undergoing surgery for cystic hepatic lesions at a single institution between 2002 and 2017 were analyzed. Pre- and postoperative imaging reports and films were reviewed. Comparisons between patients with a pathologic diagnosis of hepatic cysts vs. biliary cystadenomas (BCA) were performed using the Chi-square or Mann-Whitney test.

Results: Thirty-five patients underwent surgery for hepatic cysts (n=22), BCA (n=12), and echinococcal cyst (n=1). Preoperative diagnoses were correct in 68% and 42% of patients with hepatic cysts and BCA, respectively. Fourteen patients underwent preoperative biopsy and/or cyst fluid aspiration, which yielded a correct diagnosis in 7 patients (50%). Patients with BCA were more likely to have undergone preoperative biopsy and have a solitary lesion with a segment 4 predilection (Table). Imaging characteristics associated with BCA were septation, peripheral wall enhancement, and internal enhancement. These imaging features were also identified in hepatic cysts that were hemorrhagic (n=5) or infected (n=1). Three patients with BCA developed disease recurrence after fenestration. One patient developed biliary cystadenocarcinoma after prior R2 resection, underwent re-resection, and remains free of disease.

Conclusion: Differentiating BCA from hepatic cysts is challenging due to overlapping imaging characteristics, particularly with hemorrhagic and infected cysts. Patients with indeterminate lesions may benefit from short-term interval imaging before choosing a surgical strategy or continued surveillance.
Table 1. Clinical and imaging characteristics of patients undergoing surgery for cystic hepatic lesions

<table>
<thead>
<tr>
<th>Factor</th>
<th>Hepatic cyst, n=22</th>
<th>Biliary cystadenoma, n=12</th>
<th>Echinococcal cyst, n=1</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female gender</td>
<td>15 (68)</td>
<td>10 (83)</td>
<td>1</td>
<td>.44</td>
</tr>
<tr>
<td>Median age (range), years</td>
<td>63 (20 – 79)</td>
<td>46 (33 – 83)</td>
<td>29</td>
<td>.058</td>
</tr>
<tr>
<td>Preoperative biopsy or aspiration</td>
<td>5 (23)</td>
<td>9 (75)</td>
<td>1</td>
<td>.005</td>
</tr>
<tr>
<td>Preoperative imaging</td>
<td></td>
<td></td>
<td></td>
<td>.15</td>
</tr>
<tr>
<td>CT only</td>
<td>14 (64)</td>
<td>3 (25)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CT and MRI</td>
<td>2 (9)</td>
<td>2 (17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT and US</td>
<td>3 (14)</td>
<td>2 (17)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT, MRI, and US</td>
<td>3 (14)</td>
<td>5 (42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median size of largest cyst (range), cm</td>
<td>9.9 (1.7 – 19.0)</td>
<td>8.6 (3.0 – 21.0)</td>
<td>6.3</td>
<td>.36</td>
</tr>
<tr>
<td>Number of cystic lesions</td>
<td></td>
<td></td>
<td></td>
<td>.016</td>
</tr>
<tr>
<td>One</td>
<td>9 (41)</td>
<td>11 (92)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Two or three</td>
<td>2 (9)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four or more</td>
<td>11 (50)</td>
<td>1 (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Septation</td>
<td>5 (23)</td>
<td>11 (92)</td>
<td>1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Peripheral wall enhancement</td>
<td>2 (9)</td>
<td>10 (83)</td>
<td>1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Internal solid component</td>
<td>3 (14)</td>
<td>4 (33)</td>
<td>0</td>
<td>.21</td>
</tr>
<tr>
<td>Internal enhancement</td>
<td>6 (27)</td>
<td>8 (67)</td>
<td>1</td>
<td>.036</td>
</tr>
<tr>
<td>Liver segments of largest cyst</td>
<td></td>
<td></td>
<td></td>
<td>.049</td>
</tr>
<tr>
<td>2 and/or 3</td>
<td>9 (41)</td>
<td>1 (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1 (5)</td>
<td>5 (42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right liver</td>
<td>10 (45)</td>
<td>4 (33)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central (4, 5, 8)</td>
<td>1 (5)</td>
<td>1 (8)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Caudate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial surgery</td>
<td></td>
<td></td>
<td></td>
<td>.22</td>
</tr>
<tr>
<td>Resection</td>
<td>8 (36)</td>
<td>8 (67)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Enucleation</td>
<td>2 (9)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fenestration</td>
<td>12 (55)</td>
<td>4 (33)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recurrence</td>
<td>3 (14)</td>
<td>4 (33)</td>
<td>0</td>
<td>.21</td>
</tr>
</tbody>
</table>

Data presented as number (%), unless otherwise stated. *Chi-square or Mann-Whitney test between hepatic cyst and biliary cystadenoma.
P 118. IMPACT OF SOCIAL DETERMINANTS OF HEALTH ON TIMELINESS TO CHEMOTHERAPY AND OUTCOMES IN METASTATIC HEPATOCELLULAR CARCINOMA: A 12 YEAR STUDY

T Jayakrishnan, V Bakalov, Z Chahine, G Finley, D Monga, R Wegner

Presenter: Thejus Jayakrishnan MD | Allegheny Health Network

Background: The incidence of liver cancer has tripled in the last three decades in the United States. While we strive for progress in treatment and outcomes, it is imperative that disparities driven by socioeconomic factors are addressed at the same time. We sought to determine if social determinants of health impacted the timeliness to chemotherapy and outcomes in hepatocellular carcinoma (HCC) patients with metastases as they represent the most vulnerable group of patients.

Methods: We queried the National Cancer Database (NCDB) for patients with metastatic hepatocellular carcinoma (Histology code 8170, AJCC pathologic stage 4) diagnosed from 2004-2016 and considered for first line chemotherapy. Patients who were treated within 6 months (180 days) of diagnosis were selected. Time to initiation (TTI) was defined as time in days (d) from diagnosis of cancer to initiation of systemic chemotherapy and survival was measured in terms of months (m) from the day of diagnosis. Negative binomial regression and Cox proportional hazard models were used for analyses.

Results: We identified 720 patients meeting the eligibility criteria. Median age was 61 (range 25-90) years and included 82% males. Median TTI in the group was 55d and median overall survival was 7 months (Figure 1). TTI was not significantly impacted by socioeconomic factors namely – race (p-value=0.35), income (p-value=0.12), insurance type (p-value=0.64), educational status (p-value=0.96), geographical location (p-value=0.98) and facility type for treatment (p-value=0.17). There did exist tendencies for longer TTI in African Americans 29d vs. Caucasians 26d, Medicare/Medicaid 62-69d vs. Private insurance 57d, Lowest income group 72d vs. Highest income group 57d. In terms of year of diagnosis, the longest TTI was recorded in 2015 -76d vs. 39d in 2006. Only characteristic that impacted survival was comorbidity (p-value=0.011) while factors such as race (p-value=0.19), insurance status (p-value=0.55), income (p-value=0.31), educational status (p-value=0.36), geographical location (p-value=0.72), facility type (p-value=0.79) did not impact it significantly. There was no improvement in survival over the study period - median survival 7.8m in 2004 vs. 7.5m in 2015 (p-value=0.98).

Conclusion: Unlike several other cancer populations, the impact of social determinants of health on metastatic HCC patients doesn’t appear to be significant according to the present study. Whether this is a true phenomenon or if the surrogates used for the analyses (timeliness to therapy and survival) limited our assessment is unclear and need further investigations.
Kaplan-Meier survival estimate

Patients with AJCC Pathological Stage 4 Hepatocellular Carcinoma

Probability of Survival vs. Time in months from date of diagnosis
Background: Surgical options vary for polycystic liver disease (PCLD) based on cyst extent and patient symptoms. While laparoscopic fenestration has largely replaced open fenestration of liver cysts, the majority of hepatectomies for PCLD are performed open. Data on laparoscopic hepatectomy for PCLD is lacking. We present a series of patients who underwent laparoscopic hepatectomy as treatment for symptomatic PCLD.

Methods: A retrospective review of patients who underwent surgery for polycystic liver disease at a single institution between 2010 and 2019 was performed. Patients were grouped based on operative approach. Imaging was reviewed for pattern of distribution of cysts. Pre- and post-operative volumes were calculated for patients who underwent resection. Perioperative variables were examined. The primary outcomes were: volume reduction, re-admission and postoperative complications.

Results: Twenty-six patients were treated for PCLD: 13 (50%) with laparoscopic fenestration, nine (34.6%) with laparoscopic formal hepatectomy, three (11.5%) with open formal hepatectomy and one (3.8%) with liver transplantation. Fenestration was performed for patients with a small number of dominant cysts, whereas hepatectomy was reserved for patients with diffuse disease where resection would result in significant volume reduction. One patient who underwent open liver resection had a dominant cyst with complex features (concerning for cystadenoma). The average length of stay for the patients who underwent laparoscopic resection was 3 days (IQR 2-3.5). There were no readmissions. One patient developed postoperative atrial fibrillation. There were no other complications. There was an overall 51.4% (range) volume reduction for all the patients who underwent liver resection. The patients who underwent open resection had volume reduction of 32.2% (range 22.3-46.7), whereas the patients who underwent laparoscopic resection had 57% (range 42.8-68.5) volume reduction. Average length of follow-up for the patients who underwent laparoscopic resection was 14 months (IQR 2-63).

Conclusion: Hepatectomy can be challenging in the setting of polycystic liver disease, as anatomic planes and vasculature are distorted. This presents a challenge to laparoscopic approach which is coupled with limited working domain due to hepatomegaly. Laparoscopic volume reduction is comparable to volume reduction in previously published open resection series, and exceeded volume reduction from open approach interventions performed in our institution. This series of laparoscopic liver resections for polycystic liver disease demonstrates that adequate volume reduction can be accomplished by laparoscopic means, with acceptable postoperative morbidity.
Figure: Pre- and Post-operative Liver Volumes

LR = Laparoscopic Resection
Or = Open Resection
Background: A previously healthy 59-year-old female presented to clinic with intermittent, increasing abdominal pain for several months. Imaging revealed a pathologically enlarged, necrotic lymph node versus neoplasm in the portacaval space (Figure 1a). Initial endoscopic ultrasound with biopsy revealed atypical cells. Staging work up revealed no metastatic disease. Following multi-disciplinary liver tumor board review, a repeat biopsy yielded a desmin positive spindle cell neoplasm consistent with leiomyosarcoma. Liver function tests and tumor markers were normal. Body surface area adjusted remnant liver volume following right hepatectomy was estimated to be 32.4%. The common bile duct and right hepatic artery were adherent to tumor. The proximal main and left PV branches were transected, and reconstruction between the main and left PV was performed with 10 mm X 10 mm CryoVein® interposition graft (Figure 1c). Clamp time was 18 minutes and arterial perfusion to the left liver was never compromised. A right hemihepatectomy was performed with a roux limb hepatico-jejunostomy to the left hepatic duct. Postoperatively, the patient had an unremarkable recovery. Duplex ultrasound on post-operative days 1 and 4 showed normal portal and arterial flow. She was discharged on postoperative day 6. Patient remains no evidence of disease 18 months after her surgery. Pathological examination revealed an intermediate grade leiomyosarcoma (Figures 1d). Grossly, the tumor invaded the wall of the right portal vein. Histology showed areas of infiltration into the vein wall. Immuno-stains demonstrated the tumor to be strongly caldesmon positive and smooth muscle actin positive. It was negative for CD117 and DOG1 supporting the diagnosis.

Vascular leiomyosarcomas are smooth muscle cell tumors that can present in any vascular structure; venous origin is most common. Mesenteric and particularly extrahepatic portal vein leiomyosarcomas are exceedingly rare. In published reports, patients had normal tumor markers and none demonstrated tumor thrombus. Local recurrence is common. Of the several case reports that include longitudinal follow up, all report local recurrence. Disease-free interval in these reports from date of primary surgery to discovery of unresectable recurrent disease was 12 months, 36 months, and 4 years.

Due to the lack of information on vascular leiomyosarcomas, particularly the even rarer subset of extrahepatic portal leiomyosarcomas, there are no established treatment recommendations. Surgical management with a goal of an R0 resection remains the recommended treatment. Neither adjuvant nor pre-operative chemotherapy is routinely indicated. In the IVC leiomyosarcoma population, predictors of lower survival rates include: older age, larger tumors, resection of adjacent organs, and R2 resection. Radiation is often recommended in patients with R1 resections. Careful follow up should include frequent evaluation of graft patency by ultrasound and cross-sectional imaging to identify recurrent disease.
Background: Minimally invasive pancreatectomies and hepatectomies are gaining popularity. Their outcomes in the elderly are not established. We hypothesized that with the increased use of minimally invasive surgery (MIS) for pancreas and liver surgery perioperative outcomes are maintained in the elderly (≥80yo).

Methods: The National Cancer Database (2010-2016) was utilized to assess perioperative outcomes of minimally invasive pancreatectomies and hepatectomies.

Results: Data from 45375 pancreatectomies and 10526 hepatectomies were analyzed. Median age was 66 for the pancreatectomies (range:18-90) and 64 for the hepatectomies (range:18-90) whereas 8.9% of patients who underwent pancreatectomy and 6.3% of patients who underwent hepatectomy were ≥80yo. The utilization of MIS surgery for patients ≥80yo increased from 2010 to 2016 (for pancreatectomies: robotic: increase from 1.4% to 8%; laparoscopic: increase from 14.1% to 23.6%; hepatectomies: robotic: increase from 0.9% to 4.3%, laparoscopic: increase from 18.8% to 26.4%). Most common MIS pancreatectomies were partial pancreatectomies/distals (42%) and Whipples (29%) whereas MIS hepatectomies were partial lobectomies (69%). MIS pancreatectomies and hepatectomies for the elderly had lower 90 day mortality rates compared to open which reached significance for pancreatectomies (pancreatectomies MIS: 8 vs 13.3%; p<0.001; hepatectomies MIS 8.9% vs 11.3%; p=0.3). The Charlson Comorbidity Index (CCI) didn’t correlate with 90 day mortality for the elderly who underwent MIS surgery (pancreatectomies: mortality 12.6%, 11.1%, 8.6% and 13% for CCI scores 0,1,2,3; hepatectomies: mortality 4.7%, 12.8%, 11.1%, 21.4% for CCI scores 0,1,2,3; p=0.1).

Conclusion: With appropriate patient selection there is increase utilization of minimally invasive pancreatectomies and hepatectomies for the elderly with improved outcomes compared to open surgery. Elderly patients should not be excluded from clinical trials on minimally invasive surgery. The development of preoperative comprehensive geriatric assessment tools more sensitive than comorbidity indexes may allow for better patient selection for minimally invasive surgery.
**P 122. HEPATICOPANCREATICODUODENECTOMY FOR ADVANCED GALL BLADDER CARCINOMA: IS IT WORTHWHILE?**

**A Aruni, V Bhargava, K Gupta, S Irrinkki, SK Sinha, R Kochhar**

**Presenter:** Vikas Gupta | PGIMER Chandigarh

**Background:** Hepatico-pancreaticoduodenectomy (HPD) is curative option for locally advanced carcinoma gall bladder however its wide acceptance is debated due to concerns over high morbidity and mortality.

**Methods:** Twenty-four patients undergoing HPD for locally advanced carcinoma gall bladder were analyzed retrospectively. Patient and tumour characteristics, preoperative treatment and survival outcomes were analyzed. Pancreatoduodenectomy component of HPD was done in standard fashion while hepatic component was tailored as per the extent of bile duct and liver involvement. Either bi-segmentectomy or modified right extended hepatectomy with segment 4a preserving was done.

**Results:** Median age was 54 years with male to female ratio 1:4. Twenty patients required preoperative biliary drainage and none required portal vein embolization. Mean future liver remnant was 41.2±4.67. Major hepatic resections were performed in 18 and bisegmentectomy was done in six. Vascular resection was performed in 10 (41.7%) patients when macroscopic vascular invasion was confirmed during surgery; combined resection/reconstruction of the portal vein and hepatic artery was carried out in 33.4% and 8.3% patients respectively. Direct invasion of the pancreas was observed in 19 (79%). R0 resection was achieved in 18 (75%). T3 disease was seen in 16 (66.7%) and T4 in 8 (33.3%). Node positivity was seen in 12 (50%). Grade B & C liver failure was seen in 2 and 3 patients respectively. Pancreatic fistula grade B was seen in 8 patients and grade C in none. Grade 3 or more complications were observed in 8 (33.33%) patients. Three (12.5%) patients died postoperatively. Overall 1, 2 and 3 years survival rate was 72.7%, 45.5% and 9.1%, with a median survival time of 24 months. 1, 2 and 3 years survival rate was 90%, 60%, 10% respectively in node negative patients and 70%, 40%, 10% respectively in node positive disease. 1, 2 and 3 years survival rate was 69.23%, 30.7%, 0% respectively without vascular resection and 77.77%, 66.66%, 22.22% respectively with vascular resection.

**Conclusion:** HPD with vascular resection can be done safely in selected group of patients with advanced gall bladder cancer as it remains only option for long term cure.
P 124. ALTERNATIVE APPROACHES TO MANAGEMENT OF COMMON DUCT STONE (CBDS) IN PATIENTS WHO HAD
ROUX-EN-Y GASTRIC BYPASS (RYGB)
A Marsala, R Zibari, S Ahmadzadeh, HM Shokouh-Amiri, Q Chu, D Dies, GB Zibari
Presenter: Gazi Zibari MD | John C. McDonald Transplant Center/Willis Knighton Health System

Background: Symptomatic common bile duct stones (CBDS) are commonly diagnosed in obese patients after a roux-en-Y gastric bypass (RYGB). Management can be challenging due to the altered gastrointestinal anatomy, and various techniques are available to address this challenge. We present a cohort of patients who were safely managed with three different approaches to remove CBDS.

Methods: A retrospective chart review of patients who had symptomatic CBDS after RYGB was performed. Patients underwent (1) percutaneous trans-hepatic CBDS removal (2) laparoscopic assisted trans-gastric/ERCP, and (3) robotic CBD exploration & choledocho-duodenostomy/choledocho-jejunostomy.

Results: From April 2011 to June 2019, a total of 24 patients (93.3% Caucasian; 70% female; age ranges from 38-90 years) were successfully managed with PTC, balloon sphincteroplasty and stone forced down to the duodenum (#18), laparoscopic trans gastric ERCP (#3), and robotic CBD exploration & CBD bypass & cholecystectomy(#3). There were four complications, two hemobilia, one bile leak and one enterotomy, and no mortality.

Conclusion: We are presenting three different safe approaches to the management of CBDS in patients with previous roux-en-Y gastric bypass with low morbidity and no mortality.
P 125. LIVER TRANSPLANTATION FOR HEPATOCARCINOMA: THE IMPACT OF INTRAOPERATIVE BLOOD RECOVERY DEVICE
MA Pinto, TJM Grezzana Filho, AD Chedid, I Leipnitz, BB Lopes, JE Prediger, AZD Giampaoli, S Zahler, RV Schramm, G Viana, CRP Kruel, MF Chedid
Presenter: Cleber Kruel MD, PhD | Universidade Federal do Rio Grande do Sul

Background: Intraoperative recovery devices (DRIS) (Cell Saver (R) and others) allow the blood lost by the patient to be reinfused into himself. DRIS are often used in major surgeries, reducing the need for blood transfusions. There is no consensus whether or not it is safe to use these devices in oncological patients. The aim of the present study is to evaluate the impact of DRIS in patients with hepatocellular carcinoma (HCC) submitted to liver transplantation.

Methods: Adults patients undergoing a first liver transplantation for HCC in a single center from 2002 to 2018 were included. Patients transfused with blood recovered form DRIS, were compared to patients who did not receive autologous blood. Survival was calculated using the Kaplan-Meier Method, and comparison between the two groups was performed using the Log-Rank test (p value < 0.05 was considered statistically significant).

Results: A total of 155 patients were included in this study. In 121 patients, DRIS were used intraoperatively, and in 34 patients these devices were not required due to minor blood loss. For the DRIS group survival at 1, 3 and 5 years was 84.8%, 76.9% and 68.2% vs. 85.3%, 71.5% and 67.5% for the control group (p = 0.82). Patients who did not use DRIS or received blood transfusion had no better survival than the others (p = 0.48). Transfusion was not associated with poor survival (p = 0.55).

Conclusion: The use of DRIS seems to have no impact in tumor recurrence in HCC patients submitted to liver transplantation.
Background: Laparoscopic liver resection (LLR) for the treatment of benign and malignant liver tumors has been shown to be safe, with acceptable morbidity and mortality in both minor and major hepatectomy. However, the feasibility and safety of outpatient LLR is not well-studied.

Methods: Using a prospectively managed database, we identified patients who underwent LLR by one surgeon at a single institution between 2012 and 2019. Patients were divided into an ultra-short hospital stay group (length of stay [LOS] < 1 day) compared to a standard discharge group (LOS 2+ days). Factors including patient and tumor characteristics were assessed between the groups, as were surgical outcomes such as perioperative complication and readmission rates.

Results: Of the 109 patients who underwent LLR in the study period, 31 patients (28.4%) had LOS < 1 day. The majority of the 109 patients (69.7%) underwent single wedge resection. Age, gender, and disease pathology were not significantly different between the two LOS groups. Factors significantly correlated with the ultra-short LOS group included extent of resection (100% of patients with wedge resection or single segmentectomy vs 66.7% having a more extensive resection, P < 0.0001), mean specimen volume (146.4 cc vs 456.5, P < 0.0001), mean estimated blood loss (68.5 mL vs 246.2, P < 0.0001), and median operating time (186 minutes vs 265, P < 0.0001). The 30-day perioperative morbidity was 12.9% in the ultra-short LOS group, compared to 25.6% in the standard group (P=0.20). No patients had any major complications (Clavien-Dindo≥III). Readmission rates at 30-days were 3.2% vs 6.4% (P=0.67) in the ultra-short vs standard LOS cohorts, respectively. The median follow-up for the entire cohort was 28.7 months. As the years progressed, the median length of stay decreased from 4 days in 2012 to 1 day in 2019.

Conclusion: Outpatient LLR appears to be a feasible and safe option in patients who undergo limited hepatectomy (wedge resections or single segmentectomies), have a smaller volume of specimen removed, lower estimated blood loss, and shorter operating time. These factors may help predict which patients could be candidates for LLR in the ambulatory setting.
Background: It is well-established that regionalization benefits the outcomes after pancreaticoduodenectomy. However, due to geographic or financial constraints and personal choices, not all patients receive their care at high-volume pancreatic surgery centers. This study assesses how the overall hepato-pancreato-biliary surgery volume of a hospital impacts the outcomes of pancreaticoduodenectomy.

Methods: The National Cancer Database (2004-2014) was queried for patients who underwent liver, biliary, or pancreatic cancer operations. Hospital volume was determined separately for all HPB surgery and pancreaticoduodenectomies (PD). Centers were dichotomized as low- and high-volume centers. High-volume for PD was defined as 20 or more PD per year and high-volume for HPB as 40 or more HPB surgeries per year. Three study cohort were created: low volume for PD and HPB (LV-LV), low volume for PD but high volume HPB (LV-HV), and all high-volume PD centers (HV-HV). Multivariable logistic and linear regression analyses were performed to predict surgical outcomes. Subset analysis was performed in patients with pancreatic adenocarcinoma to assess multimodality therapy completion rates and survival.

Results: In total, 30,256 patients were identified, 53.9%, 8.4%, and 37.8% of patients were treated at LV-LV, LV-HV, and HV-HV, respectively. 30-day mortality was 4.4% in LV-LV, 2.3% in LV-HV, and 2.2% in HV-HV. On multivariable analysis, treatment at LV-LV was associated with higher 30-day mortality compared to LV-HV (OR, 1.70; p<0.001) and 30-mortality at HV-HV was similar to LV-HV (OR, 0.93; p=0.656). R1/2-resection rate was 24.8% in LV-LV, 19.8% in LV-HV, and 19.7% in HV-HV. Positive resection margin rates were significantly higher in LV-LV compared to LV-HV (OR, 1.23; p<0.001), but comparable at HV-HV and LV-HV (OR, 1.10; p=0.877) on multivariable analysis. Unplanned readmission was 8.2% in LV-LV, 8.1% in LV-HV, and 7.8% in HV-HV. On multivariable analysis, readmission was similar in LV-LV (vs. LV-HV: OR, 1.00; p=0.981) and HV-HV (vs. LV-HV: OR, 0.95; p=0.521) compared to LV-HV. Median length of stay was 10 days at LV-LV, 9 days at LV-HV, and 8 days at HV-HV. Hospital stay was significantly higher at LV-LV versus LV-HV (OR, 0.74; p<0.001), but shorter at HV-HV compared to LV-HV (OR, 1.14; p<0.001) on multivariable analysis. In patients with pancreatic adenocarcinoma, 66.4% complete multimodality therapy at LV-LV, 66.6% at LV-HV, and 70.4% at HV-HV. On multivariable analysis, LV-LV had similar multimodality therapy completion rates to LV-HV (OR, 1.01; p=0.811). Patients at HV-HV were more likely to complete all components of care compared to patients at LV-HV (OR, 1.21; p<0.001). Median overall survival was significantly lower for patients treated at LV-LV compared to LV-HV (18.5 vs. 22.0 months; p<0.001). However, survival was similar for patients treated at HV-HV and LV-HV (median survival: 22.7 vs. 22.0 months; p=0.624).

Conclusion: PD outcomes at low-volume centers that have extensive experience with HPB surgery are similar to postoperative and survival outcomes at hospitals with high PD volume. LV-HV hospitals provide a model for PD outcomes to improve quality and access for patients who cannot receive care at HV centers.
Background: Neoadjuvant therapy (NAT) is currently recommended for borderline resectable pancreatic ductal adenocarcinoma (PDAC) and is under active clinical trial investigation in patients with resectable disease. Although the safety of NAT has been evaluated in single, high-volume institution studies, the association between NAT and postoperative complication rates within a multicenter, national population is not well established. The primary aim of this study was to evaluate the association of NAT versus Surgery First (SF) with 30-day postoperative outcomes among patients undergoing pancreaticoduodenectomy (PD) for PDAC.

Methods: A retrospective cohort study of patients who underwent PD for PDAC from 2014 to 2017 within the American College of Surgeons National Quality Improvement Program (ACS-NSQIP) pancreatectomy specific module was performed. Patient demographic and clinical data was collected, and postoperative complication rates, including mortality were compared between groups using the inverse probability of treatment weights propensity score method. Adjusted risk difference (aRD) and associated 95% confidence interval (CI) were determined as measures of strength of association and precision, respectively.

Results: Among the 8,132 patients who underwent PD for PDAC, 29.1% (N=2370) were treated with NAT. Patients treated with NAT were more likely to undergo a vascular resection (35.6% (N=839) vs. 17.8% (N=1015), p<0.001), require a longer median operative time (413 vs 362 minutes, p<0.001), and receive a perioperative transfusion (25.9% (N=614) vs. 19.5% (N=1121), p<0.001). Propensity score adjusted results are presented in Table 1. Patients treated with NAT had significantly lower rates of delayed gastric emptying (DGE) [aRD = -3.36% (95% CI= -5.99% to -0.74%), p=0.012] and post-operative pancreatic fistula (POPF) [aRD = -5.50% (95% CI= -7.85% to -3.15%), p<0.0001] versus SF. There were no differences in rates of 30-day overall major complications, length of stay > 30 days, readmissions, or mortality between groups (Table 1).

Conclusion: Despite increased rates of vascular resection, longer operative times, and higher perioperative transfusion rates, NAT was not associated with increased overall 30-day major complications or mortality. Further, rates of DGE and POPF were significantly lower among patients treated with NAT compared to SF. Findings from this multicenter, national cohort study suggest that NAT can be safely used in appropriately selected patients without increased postoperative morbidity or mortality. In addition to oncologic outcomes, prospective clinical trials comparing NAT and adjuvant therapy should also report overall and pancreas-specific complication rates to inform optimal treatment sequencing.
P 129. LAPAROSCOPIC LIVER RESECTION OF THE SPIEGEL LOBE BY A LEF-SIDAD APPROACH PRESERVING AN ACCESSORY LEFT HEPATIC ARTERY

V Molina, G Vitielo, D Sacoto, A Moral, S Sánchez-Cabús

Presenter: Víctor Molina | Hospital de la Santa Creu i Sant Pau

Background: Caudate lobe of the liver can be divided in three portions: Spiegel lobe, para-caval portion and caudate process. The anatomy of the caudate lobe and its proximity to major vascular structures makes this operation a difficult resection, especially for laparoscopic liver surgery. For that reason the Iwate criteria proposed to classify this surgery at the "2nd International Consensus Conference on Laparoscopic Liver Resection" as intermediate or advanced difficulty depending on the type of resection, and the size of the tumor. For tumors located in the Spiegel lobe, the left side approach is preferred.

Methods: We present a 69-year-old woman with liver metastasis from previously resected sternal condrosarcoma. A Spiegel lobe resection with left side approach preserving an accessory left hepatic artery was performed.

Results: The patient was positioned in supine position. Six ports were used, 4 of 12mm and 2 of 5mm. We started the surgery with the left lateral segment mobilization. The gastrohepatic ligament was opened to expose the caudate lobe. In this case we only opened part of the ligament to preserve the accessory left hepatic artery. We continued retracting to the right the hepatic hilum with tissue band used as the external Pringle tourniquet to expose de caudate process and the right side of the Spiegel lobe. The transection of the liver was started with Thunderbeat and ultrasonic dissector. The portal branches to the Spiegel lobe were dissected and controlled with clips. We continued with the blunt dissection of the Spiegel lobe from the inferior vena cava. The fibrous ligament of the Spigel lobe to the crus of the diaphragm was cut and the retrocaudate vessels to the inferior vena cava were individualized and ligated with clips. Finally, we opened the gastrohepatic ligament behind the artery, pulled up the caudate lobe, and finished the liver transection. A closed aspirative drainage was left in place. The specimen was removed from an enlargement of the left subcostal 12mm port. The operative time was 180 min and the total Pringle time was 30 min. Patient was discharged at the 4 postoperative day and there were no postoperative complications.

Conclusion: Laparoscopic liver resection of the caudate lobe for condrosarcoma liver metastasis is feasible and safe. Left approach seems the best option for Spiegel lobe resections even in patients with accessory left hepatic artery.
Background: Operative management of chronic pancreatitis (CP) must be tailored to individual patient’s anatomy to achieve durable symptom relief. Incomplete drainage of an atrophic pancreatic tail is a common cause of symptom recurrence in patients undergoing drainage procedures. We have selectively applied limited distal pancreatectomy (DP) with duodenal-preserving pancreatic head resection (DPPHR) to patients with appropriate anatomy and hypothesized that this novel procedure provides durable therapy.

Methods: Ten patients underwent DPPHR combined with limited DP between 2013-2018. Patient demographics, comorbidities, perioperative outcomes, and long-term CP-specific outcomes were recorded. Measurements of the pathology specimen determined pancreas tail volume. Chronic pancreatitis specific outcomes included endocrine/exocrine insufficiency, pain relief, and nutritional status. The amount of opioid pain medication was reported as daily morphine equivalents. Body mass index (BMI) and albumin were reported as surrogates for nutritional status. Descriptive statistics were applied. Continuous data are reported as means ± standard error of the mean.

Results: Ten patients (8 females; age 49 ± 3 years) had etiology of idiopathic (n = 4), alcohol (n = 2), sequelae of severe acute pancreatitis (n = 1), hereditary (n = 1), autoimmune (n = 1), and pancreas divisum (n = 1). Operation was 57 ± 14 months after CP diagnosis. Patients had 6 ± 1 endoscopic procedures prior to operation. Mean operative time was 215 ± 11 minutes; estimated blood loss was 110 ± 28 mL. On average, 6 ± 1 cm of pancreatic tail was resected. Splenic preservation was possible in 7 patients. Postoperative LOS was 13 ± 2 days. Postoperative morbidity occurred in two patients; one grade B postoperative pancreatic fistula and one perforated duodenal ulcer. Readmission occurred in 5/10 patients at median time of 36 days (range, 16-78 days) postoperatively. Causes included abdominal pain (n = 2), small bowel obstruction (n = 1), intraabdominal abscess requiring antibiotic therapy (n = 1), and failure to thrive (n = 1). No perioperative mortality occurred. Overall, analgesic requirements and nutrition (measured by albumin) improved substantially (Figure 1). In addition, improvement in BMI (preoperative, 23.5 ± 1 kg/m2) was sustained at one- (23.7 ± 1 kg/m2), three- (25.6 ± 1 kg/m2), and five-years postoperatively (24.2 ± 1 kg/m2). At operation, 20% of patients required insulin; at five-year follow up this number was 25%. Eighty percent of patients were prescribed exocrine replacement preoperatively; all patients were on exocrine replacement at five-year follow up. During follow up (mean, 38 ± 7 months), one patient with hereditary CP underwent salvage total pancreatectomy with islet cell auto-transplantation 13 months postoperatively.

Conclusion: In select chronic pancreatitis patients, including limited distal pancreatectomy with duodenal-preserving pancreatic head resection provides durable, long-term pain relief and improves nutritional parameters with minimal effect on pancreatic endocrine and exocrine function. This operation should be considered in select patients with appropriate anatomy.
**Background:** Improved systemic and radiation therapies administered as induction therapy have driven a trend of more aggressive operations in patients with locally advanced pancreatic ductal adenocarcinoma (PDAC) that was historically considered technically unresectable. Previously, we have reported the efficacy and safety of this practice. Herein, we present a technical report describing our surgical experience of tumors considered locally advanced with long segment encasement of the superior mesenteric vein (SMV), celiac axis (CA), or the inferior pancreaticoduodenal artery (IPDA) or gastroduodenal artery (GDA) preluding distal pancreatectomy-ceilic axis resection (DP-CAR). We present novel surgical approaches, including reconstruction techniques using mesocaval shunts, non-anatomic bypasses and separate reconstruction of multiple SMV tributaries. Additionally, we assessed the ability to predict resectability using high-quality imaging, in patients with superior mesenteric artery (SMA) involvement.

**Methods:** Our single institutional surgical experience was used to describe the technical aspects of patient selection and surgical techniques to manage the aforementioned tumors.

**Results:** The surgical approaches were stratified by tumor location and type of vessel involvement. Reconstructions were performed using banked cryopreserved vein, left renal vein, tubularized falciform ligament, or tubularized bovine pericardium.

### SMV Involvement or Occlusion with Multiple Collaterals
With complete occlusion of the SMV and involvement of the insertion of the tributaries and well-developed left sided collaterals, the SMV does not need to be reconstructed if the collaterals can be preserved. However, dominant collateral circulation is absent a temporary mesocaval shunt can be performed prior to resection. The option then remains to keep the mesocaval shunt and implant the other branch into the portal vein or to transpose the mesocaval shunt to the portal vein.

An extra-anatomic bypass is performed from the ileal and/or jejunal branch to the portal vein in patients with involvement of the ileal and jejunal tributaries, and occlusion of the SMV up to the confluence of the splenic and portal vein. If SMV involvement reaches the level of the main tributaries, multiple non-anatomic reconstructions of the ileal and jejunal tributaries can be performed.

### GDA, IPDA, and CA Encasement
In patients with GDA and/or IPDA involvement a DP-CAR is not possible. If an acceptable distal target is present a bypass graft can be placed between the aorta, celiac cuff, right renal artery, or iliac artery to the CHA or the proper hepatic artery (PHA). DP-CAR can be performed if a replaced left hepatic artery is present, which can be reimplemented into the CHA, through which it receives retrograde flow.

### SMA Encasement
Two types of SMA encasement were identified on imaging: true encasement/invasion and encasement with a “halo” sign. Narrowing of the SMA lumen is indicative of true invasion making SMA preservation not possible. In cases of a “halo” sign in our experience a margin negative resection is possible without SMA resection.

**Conclusion:** Here we describe surgical approaches to successful resection of variants of locally advanced PDAC as stratified by the vessels involved. With increasing utilization of these techniques a need to revise the current definitions of tumor staging seems imminent.
P 132. THE GALLBLADDER THAT NOBODY WANTS: A PREDICTION TOOL TO ASSESS THE DIFFICULTY OF CHOLECYSTECTOMY

M Baimas-George, RC Kirks, A Cochyran, M Watson, E Baker, BL Paton, LM Schiffern, BD Matthews, JB Martinie, D Vrochides, DA Iannitti

Presenter: Maria Baimas-George MD, MPH | Carolinas HealthCare System

Background: Cholecystectomy is a common procedure yet can have significantly varied outcomes based on patient physiology and comorbidities. As providers move towards fee-for-value models, it is important to risk stratify patients for appropriate referral and cost prediction. We analyzed differences in comorbidities, outcomes, and cost associated with cholecystectomy by acute care (ACS) versus hepatobiliary (HPB) surgical practices to create a predictive tool for difficult gallbladders.

Methods: Patients were retrospectively identified through procedure codes from 2008 through 2015. Exclusion criteria included: (1) cholecystectomy performed at time of or as part of another procedure; (2) abdominal trauma requiring cholecystectomy; (3) ICU admission or preoperative vasopressor requirement. Cholecystectomies referred to HPB were identified and matched to general surgery cholecystectomies by demographics including sex, age, and surgery date. A regression model was created and trained to create a scoring system of independent risk factors.

Results: There were 1160 cholecystectomies performed of which 736 were subjectively referred to HPB surgeons from general surgeons. Of these, 122 HPB cholecystectomies met inclusion criteria and were case matched to 126 general surgery cholecystectomies. In the HPB subset, there was higher burden of comorbid disease, different indications for surgery, and a significantly lower projected 10-year survival (87.4% ACS vs. 68.5% HPB, p < .0001). Median surgical and hospital lengths of stay were longer in HPB patients (1 vs. 4 days, p < .0001; 2 vs. 5 days, p < .0001) as were 30-day and 90-day readmission rates (5.6% vs. 13.1%, p = .040; 7.9% vs. 20.5%, p = .005 respectively). Median cost was higher in the HPB population including operative supply cost (969.42 vs. 1920.66, p < .0001) and total cost of care (7340.66 vs. 19338.05, p < .0001). A predictive scoring system for a difficult gallbladder was constructed using five factors including history of liver disease, ASA, and alkaline phosphatase level. A score of ≥ 5 was determined to be the best cut-off value for the high-risk difficult gallbladder group and a phone application was created to assist providers in quick identification of such cases.

Conclusion: Although often regarded as a simple procedure, a cholecystectomy in a complicated patient can become anything but, leading to a difficult operation, significantly longer hospital stays, and higher costs. The hybrid use of an objective scoring system along with a subjective clinical impression can help providers appropriately plan for high-risk patients with management of pre-operative patient expectations and consideration of an HPB consultation or transfer. This predictive tool highlights a population that should have a different reimbursement tool as the use of procedure codes to appropriately explain disparities in outcomes and costs is insuficient. The incorporation of comorbid disease and risk factors with such clinical metrics needs to be addressed for operative planning as well as categorization and reimbursement of surgical practices.
P 133. MELD SCORE DOES NOT INCREASE AFTER HEPATECTOMY IN CIRRHOTIC PATIENTS
M Baimas-George, M Watson, P Salibi, K Thompson, E Baker, L Ocuin, JB Martinie, DA Iannitti, D Vrochides
Presenter: Maria Baimas-George MD, MPH | Carolinas HealthCare System

Background: With prevalence of hepatic cirrhosis increasing, there is a subsequent increase in patients needing liver resections as it is the mainstay of treatment for many hepatobiliary neoplasms. However, because of the reduced ability of a cirrhotic liver to tolerate surgical insult and mass reduction, resection requires consideration between oncologic benefit and risk of impaired hepatic reserve as liver function is expected to deteriorate post-operatively. To quantify this risk, we evaluated change in MELD and MELD-Na scores in cirrhotic patients with hepatocellular carcinoma (HCC) after liver resection.

Methods: A retrospective review identified all cirrhotic patients with HCC who underwent a hepatic resection between 2010 to 2017 at a single tertiary-care institute. The MELD scores for each patient were calculated pre-operatively, immediately post-operative, and the first time point 3 months after surgery. Patients were stratified by major (>3 segment resection) and minor hepatectomy and by MELD/MELD-Na score (MELD: &lt; 10 and 10; MELD-Na &lt; 12 and 12) and the change after 3 months was evaluated.

Results: Thirty-five patients were identified. Of these, 20 patients underwent a minor hepatectomy and 15 underwent a major hepatectomy. In the minor hepatectomy cohort, low-MELD patients (n=14) demonstrated an increase of 0.6 in MELD score 3 months post-operatively whereas the high-MELD cohort (n=6) demonstrated a decrease of 0.9. When stratified by MELD-Na, low-MELD-Na (n=6) demonstrated an increase of 0.2 whereas the high-MELD-Na (n=6) had a decrease of 1.0 after 3 months. In the major hepatectomy cohort, low-MELD patients (n=13) demonstrated an increase in MELD of 3.9 whereas high-MELD (n=2) had a decrease of 0.5 after 3 months. When stratified by MELD-Na, low-MELD-Na (n=9) demonstrated an increase of 4.9 whereas high-MELD-Na (n=6) had a decrease of 1.0.

Conclusion: Liver function is expected to deteriorate post-operatively in cirrhotic patients undergoing hepatic resection. We demonstrate that MELD and MELD-Na scores either stay the same or mildly improve after 3 months post-operatively in patients undergoing minor hepatectomies, suggesting that either there is an adequate hepatic reserve present or the liver may repopulate healthy hepatocytes.
P 134. RUPTURED HEPATOCELLULAR CARCINOMA: TREATMENT WITH MICROWAVE ABLATION MAY OFFER ADDITIONAL BENEFIT

M Baimas-George, M Watson, J Sulzer, P Salibi, K Murphy, D Vrochides, J Martinie, E Baker, L Ocuin, DA Iannitti

Presenter: Maria Baimas-George MD, MPH | Carolinas HealthCare System

Background: Hepatocellular carcinoma (HCC) can present as spontaneous rupture with resultant high morbidity and mortality. The therapeutic goal at this presentation is to stop hemorrhage, conventionally through transcatheter embolization (TAE) or open surgery with possible emergent resection. The new role of laparoscopic microwave ablation (MWA) for treatment of ruptured HCC may serve to not only prevent hemorrhage but also have an oncologic benefit.

Methods: A retrospective review identified patients with HCC who presented with hemorrhagic rupture at a single tertiary institution between 2008 to 2018. The treatment algorithm consisted of TAE followed by laparoscopic MWA with palliative intent. Patient characteristics, treatment pathway, and oncologic outcomes were identified through chart abstraction.

Results: Fifteen patients presented with ruptured HCC of which five patients had one lesion, five patients had multifocal disease, and five patients had metastatic disease. The etiology of cirrhosis included hepatitis C (n=6), hepatitis B (n=2), cryptogenic (n=4), alcoholic liver disease (n=1), and non-alcoholic fatty liver disease (n=2). The median tumor size on pre-operative imaging was 83mm (5-228). The majority (56%) underwent TAE at presentation followed by laparoscopic MWA and washout. Those patients with contraindications to TAE (44%) went immediately to the operating room for laparoscopic MWA. Three patients (20%) required an additional treatment for bleeding after MWA; either repeat TAE (n = 1) or return to operating room (n = 2). In-hospital mortality was 33% and 30-day mortality was 40%. Of the patients who survived the hospital stay, additional treatments included chemotherapy (n= 5), trans-arterial chemoembolization (n= 3), and partial lobectomy (n=2). Median follow-up was 18.2 months. Median patient survival, excluding patients who expired within 30-days, was 431 +/- 284 days. One-year survival was 72.2%; two-year survival was 44.4%; and three-year survival was 22.2%. Six patients had post-operative imaging of which only one patient demonstrated a recurrence. The possibility of recurrence was 11.1% in one-year.

Conclusion: This retrospective review demonstrates improved rates of recurrence and survival in patients with ruptured HCC. Therefore, the role of laparoscopic MWA may serve to not only prevent hemorrhage but to have a long-term oncologic benefit.
P 135. DEVELOPMENT OF A NOVEL INTRAOPERATIVE DIFFICULT SCORE FOR MINIMALLY INVASIVE CHOLECYSTECTOMY
C Hammill, B Calkins, J Chininis, G Williams, D Sanford
Presenter: Brittany Calkins | Washington University, St. Louis

Background: The rate of biliary injuries from minimally invasive cholecystectomy has remained high and static for over two decades. The Critical View of Safety has been recommended to reduce the risk of biliary injuries however in the presence of severe inflammation or hostile anatomy it may be impossible to obtain the Critical View of Safety. In these situation there are multiple “bail-out” methods described including aborting the procedure, converting to open, or performing a sub-total cholecystectomy. Currently there is a gap in the cholecystectomy literature for characterizing the intraoperative difficulty threshold for when a bail-out method should be implemented. The goal of this study was to test the ability of a novel intraoperative difficulty score to predict early in the operation whether a bail-out technique would be required.

Methods: From January 2014 to February 2019 cholecystectomy videos were collected and de-identified. A five point scale was developed to rate the videos (see table 1). An online platform was developed to review and score the videos. Ten reviewers were recruited to test the scale including two faculty hepatobiliary surgeons (experts) and eight non-clinical participants (non-experts). The videos were accelerated and edited to include the first 2 – 3 minutes of the operation during which the gallbladder was visualized prior to analysis. Inter-coder reliability was evaluated using Krippendorff’s alpha and regression models were used to evaluate the difficulty scores ability to predict the need to implement a bail-out technique. All statistics were performed using SPSS (v25).

Results: 62 cholecystectomy videos were collected for analysis. The median length of the final videos for review was 37.5 (IQR 29-43) seconds with a median time of 46.2 (IQR 38-53) seconds per reviewer to grade the videos. The bail-out rate in our sample was 42.9%, the majority of which were converted to subtotal cholecystectomies. The inter-coder reliability between experts and non-experts was 0.675 with an average difficulty score of 3.0 (SD=1.01). Regression models showed that the scale was able to significantly predict bail-out b=0.29, ß=0.56, p ≤.01.

Conclusion: This novel difficulty scale tested herein was able to predict the need to implement a bail out technique during minimally invasive cholecystectomy. The ability to predict early in the operation the need for conversion provides surgeons heightened awareness of a difficult gallbladder.

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P 136. TOBACCO AND ALCOHOL USAGE AMONG HEPATITIS C POSITIVE PATIENTS THAT PARTICIPATE ON A LIFESTYLE INTERVENTION
F Ramirez, S Jang, N Nedley
Presenter: Francisco Ramirez MD | Nedley Clinic

Background: Research indicates that many hepatitis C positive individuals are known to experience anxiety and addiction symptoms. Lifestyle changes have been documented to help individuals suffering from anxiety and addiction. We are reporting how lifestyle intervention is able to help participants with hepatitis C during an 8-week lifestyle intervention program.

Methods: The 8-week lifestyle intervention program is run in various countries and settings in 3 continents. It was conceived by the Nedley Clinic based in Weimar, California, USA. Lay and professional participants are trained and certified to run the community based program. The program does not create a physician patient relationship. The program tries to identify the triggers of anxiety and addiction. One of those triggers could be the hepatitis c virus. The program teaches various lifestyle interventions including healthy, functional and balanced lifestyle, as well as CBT. Different lifestyle education changes are taught every week during the once a week for 2 hour sessions. Participants are encouraged to implement those changes during the following week. The previously validated Anxiety Assessment Test (registration TX 7-398-022) was used at baseline and at the end of the 8-weeks. It assessed anxiety level based on DSM-5 [The Diagnostic and Statistical Manual of Mental Disorders Volume 5] criteria, addiction, demographics and hepatitis C positivity. No questions were asked about individuals' treatment of hepatitis C or anxiety or addiction. The anxiety category was classified according to DSM-5 into 4 categories as none (0-4), mild (5-8), moderate (9-12) or severe (13 or more).

Results: Of 81 participants (58 from USA, 10 Canada, 11 Australia, 2 New Zealand) that finished the program, reported to have hepatitis C. Average age was 54.6 (SD 11.3). Participants with hepatitis C at the beginning of the program had as a group on average a DSM-5 level of anxiety of mean 8.5, SD 4.7, median 8, mode 11. Data showed that 7.4%(n=6) smoked and 25.9%(n=21) consumed alcohol. By the end of the 8-weeks, participants on average, had anxiety of mean 4.3, SD 3.7, median 3, mode 2, and 7.4%(n=6) of them smoked and 22%(n=18) drank alcohol.

Conclusion: Eight sessions of physical exercise a week was related to more improvement in anxiety in hepatitis C positive individuals. Addiction level was also related to lifestyle intervention. The eight week lifestyle intervention program increases exercise, diet, and cognitive behavioral change adherence and seems to help to improve anxiety level of hepatitis C positive individuals with decrease in alcohol consumption. Furthermore, evidence shows that alcohol consumption is a big risk for people with hepatitis C infection. The awareness awakened through the lifestyle intervention program seems to have an association with a change in addiction behavior of alcohol consumption of the participants.
Background: Robotic training is new to HPB fellowship. Data has demonstrated increasing need on behalf of trainees which has not been met by training programs. Specialized robotic fellowships have been developed with the aim to train HPB surgeons in advanced robotic surgery techniques. There is limited data on outcomes of robotic trained HPB fellows in their initial years of practice (learning curve). We present outcomes of such a series.

Methods: Consecutive patients underwent liver resection surgery by a fellowship trained HPB surgeon (with a robotic curriculum) at a community hospital. All procedures were performed robotically. Patient outcomes evaluated included demographics, pathology, post-operative complications, length of stay, ACS NISQUIP risk score for any and serious complications, 90-day mortality, 30-day readmission, preoperative embolization as well as conversion to open surgery. All liver surgeries performed by the surgeon are done using the robotic Da’Vinci XI platform.

Results: 22 patients underwent robotic hepatectomy surgery. All liver resections were performed robotically by this surgeon. 90.9% of cases were completed robotically. Median: Age was 56.5y, BMI was 29.5. ACS NISQUIP expected complication rates were 20% (median) and observed rates were 13.7%. Major Hepatectomies were performed in 31.5% cases. Post-operative bleeding occurred in 4.5%, bile leak in 9.1% and liver failure in 4.5% and infection in 13.7%. Median expected LOS (determined by ACS NISQUIP risk calculator) was 6 days and observed LOS was 3 days. There was no mortality (90-day period) and 4.5% readmission rates. There was an associated major procedure (Colon resection, pancreaticoduodenectomy etc.) in 18.7% of patients. Pathologic outcomes demonstrated R0 resection rates in 87.7% of patients. Preoperative liver directed therapy was performed in 27% of patients.

Conclusion: Although this is a small cohort, it does appear to demonstrate that robotic hepatectomy can be performed successfully with a high completion rate and low morbidity profile even in the learning curve of robotically trained HPB surgeons. Outcomes in this series are not influenced by case selection since this data represents consecutive patients and all patients were approached robotically. There is a need to track similar data on newly trained HPB fellows performing robotic surgery to evaluate if similar outcomes are seen.
**Background:** Bile duct injury (BDI) after cholecystectomy remains a substantial problem in gallbladder surgery. Despite advancement in modern surgical technique, the BDI rate has remained steady over time since the 1990s. Although most cases can be successfully managed by hepaticojejunostomy, few cases with complex BDI would require hepatectomy (HT) and/or liver transplantation (LT). Those indications and outcomes are little described in the literature.

**Methods:** A systematic review of the literature was performed by searching Medline/PubMed, Scopus and Cochrane databases. Timings of surgery were categorized into early (within 12 months from BDI) and late (12 months after BDI).

**Results:** 179 studies were screened for relevance and 32 studies were selected. There were 2157 BDI and 163 hepatectomies (7.5%) and 68 liver transplants (3.1%) were identified among those patients. The most common non-surgical intervention was endoscopic stenting and the most common surgery was hepaticojejunostomy. The indications for HT were mostly recurrent cholangitis and liver abscess. The most common indication for LT was secondary biliary cirrhosis. BDIs submitted to early surgery were associated with major vascular injuries (hepatic artery and portal vein) leading to liver failure and the need for a liver transplant. Reported mortalities are 22 (13.4%) and 6 (8.8%) cases, respectively in HT and LT.

**Conclusion:** HT and LT are seldomly required after BDI and the indications were mostly concomitant vascular injury, leading to acute liver failure or, chronic infective complications including abscess, recurrent cholangitis and secondary biliary cirrhosis. Early recognition of major vascular in the setting of BDI and referral to a Tertiary centre is imperative for a better outcome.
P 139. ANATOMICAL LIVER RESECTIONS FOR INTRAHEPATIC CHOLANGIOCARCINOMAS: PERIOPERATIVE RESULTS AND SURVIVAL
G Ochoa, A Troncoso, M Dib, E Briceño, J Martínez, N Jarufe
Presenter: Gabriela Ochoa MD | Pontificia Universidad Católica de Chile

Background: Intrahepatic cholangiocarcinoma (ICC) is an infrequent neoplasm, whose incidence is increasing with a poor prognosis. The only curative management is surgery, however, despite the correct selection of the cases, only 1/3 of patients achieve negative margins. We aimed to describe the experience and results in resected cases from Catholic University Hospital in Chile.

Methods: Retrospective cohort analysis of the resected ICC cases with curative intention, between 2006 to 2019. The information was obtained from electronical clinical reports. The analysis was made with descriptive statistics.

Results: Out of 17 patients operated for ICC. 10 were males and 7 women, between 48 and 84 years-old, 2 with risk factors (chronic liver disease, iatrogenic bile duct injury). 5 patients received neoadjuvant therapy and in 1 case portal embolization was made beforehand. 13 cases were performed open and 4 laparoscopic. There were 4 extended right hepatectomies, 3 right hepatectomies, 4 extended left hepatectomies, 3 left hepatectomies, 2 bisegmentectomies (IV, V) 1 left lateral sectionectomy. Mean operative time was 263 minutes and hospital stay average was 14.2 days. There was no 30-day mortality. The global morbidity was 41.2% (7 patients), and Clavien Dindo >IIIB complications were 17.6% (3 patients). Reoperations were performed in 2 cases, one for hemoperitoneum and the other for bile leak. The oncologic classification was Ia (1), Ib (1), II (4), IIIa (2), IIIb (8) y IV (1). There were positive lymph nodes in 8 cases and 1 patient with peritoneal metastases. 8 patients resulted R1 (47.1%). 14 patients received adjuvant treatment. The global survival was 82.4% at 6 months, 46.7% at 1 year and 40% at 2 years, with a mean follow-up of 24.3 months.

Conclusion: The surgical treatment of ICC normally requires large anatomical liver resections, despite which, the incidence of R1 positive margins is high and could result in the poor prognosis of long-term disease.
**P 140. MIRIZZI SYNDROME - A RECONSTRUCTION RECONSTRUED: TECHNIQUE FOR BILE DUCT RECONSTRUCTION USING A VASCULARIZED GALLBLADDER PEDICLE**

**MJ Jacobs, P Jayanthi**

**Presenter:** Prakash Jayanthi MD | Michigan State University College of Human Medicine

**Background:** Mirizzi’s Syndrome is rare, with < 1% incidence in developed countries. No best treatment algorithm is available. Correct preoperative identification and planning is associated with less morbidity, with operative preference based on surgeon experience. The greater the degree of inflammation/erosion, the more complex the treatment - Csendes Type 1 Mirizzi patients benefit from cholecystectomy alone; Types 2-4 may require subtotal cholecystectomy/choledochoplasty versus biliary-enteric reconstruction; Type 5 usually requires fistula takedown/reconstruction.

**Methods:** A 74-year old female presented with severe RUQ pain. CECT Abd/Pelvis: pneumobilia with air in gallbladder fossa. Perforated, gangrenous cholecystitis was suspected. MRI/MRCP: 3.5 cm gallstone impacted in the gallbladder neck, proximal hepatic duct dilatation, likely adjacent abscess. Bilioenteric fistula was suspected due to pneumobilia. Open cholecystectomy was planned for a diagnosis of Csendes Type V - fistula with complete bile duct wall erosion. Normally, fistula takedown with bileo-enteric reconstruction is preferred; however, the fistula ruptured, with resultant severe inflammation making bileo-enteric reconstruction hazardous. Hence, choledochoplasty using a well-vascularized pedicle of gallbladder neck was performed.

**Results:** Intraoperatively, severe inflammation obscured normal anatomy. The gallbladder was taken dome-down. A broad neck of the gallbladder was attached to the CHD, consistent with Mirizzi’s Syndrome. Subtotal cholecystectomy was performed, leaving a remnant cuff vascularized via cystic artery. Frozen sections were sent, with no evidence of cancer. A pericholecystic abscess, likely from a ruptured bileoenteric fistula, was debrided. A 3.5cm gallstone caused near complete erosion of anterior bile duct - Csendes Type V. The back wall of the duct was identified, with proximal channel towards the liver and distal channel towards duodenum. Choledochoscopy demonstrated no obstruction or lesions. Extensive xanthogranulomatous inflammation precluded biliary-enteric reconstruction, with further dissection concerning for possible Right Hepatic artery compromise. The gallbladder flap approximated easily- therefore choledochoplasty was decided upon. Proximal/distal bile duct was cannulated by 18Fr T-tube; choledochoplasty was performed over it, using interrupted 3-0 Maxon suture without narrowing luminal diameter, re-creating an anterior wall for the bile duct common channel. Pressurized saline through T-tube showed no leak. T-tube cholangiogram confirmed patency and absence of stenosis/obstruction. Several weeks later, a T-tube cholangiogram showed satisfactory repair, with appropriate passage of contrast. Hence, the tube was then removed. The patient did not have any complications.

**Conclusion:** Although rare, Mirizzi’s Syndrome is well-known and historically classified into Type 1 - Gallstone compression of bile duct; Type 2 - Common hepatic/bile duct erosion. Csendes et al. (1989) classified Mirizzi syndrome based on degree of erosion of duct wall into 4 types. Type 5 including cholecystoenteric fistula +/- gallstone ileus was added in 2007. Preoperative suspicion is paramount as bile duct injury approaches 17% incidence, with preoperative diagnosis only made in 62% of patients. Open repair is the gold standard. Cholecystectomy should be sufficient in type 1; any duct wall erosion makes a total cholecystectomy potentially unsafe. Bilioenteric reconstruction, e.g. choledochoplasty or hepaticojejunostomy, may be required for continuity. Choledochoscopy is used to confirm patency, as are cholangiograms in patients with T-tube. This case highlights this disease’s unpredictable nature, and the need for familiarity with options for repair.
P 141. DELAY IN PANCREATECTOMY AFFECTS OVERALL SURVIVAL OF PATIENTS WITH PANCREATIC DUCTAL ADENOCARCINOMA: AN NCDB ANALYSIS
S Naffouje, F Dahdaleh, G Salti
Presenter: George Salti MD | Edward-Elmhurst Health

Background: Pancreatectomy remains the cornerstone treatment of Pancreatic Ductal Adenocarcinoma (PDAC). Herein, we analyze the impact of delay in offering pancreatectomy on overall survival (OS) of PDAC patients.

Methods: NCDB for pancreas cancer 2004-2015 was used for the analysis. Only patients with PDAC who underwent R0 pancreatectomy upfront without neoadjuvant treatments were selected. Kaplan-Meier method was used for survival analysis. Cox regression was used for study independent predictors of outcomes. JPsurv was used to analyze OS curve by temporal delay in surgery.

Results: 340,780 patients in the database, 12,376 of whom met the inclusion criteria. Mean age was 66.31±10.49 years, 50.3% were males, and 61.8% were stage IIIB. The population was validated by Kaplan-Meier survival curve per TNM stage (median survival, Stage IA=64.20±4.39 through Stage III=18.37±1.74). Cox regression confirmed delay from diagnosis to surgery as an independent predictor of OS (p<0.001), in addition to other known factors such as age, comorbidities, stage, grade, and adjuvant treatments. Interestingly, delay between surgery and adjuvant chemotherapy was not a predictor of OS. In case of pancreatectomy and adjuvant chemotherapy, JPsurv demonstrated a joinpoint at 4 weeks correlating with OS 27.56±1.37 months with 0.71 months decline in OS for each week of surgery delay thereafter. If no adjuvant therapy is offered, OS declines steadily by 0.55 months for every week delay between diagnosis and surgery.

Conclusion: Delay in pancreatectomy negatively influences survival in patients with resectable PDAC. Adjuvant chemotherapy appears to reverse this negative effect.
Background: Hepatocellular carcinoma (HCC) accounts for the majority of primary liver cancers, being the sixth most common cancer and coming second in terms of cancer related deaths. On the basis of annual projections the World Health Organisation registers that its incidence is 5 in 100 000 in Latin America while in Nicaragua its incidence rises to 105 per 100 000. Liver transplant and Surgical resection are curative treatments while Transarterial chemobolization (TACE) represents the main palliative treatment. Since 2012 patients with HCC have been treated with TACE in Roberto Calderon university hospital (HERC) in Managua, Nicaragua (Low income country). The objective of this research is to analyse the experience of TACE in patients with HCC treated in the above mention hospital during the period of December 2013 to March 2018.

Methods: Descriptive cross sectional study; patients included where those who were diagnosed with unresectable HCC in a stage A, B or C with a performance status ≤ 2. We included 39 patients with a diagnosis of unresectable HCC underwent TACE in the period from December 2013 to March 2018 in HERC Managua Nicaragua.

Results: Our study revealed that the male sex was predominant with 51.3%, the average age was 44.62 years and 77.44% of our patients came from rural areas. In regards to the BCLC score on presentation, 79.5% of patients presented at an intermediate stage, followed by advanced stage with 17.9% and only 2.9% in an early stage. 35.9% of the lesions were located in both hepatic lobules, 84.5% had ≥ 2 nodules and had an average measurement of 12 cm. 12.8% of the patients had cirrhosis and 10.3% hepatitis B virus infection and the rest of the causes were unknown. The most commonly used chemotherapeutic agent was a combination of cisplatin and doxorubicin and the most commonly used embolizing agent was gelfoam. Complications only arose in 15.4% of cases, the main complication being post embolisation syndrome. In terms of the start of treatment in relation to the time of diagnosis, 35.9% were treated in ≥ 4 months, 12.6% at 2-3 months and only 15.4% in ≤ 1 month. A single TACE session was performed in 61.5% of the cases, 2 sessions in 20.51% and 17.9% were intervened thrice. There was partial response in 53.8% (partial mRECIST). In patients who received one TACE session a partial mRECIST response was achieved in 45.8% and were two sessions of TACE were performed a partial mRECIST was obtained in 62.5% of patients. Research limitations: Survival rates could not be determined due to lack of resourced for the follow up of the majority of patients.

Conclusion: TACE proved to be a safe procedure with low percentage of complications and a 0 mortality rate. It should be noted that due to the socio-economic conditions of the hospital TACE procedure is performed on a low budget but with good results. The standardisation and implementation of a protocol of this palliative treatment option is recommended for patients with unresectable HCC in the country.
Table 1. Characteristics clinical, serum, radiology and response to TACE in patients with HCC HERC, Managua, Nicaragua. n=39

<table>
<thead>
<tr>
<th></th>
<th>m</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>44.62</td>
<td>20.628</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>20 m</td>
<td>51.3</td>
</tr>
<tr>
<td><strong>Neutrophil lymphocyte ratio</strong></td>
<td>2.486 m</td>
<td>1.2306 SD</td>
</tr>
<tr>
<td><strong>Alpha protein level</strong></td>
<td>130.514 m</td>
<td>225.9509 SD</td>
</tr>
<tr>
<td><strong>Tumor site</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilobular</td>
<td>14</td>
<td>35.9 %</td>
</tr>
<tr>
<td>Right lobe</td>
<td>18</td>
<td>46.2 %</td>
</tr>
<tr>
<td><strong>Node numbers</strong></td>
<td>2.38 m</td>
<td>1.045 SD</td>
</tr>
<tr>
<td><strong>Tumor size</strong></td>
<td>11.938 m</td>
<td>6.5088 SD</td>
</tr>
<tr>
<td>No portal vein compromise</td>
<td>38</td>
<td>97.4 %</td>
</tr>
<tr>
<td>Not hepatic vein compromise</td>
<td>39</td>
<td>100</td>
</tr>
<tr>
<td><strong>Response mRECIST</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progression</td>
<td>3</td>
<td>7.7 %</td>
</tr>
<tr>
<td>Stable disease</td>
<td>4</td>
<td>10.3%</td>
</tr>
<tr>
<td>Parcial</td>
<td>21</td>
<td>28.2%</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Not determinate*</td>
<td>11</td>
<td>53.8%</td>
</tr>
</tbody>
</table>

m = mean, SD = standard deviation, *it wasn’t possible to get a CT scan in the follow up
Background: Pancreatic head adenocarcinoma (PC) has poor prognosis despite surgical resection. There is an increasing trend of neoadjuvant treatment (NAT) as opposed to upfront surgery for borderline and localized PC. Similarly there is an increase trend of minimally invasive approach (MIPD) to pancreatoduodenectomy (PD). However, the role of operative approach within the context of NAT remains unclear. The recently published “Miami International Evidence-based Guidelines on Minimally Invasive Pancreatic Resection” endorsed by AHPBA, noted the lack of evidence on which approach was optimal for patients who had received NAT. The aim of this study was to evaluate the impact of operative approach on 30-day outcomes in patients with PC that underwent NAT followed by PD.

Methods: PDs were identified from the 2014–2017 Procedure Targeted Pancreatectomy PUFs. Patients with PC undergoing NAT followed by either MIPD or open PD (OPD) were included. Outcomes assessed were mortality, major complications, minor complications, clinically relevant pancreatic fistula (CR-POPF), delayed gastric emptying (DGE), postoperative length of stay (LOS) and operative time (ORT). Comparisons in both preoperative characteristics and postoperative outcomes were conducted between MIPD and OPD. Patients were further grouped based on operative approach and NAT modality (chemotherapy alone or chemoradiation). Multiple logistic regression was used to adjust for potential confounders and comparisons yielding p-values < 0.05 were considered statistically significant.

Results: In total, 2428 patients underwent PD for PC. Of those, 2219 (91.4%) underwent OPD and 209 (8.6%) underwent MIPD. Patients undergoing MIPD were more likely to receive chemotherapy alone (70.8 vs 57.5%, P < 0.001), less likely to undergo vascular resection (21.2 vs 37.5%, P < 0.001), more likely to have longer ORT (7.18 vs 6.87, P=0.043), and more likely to have a shorter LOS (8.11 vs 9.85 days, P < 0.001). For patients undergoing chemoradiation, MIPD was independently predictive of a lower incidence of major complications (OR: 0.22, P < 0.001). For patients who underwent chemotherapy alone, MIPD was independently predictive of a lower incidence of minor complications (OR: 0.76, P=0.032) and a shorter LOS (Estimate: -2 days, P= < 0.001). There were no significant differences in mortality, DGE, and CR-POPF between the different operative approaches and NAT modalities.

Conclusion: MIPD is safe and feasible in patients with PC undergoing NAT in centers with expertise in this approach. MIPD was associated with a lower incidence of major complications in patients undergoing NAT with chemoradiation. For patients who received NAT with chemotherapy alone, MIPD was associated with shorter length of stay and a lower incidence of minor complications. Further analysis is necessary evaluate the impact surgical approach with type of neoadjuvant chemotherapy, adjuvant chemotherapy receipt and long-term patient survival.
P 144. ADOPTION OF ROBOTIC HEPATECTOMY IN A COMMUNITY CANCER CENTER
R Cornateanu, K Vance, AB Clark, JM Lyons
Presenter: Annabelle Clark | Louisiana State University Health Science Center

Background: Minimally invasive approaches have had slower adoption in hepatobiliary surgery than in other surgical subspecialties. However, the robotic platform offers a more sophisticated alternative to traditional laparoscopy for performing liver resection. Our goals were to examine the adoption of robotic hepatectomy (RH) at a community cancer center and to compare outcomes between open (OH) and RH.

Methods: We analyzed patients at our institution undergoing hepatectomy by a single surgeon over a 5-year period (2013-2018). Demographics and operative outcomes were studied, and comparisons between OH and RH were made.

Results: 94 patients had surgical treatment of their hepatic disease. Of those, 73 were included in this analysis. The mean age of patients undergoing hepatectomy was 61.18, the mean ASA 2.89, and the mean BMI 28.78. During the study period, the percentage of RH cases almost tripled (28.57% RH in 2015 vs. 82.35% RH in 2018; p = 0.0030). Patients undergoing RH had similar demographics, age, BMI. There was a trend toward more cirrhosis among patients undergoing RH (22% vs 7%), but this difference was not significant. Length of stay (5 vs 8 days; p < 0.0001) and median blood loss (150cc vs 400cc; p = 0.0451) were lower following RH. No significant differences were observed in the margin positivity rate nor in overall complication rate; however, complications following OH were more likely to be more severe (≥ Clavien-Dindo Class 3 - 3% vs 21%; p = 0.0254).

Conclusion: Our early institutional experience with RH demonstrates this to be a safe and effective procedure that may offer improved outcomes. Increasing experience with prospective case matched analysis is warranted to ensure oncologic equivalency.
Background: A 44-year-old female who complained of right upper quadrant pain radiating to her back for three months was evaluated in our hospital. Her past medical history included ulcerative colitis (UC) and chronic migraine. Her past surgery history included open cesarean-section, tubal ligation, and abdominoplasty. Abdominal enhanced CT showed a heterogeneously enhancing 7.4×7.9 cm mass arising from pancreatic head with areas of cystic degeneration and calcification which was not closely involved with surrounding vasculature. No biliary or pancreatic ductal dilatation was found. A fine needle aspiration biopsy under endoscopic ultrasound (EUS) was performed for the patient at outside hospital and pathologic diagnosis was considered as well-differentiated neuroendocrine tumor.

Methods: After discussion with the patient, robotic Whipple procedure was recommended. Da Vinci Xi system was used for the surgery. One 10mm assisting trocar and four 8mm robotic trocars were placed.

Results: A large tumor with largest dimension of 8 cm was revealed in the head of pancreas during the surgery, pushing superior mesenteric vein (SMV) to the medial side. Extensive Kocher maneuver was performed to mobilize this large tumor in the head of the pancreas and duodenum out of the retroperitoneum. Finally, a robotic pancreaticoduodenectomy (Whipple procedure) was successfully performed for this patient. Postoperative pathology showed a well-differentiated pancreatic neuroendocrine tumor (8×6.5×6.4 cm, WHO grade 1). Margins and twenty-three lymph nodes were both negative for tumor. Pathologic tumor stage is pT3 pN0. The patient progressed well after the surgery. Surgical drain was removed on postoperative day (POD) 6 and the patient was discharged to home in good condition on the same day. The patient is doing well at the follow up in 3 weeks after discharge.

Conclusion: This experience demonstrates the feasibility and safety of robotic pancreaticoduodenectomy for large pancreatic neuroendocrine tumors.
Background: Gallbladder cancer (GBC) is the most common malignancy of the biliary tract, however, is a relatively rare occurrence with a poor prognosis (overall 5-year survival is 50% for stage I cancers and 3% for stage IV cancers). Risk factors include age, female sex, gallbladder polyps greater than 1 cm cholelithiasis and chronic inflammation. Imaging techniques such as computerized tomography and ultrasound scan can aid with the diagnosis. Patients with GBC diagnosed after cholecystectomy for suspected benign disease represent more than half of new cases. Incidentally discovered GBCs have improved survival, because they are often diagnosed at an earlier stage, the oncologic resection include radical cholecystectomy with liver resection plus lymphadenectomy and in selective case biliary tract resection with reconstruction. Unfortunately, most of the cases is presented in advanced stage for palliative care and some cases include chemotherapy. The objective of this study is to describe the therapeutic approach in patients with Gallbladder cancer in the public hospital Dr Roberto Calderon (HDRC) Managua, Nicaragua.

Methods: Descriptive cross sectional study; 85 patients were included, those with a clinical, histological or radiological diagnosis of gallbladder cancer in HDRCG from 2013 to 2019. Continuous variables are presented as mean ± standard deviation (SD) or as median (25th percentile, 75th percentile).

Results: Our study revealed that the female sex was predominant with 79% of the cases, the average age was 58.6 years, 67% of our patients came from urban areas, 15.2% of the cases had undergone a previous cholecystectomy, 48 patients (56%) was presented in advanced stage, for received palliative care or no treatment. At the time of diagnosis 90% of patients presented with right upper quadrant pain and 34% were jaundiced. Regarding imaging studies, only 63% had a CT scan. The majority of patients had one single lesion, however, 9.4% of cases had multiple lesions. The diagnosis was confirmed through biopsy in 67% , being the adenocarcinoma the histology in 98% of the cases. With regards to treatment modalities, 43.5% of the cases underwent surgery, these surgeries included; conventional cholecystectomy 18% (16 patients) , convention cholecystectomy + hepaticojejunostomy 5.8% (5), segment IV-V hepatectomy + lymphadenectomy 13% (11), segment IV and V hepatectomy + lymphadenectomy + hepaticojejunostomy 5.8% (5); 21 % of the patients received systemic chemotherapy and 34% received palliative care with percutaneous biliary drenage or T Tube drenage. The morbidity related to the surgery was 15%. And finally 9.4% of patients died in the hospital, all of them in advanced stage. Research limitations: The follow up in the study was short, the average follow up in months was mean 5.05 months, but nevertheless in the surgery group the maximum survival was 38 months.

Conclusion: Gallbladder cancer is relative common in our institution, unfortunately the most of the case is diagnosed in advanced stage. The surgery is the most important treatment with positive outcomes short and long term.
Radical cholecystectomy with skin implant resection after T Tube drenage of the Gallbladder cancer in 57 years old female.
P 147. CAN WE CONTINUE BLAMING ON THE STATIC PRESERVATION SOLUTION AS THE SINGLE MOST IMPORTANT CAUSE OF DGF OR PNF FOR LIVER TRANSPLANT?
Presenter: Gabriel Gondolesi | Hospital Universitario Fundación Favaloro

Background: DGF and PNF have shown in different studies the impact they have on early and long term outcomes after liver transplantation. UW has been considered as the Gold Standard preservation solutions until discontinuation. HTK has been the alternative and only available option in different countries. Although controversies have been raised regarding its indications of use and the possible negative impact on graft survival; the preservation solution has been considered by us as just one piece in a very complex procedure, with other variables like DRI, MELD score, logistics, costs (among others) that also have a role as risk factor for graft failure. We aim to analyze the variables involved in a liver transplant procedure during two different eras under the same medical group, but with different preservation solutions (PS), available, in order to evaluate their impact as independent risk factor for graft loss.

Methods: A retrospective database analysis of adult (>18 years old) patients receiving a cadaveric donor organ for a primary liver transplant. Diagnoses, MELD score, BMI, time on waiting list (WL), DRI, national, regional or local procurement; preservation solution used total ischemia time (TIT), warm ischemia time (WIT), cold ischemia time (CIT), delay graft function (DGF), primary non function (PNF), LFT’s, biliary complications, incidence of acute and chronic rejection, patient and graft survival, were analyzed comparing the two study periods (UW: 2009-11; HTK: 2016-19). All analyses were performed using IBM SPSS v20.0.

Results: A total of 290 liver transplant were performed between 2009-11 and 2016-19; 176 (60.7%) were adult primary liver transplants (102 males (58%) and 74 females (42%)). Diagnoses were: viral infections (n=52, 30%), alcoholic liver disease (n=44, 26%), autoimmune hepatitis (n=30, 18%), metabolic diseases (n=24, 14%), cryptogenic cirrhosis (n=18, 10%) and acute liver failure (n=4, 2%). Table 1 summarizes Donor and Recipient variables. We observed a difference on LFT’s when we compared the preservation solution used and the primary disease that lead to the liver transplant (Table 1). There were no differences in biliary or venous complications, DGF, PNF or rejection in regards to donor location. Quite the contrary, there was an increased TGO mean value 48 hs post op. and a higher rate of arterial complications (p: 0.0001), and recurrence of the primary disease (p:0.008) in the UW group. Long term patient and graft survival showed no significant difference in favor of the use of HTK (Figure 1), even when MELD score was considerably worse for this group.

Conclusion: Liver transplantation is a complex multifactorial procedure. Preservation solution is only “one of the multiple players” involved in it, and its use might depend on availability; but other hospital policies and actions like logistics improvement, reduction of TIT and surgical times should be done in order to maintain expected results, since other variables like DRI and recipient MELD can not be modified.
<table>
<thead>
<tr>
<th></th>
<th>UW: 94</th>
<th>HTK: 82</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex (H: ID2 M: 74)</strong></td>
<td>H: 51, M: 43</td>
<td>H: 51, M: 31</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>53.5 ± 12.4</td>
<td>57 ± 10.5</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>BMI receptor</strong></td>
<td>27.8 ± 5.5</td>
<td>27.2 ± 5.2</td>
<td>NS</td>
</tr>
<tr>
<td><strong>MELD</strong></td>
<td>213 ± 6.8</td>
<td>25.5 ± 5.4</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>Time on WL</strong></td>
<td>256.6 (0-202)</td>
<td>222.4 (2-1335)</td>
<td>NS</td>
</tr>
<tr>
<td><strong>DRI</strong></td>
<td>1.56 ± 0.33</td>
<td>1.54 ± 0.34</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Donor’s age</strong></td>
<td>44.3 ± 16.4</td>
<td>43.4 ± 17</td>
<td>NS</td>
</tr>
<tr>
<td><strong>CIT (hours)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td>7.2 ± 1.5</td>
<td>6 ± 2.1</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Regional</strong></td>
<td>7.2 ± 2.1</td>
<td>7.1 ± 2.1</td>
<td>NS</td>
</tr>
<tr>
<td><strong>National</strong></td>
<td>8.3 ± 1.8</td>
<td>7.2 ± 1.7</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>7.6 ± 1.9</td>
<td>6.6 ± 2.1</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>WIT (min)</strong></td>
<td>43.8 ± 13.4</td>
<td>41.7 ± 28.8</td>
<td>NS</td>
</tr>
<tr>
<td><strong>Surgical Time (min)</strong></td>
<td>7.9 ± 1.9</td>
<td>5.4 ± 1.3</td>
<td>0.0001</td>
</tr>
<tr>
<td><strong>T60/TGP first 48hs</strong></td>
<td>931 ± 1980</td>
<td>603 ± 876</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>703 ± 741</td>
<td>512 ± 582</td>
<td>0.008</td>
</tr>
<tr>
<td><strong>Tet. Bil at 48hs</strong></td>
<td>4.5 (0.4-26)</td>
<td>6.5 (0.18-31)</td>
<td>0.004</td>
</tr>
<tr>
<td><strong>5 year graft survival</strong></td>
<td>70%</td>
<td>89%</td>
<td>Log Rank: NS</td>
</tr>
<tr>
<td><strong>5 year patient survival</strong></td>
<td>72%</td>
<td>89%</td>
<td>Log Rank: NS</td>
</tr>
</tbody>
</table>
P 149. RELATIONSHIP OF THE INTRAOPERATIVE COMPLEXITY AND THE OBTAINING OF THE CRITICAL VIEW OF SAFETY WITH THE USE OF THREE OR FOUR PORTS DURING LAPAROSCOPIC CHOLECYSTECTOMY IN EIGHT HOSPITALS IN MEXICO CITY

G Rangel Olvera, B Alanís Rivera, IG Esperón Lorenzana, J Trejo Suarez, JL Beristain Hernández

Presenter: Gabriel Rangel Olvera MD, MSc | Secretaría de Salud de la Ciudad de México

Background: Different studies have shown that there is no difference in the use of three (3P) / four (4P) ports during laparoscopic cholecystectomy (LC) in different surgical variables; however, the majority of studies include only Elective surgeries (ELS) and there is no record of their association with obtaining a satisfactory (SLC) critical view of safety (VCS), part of the Culture of safety in Cholecystectomy (COSIC) and the use of one or another technique in Complex LC (CLC). Our goal is to determine the association of the OCVS (Obtaining of the critical view of safety) with a SLC (using the Intraoperative “Doublet” photography criteria) and CLC (using the Parkland Grading scale, PGS) with the use of 3P or 4P in the LCs done in 8 different second-level hospitals in Mexico City.

Methods: A retrospective, cross-sectional analysis was performed; the first phase of the study was done to determine the proportions of CLC in our population; then a second phase was performed based on a sample size calculation of 384 LC videos; divided into two groups (Non Complex LC (nCLC)/ Low Parkland: Grade 1 and 2, and Complex LC (CLC)/ High Parkland: Grade 3, 4 and 5); demographic and surgical variables were recorded (number of ports used, conversion to open surgery or adding another port, PGS, Doublet, total laparoscopic time (TT) and the time before the stapling of the cystic structures (TSS), elective (ELS) or emergency surgery (ES) and complications. The PGS and OCVS were evaluated by two surgeons with experience in LC and knowledge of the COSIC.

Results: 313 (81.51%) women, 71 (18.49%) men were evaluated; with a mean age of 44.72 years (SD 13). 224 (58.33%) ELS and 160 (41.67%) ES; 201 (52.34%) used 3 ports and 183 (47.66%) 4 ports. 9 (2.34%) bile duct injuries were recognized during surgery, 21 (5.47%) were converted to open surgery and 42 (10.93%) from 3P to 4P; only in 43 LC the OCVS was satisfactory (SLC) (11.2%); the correlation between evaluators for the PGS was 0.9138 and of the OCVS was 0.891. Significant difference was found between 3P LC and 4P LC, in the type of surgery (ELS/ES; 0.026), drainage utilization ( &amp;#60; 0.001), conversion to open surgery (0.012), mean PGS (0.0004, higher in 4P LC), Doublet (0.0054), mean blood loss ( &amp;#60; 0.001), TT ( &amp;#60; 0.001), TALC ( &amp;#60; 0.001). 4P LC was associated to a PGS &gt; 3 (CLC) (OR2.18, &amp;#60; 0.001), but not to a SLC (OR1.3, 0.417); being more complicated cases 4PLC were associated with Bleeding &gt; 100cc (OR3.32), TT &gt; 60min (OR2.77), TALC &gt; 20min (OR2.47). Conversion from 3PLC to 4PLC was associated to age &gt; 45 years (OR3.48, 0.036), Male (OR2.51, 0.021), ES (3.21, 0.04), CLC (PGS &gt; 3) (OR4.65, &amp;#60; 0.001). Previous surgery (2.09, 0.034) or pancreatitis (3.34, 0.04).

Conclusion: The present study shows a tendency to use 4P in CLC, explaining the longer operative time and bleeding in these group; however, this association was not reflected in obtaining a bigger proportion of SLC compared to 3P. Also there is a concerning low rate of OCVS in the main group, no matter if it was an ELC or ES, 3PC or 4PC. We can conclude that most of the surgeries were performed with a 3P approach and 4P mostly used as a conversion during a CLC.
<table>
<thead>
<tr>
<th>Characteristics of the 3PLC and the 4PLC</th>
<th>3PLC</th>
<th>4PLC</th>
<th>p</th>
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<tbody>
<tr>
<td><strong>Parkland Grading Scale (PGS)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Low (1 or 2)</td>
<td>119 (30.99%)</td>
<td>73 (19.01%)</td>
<td>&lt;0.001</td>
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<tr>
<td>High (3,4 or 5)</td>
<td>82 (21.35%)</td>
<td>110 (28.65%)</td>
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<tr>
<td><strong>Doublet</strong></td>
<td></td>
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<tr>
<td>Mean</td>
<td>1.5 (SD 1.75)</td>
<td>2.02 (SD 1.91)</td>
<td>0.0054</td>
</tr>
<tr>
<td><strong>Satisfactory CVS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>181 (47.14%)</td>
<td>160 (41.67%)</td>
<td>0.416</td>
</tr>
<tr>
<td>Yes</td>
<td>20 (5.21%)</td>
<td>23 (5.99%)</td>
<td></td>
</tr>
<tr>
<td><strong>Bleeding</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Mean (cc)</td>
<td>87.31 (SD 63.47)</td>
<td>141 (SD 117.45)</td>
<td>&lt;0.001</td>
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<tr>
<td><strong>Time before the staple of the cystic structures (TSS)</strong></td>
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<tr>
<td>Mean (min)</td>
<td>17.2 (SD 11.29)</td>
<td>25.87 (SD 17.6)</td>
<td>&lt;0.001</td>
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<tr>
<td><strong>Total Laparoscopic time (TT)</strong></td>
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<tr>
<td>Mean (min)</td>
<td>49.46 (SD 25.78)</td>
<td>62.5 (SD 25.09)</td>
<td>&lt;0.001</td>
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<table>
<thead>
<tr>
<th>Associated factors to the use of 4PLC</th>
<th>OR</th>
<th>CI 95%</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding &gt;100cc</td>
<td>3.32</td>
<td>2.18-5.05</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TT&gt;60min</td>
<td>2.77</td>
<td>1.82-4.22</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TSS&gt;20min</td>
<td>2.47</td>
<td>1.62-3.74</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Satisfactory CVS</td>
<td>1.3</td>
<td>0.66-2.45</td>
<td>0.417</td>
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<tr>
<td>High PGS</td>
<td>2.18</td>
<td>1.45-3.28</td>
<td>&lt;0.001</td>
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<table>
<thead>
<tr>
<th>Associated factors to the conversion of 3PLC to 4PLC</th>
<th>OR</th>
<th>CI 95%</th>
<th>p</th>
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<tr>
<td>Male</td>
<td>2.51</td>
<td>1.3-2.34</td>
<td>0.021</td>
</tr>
<tr>
<td>Age &gt;45 years</td>
<td>3.48</td>
<td>1.1-2.12</td>
<td>0.036</td>
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<td>Emergency Surgery</td>
<td>3.21</td>
<td>1.5-4.23</td>
<td>0.04</td>
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<td>2 or more comorbidities</td>
<td>1.09</td>
<td>0.7-2.76</td>
<td>0.67</td>
</tr>
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<td>History of Pancreatitis</td>
<td>3.34</td>
<td>1.1-3.56</td>
<td>0.002</td>
</tr>
<tr>
<td>Previous Surgeries</td>
<td>2.09</td>
<td>1.56-6.67</td>
<td>0.034</td>
</tr>
<tr>
<td>High PGS</td>
<td>4.65</td>
<td>1.32-4.98</td>
<td>&lt;0.001</td>
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* 3PLC: 3 port Laparoscopic Cholecystectomy, 4PLC: 4 port Laparoscopic Cholecystectomy, PGS: Parkland grading Scale, CVS: Critical View of Safety, TSS: Time before the staple of the cystic structures, TT: Total Laparoscopic Time.
P 150. SAFE HEPATECTOMY AFTER ARTERIAL-BASED LIVER DIRECTED THERAPY


Presenter: Anel Sood | Indiana University

**Background:** Liver directed therapy (LDT) for primary and secondary liver cancer has been increasingly utilized in patients with technically unresectable liver tumors, or in patients with surgically prohibitive underlying liver disease or medical comorbidities. Recent studies have shown that transarterial radioembolization (TARE) may reduce tumor burden and permit hepatectomy for complete tumor clearance. The short- and long-term outcomes of patients undergoing hepatectomy following TARE are reported in this study.

**Methods:** An observational study of patients undergoing partial hepatectomy after TARE with yttrium-90 (Y90) between 2013-2018 was performed. Demographics, comorbidities, TARE specific variables, perioperative outcomes, and long-term outcomes were recorded. Variables specific to TARE included the number of procedures, arterial selectivity of embolization, and total millicurie (mCi) dose. Operative variables included the extent of hepatectomy, estimated blood loss (EBL), duration of operation, major postoperative morbidity (Clavien-Dindo Grade III-V complications), hospital readmission, and 30-day mortality. Long-term outcomes were recorded as pattern of recurrence, disease-free survival, and overall survival.

**Results:** Eight patients (6 females, 2 males; mean age 60.4 +/- 1.8 years) underwent TARE for initially unresectable liver cancer, including hepatocellular carcinoma (n = 5), metastatic cancer (pancreatic neuroendocrine n = 1, pulmonary neuroendocrine n = 1), and cholangiocarcinoma (n = 1). The mean total dose of Y90 was 86.1 +/- 14.4 mCi during a single procedure (n = 4) or over two procedures (n = 4). Selective TARE was performed in five patients (63%) and nonselective in three patients (38%). The mean time from TARE to hepatectomy was 12.4 +/- 4 months. Six of the 8 patients (75%) required major hepatectomy (all open technique). Mean EBL was 1056 +/- 294 mL, and mean operative time was 271 +/- 43 minutes. Postoperatively, major morbidity was seen in three patients (38%) and included organ-space surgical site infection (n = 1), pneumonia requiring reintubation (n = 1), and bile leak (n = 2). Readmission occurred in four patients (50%). There were no 30-day mortalities. After a median follow-up of 37 months, recurrence was observed in four patients (50%); three patients developed hepatic recurrence, and one patient developed peritoneal recurrence. The mean disease-free survival and overall survival were 18.1 +/- 5.0 months and 33.8 +/- 8.4 months, respectively.

**Conclusion:** Hepatectomy following liver-directed therapy with Y90 radioembolization appears to be a safe treatment paradigm for patients with advanced stage liver cancer and can result in good long-term outcomes.
Figure 1. Kaplan-Meier Curve Displaying Disease-Free and Overall Survival
P 151. RIGHT HEPATECTOMY AS A SALVAGE TREATMENT FOR STEWART-WAY TYPE IV BILE DUCT INJURY
JL Beristain-Hernandez, M Garcia-Sanchez
Presenter: Jose-Luis Beristain-Hernandez MD | "La Raza" National Medical Center

Background: We present the case of a female woman presenting with a Stewart-Way type IV bile duct injury after an elective cholecystectomy that involved the right hepatic artery and the right portal branch and the right hepatic bile duct.

Methods: Patient is a 44 years-old female, with a previous history of Diabetes Mellitus. She had undergone a laparoscopic cholecystectomy 3 weeks before at another center. During the cholecystectomy they had a profuse bleeding requiring direct suture. During the postoperative period she had no bile flowing through the T tube yet she developed a high output bile leak (up to 600 ml per day). A CT scan found an heterogenous liver parenchyma, mainly over the right hemiliver. Due to the diagnosis of high output bile leak and a possible liver abscess she was referred to our tertiary care medical center. At our Center she was found to have severe abdominal pain, mainly over the epigastrium and right flank. She had a mild anemia (10.1 g/dL), glycemic descontrol (224 mg/dL) but markedly elevated liver enzymes (ALT 3112 U/L, AST 3340 U/L, alkaline phosphatase 200 U/L) and a total bilirubine 1.14 mg/dL. A triphasic CT scan showed a subdiaphragmatic liquid collection, a complete obliteration of the right branch of the portal vein and the right hepatic artery; and a lot of metallic clips in this area. A percutaneous drainage of the subdiaphragmatic was performed, obtaining 500 ml of purulent and biliary liquid; and she was started on Piperacillin-Tazobactam for 7 days. After her liver enzymes had normalized and due to her ischemic hepatic injury to the right hemiliver, she was proposed and programmed to a right hepatectomy. During the surgery a complete obliteration of the right portal branch and right hepatic artery was confirmed and the right hepatic bile duct was completely transected and left opened. Also the "T" tube was found to be out of the common bile duct. A right hepatectomy was performed with a parenchymal transection by means of cavitron ultrasonic surgical aspirator (CUSA ®) and bipolar sealer (Aquamantys ®) with no need of Pringle maneuver. It was decided not to perform the left hepaticojejunostomy due to the inflammatory status of the cavity, the biliary and purulent collections in the abdomen and the time passed from the bile duct injury.

Results: Patient stayed at the Intensive Care Unit for three days. She was started on liquid diet at day two and normal diet at day three. As she developed a low output bile leak, that was treated by retrograde endoscopic cholangio-pancreatography (ERCP), sphinterotomy and insertion of 10 French/5 cm biliary stent at day seven. The bile leak diminished after the biliary stent was placed and eventually closed at day 12. The patient was discharged at 15 days after the hepatectomy with normal liver enzymes and bilirubines.

Conclusion: Complete right hepatic pedicle ligations are very rare. Actually, the Stewart Way Classification includes a right hepatic artery ligation but not a portal branch ligation, which makes this a really particular case.
Background: Tumor sizing has prognostic consequences in patients with pancreatic cancer, as larger tumors tend to invade vital structures impeding resection and are associated with higher rates of metastatic lymphadenopathies. Endoscopic ultrasound (EUS) plays a crucial role in the staging of these patients, but findings are directly dependent on the experience of the operator and tumor location. In this study, we compared preoperative tumor sizing measured by EUS to size on pathological specimens in patients that underwent curative-intended resections.

Methods: A retrospective review of patients with biopsy proven adenocarcinoma of the head of the pancreas that underwent resection at a tertiary center was performed. Basic demographics were recorded. Maximal tumor dimensions determined by EUS were compared to those found on final pathological reports. Analysis was performed with Pearson correlation test using SAS studio.

Results: A total of 97 patients underwent a pancreaticoduodenectomy during the study period. Patients that underwent neoadjuvant therapy for borderline resectable or locally advanced cancer were excluded from the analysis. From the remaining group, 56 patients underwent upfront surgery for resectable disease. Most patients were males, whites, with an average age at diagnosis of 69 years. The total number of harvested lymph nodes was 15 with a positivity rate of 82%; 77% of patients had R0 resections. The average maximal dimension of the tumor calculated by EUS was 2.45 cm, compared to 3.11 cm seen on pathological reports (Pearson correlation coefficient 0.45400, p=0.0004).

Conclusion: Endoscopic ultrasonography is commonly used in the diagnostic workup of patients with pancreatic cancer. Based on our results, determination of tumor sizing based on EUS has the potential to under-stage patients with pancreatic cancer.
Background: There is data to suggest that more graduates from Hepatopancreatobiliary (HPB) surgery fellowships go into private practice than anticipated. Fellowships do not prepare them for this environment. In a world where HPB surgery services have typically existed in large academic institutions only, we are also now seeing an increasing number of hybrid models within these institutions. We would like to present a novel way of defining the growth of an HPB practice outside the traditional academic setting.

Methods: We examined the nuances of starting and developing a NU-TCC for HPB surgery and present them in a simplified fashion. Not much data is available to guide fellows and young HPB surgeons in this regard and most learn on the job. The information presented here is based on anecdotal data and experiences garnered over several years of running a successful HPB practice.

Results: Upon examining the nuances of starting and growing an HPB practice in the private setting the following four pillar of a surgical service were identified – Referral base, Outpatient growth, Practice management and Inpatient growth. The minutia of practice management including finances, billing, coding and staff management, the list of services that need to be secured to provide easy and timely care for our patients in the outpatient setting were identified and detailed. The essentials needed to maintain a certified HPB service include training of nursing and operating room staff, multidisciplinary consulting services and hospitalists. To maintain growth the referral base needs to be continuously maintained and increased. Having a broad based practice, saying “Yes!!” to each problem that is presented, being available/affable/able and being timely in taking care of patients are all crucial aspects. (Image included)

Conclusion: With this we hope to provide a road map for our trainees to start their own practices, clear myths and enable them with the tools to venture forth into any scenario knowing the way to succeed.
Background: The optimal surgical procedure for perihilar cholangiocarcinoma is based on tumor location and the longitudinal and horizontal extensions. Right-sided hepatectomy is often used because it appears to be oncologically advantageous assuming that, in addition to possible arterial involvement, the left hepatic duct is longer than the right and a negative ductal margin is expected. However, few studies addressed the length of the duct in normal livers. The aim of this study is to examine the lengths of the right and left hepatic ducts to guide surgical strategy for perihilar cholangiocarcinoma.

Methods: Twenty-seven adult cadavers were used in this study, preserved in 10% formaldehyde. After entering the abdominal cavity, the entire liver, with the retro-hepatic vena cava, hepatic artery, portal vein and bile duct, was removed, in a manner similar to harvesting a liver for transplantation. The bile duct was opened longitudinally and the intraluminal lengths of the right and left ducts measured.

Results: The right and left hepatic ducts measured 13.7±7.5 and 11.9±6.6 mm, respectively (p=0.11). In each specimen, the right duct was longer in 13 (48%), the left in 11 (41%) and the same length in 3 (11%) with no statistically significant difference (p=0.30).

Conclusion: The left hepatic duct is not significantly longer than the right in a majority of specimens examined. Judicious selection of the surgical procedure is necessary for Bismuth type IV perihilar cholangiocarcinoma with similar ductal extension.
P 155. COMPLETE RESPONSE OF ADVANCED INTRAHEPATIC CHOLANGIOCARCINOMA. CASE REPORT
Presenter: Jorge Sanchez-Garcia MD | Intermountain Medical Center

Background: Surgical resection is a mainstay of treatment in intrahepatic cholangiocarcinoma (icca), but it is only possible in 10-40% cases. In advanced disease cases, only chemo-/chemoradiotherapy is possible with a median overall survival of 11.7 months. Recent studies in precision medicine-based immunotherapy approaches have controversial results with survival improvement only in selected cases. The aim of this study is to report a case of unresectable icca treated with pembrolizumab and subsequent surgical resection.

Methods: a 60-year old male presented for a second opinion for persistent abdominal pain, decreased appetite, fatigue and 3 kg weight loss. Two months ago, his diagnosis was a poorly differentiated adenocarcinoma, favour pancreaticobiliary origin (ck7, ck18, ck20 focal weak, cdx2 positive in subset in tumor cells). Due to the large size and invasive nature, palliative chemotherapy was offered but the patient refused it. In our first physical examination was notable an enlarged firm mass fixed and immovable, and a palpable liver edge. A ct scan showed large liver mass measuring 20.8x15.5 cm occupying almost all of the left liver lobe and partially the right liver lobe, other small right hepatic lobe areas were identified, the portal veins were thrombosed and the main portal vein, metastatic nodes at the aorticocaval region and minimal to moderate free fluid in the abdomen (figure 1). The patient started immunotherapy with pembrolizumab (2 mg/kg every 21 days). After the second cycle of pembrolizumab, a paracentesis removed 3.7 l of clear yellow fluid without malignant cells. Following the procedure, the patient tolerated the immunotherapy and had progressive clinical improvement. After the 16th cycle, a ct-scan showed decreased size of the liver mass (11.3x8 cm) with stable portal thrombosis. A pet-ct and mri ruled out metastatic disease. The patient underwent to open left lobectomy, open cholecystectomy, portal and pericardial lymphadenectomy and portal vein thrombectomy. Pathology reported scant viable atypical epithelial cells, prominent mucin in the liver and portal vein, and negative margins compatible with complete response, all the lymph nodes were benign. The patient was under surveillance almost two years since he started the immunotherapy and almost a year since the surgery with progression-free survival (figure 1).

Results: Immunotherapy has transformed the management of a variety of advanced neoplasms. However, there are few reports of immunotherapy in icca patients and the observed therapeutic benefit has been inconsistent in this cohort. There are some case reports and keynote-028 clinical trial that have reported the outcomes of immunotherapy in biliary tract cancer, however all these studies only included patients with surgical resection, chemotherapy-refractory and progressive disease. The case reported here is the first to our knowledge of an advanced icca patient with immunotherapy as a first line of treatment who experienced a complete pathological response.

Conclusion: To our knowledge, this represents the first report of neoadjuvant immunotherapy in an unresectable icca patient who experienced complete pathological response. The patient continues to have no evidence of recurrence more than 24 months after diagnosis. This study opens new horizons and opportunities in treatment and further clinical trials in personalized medicine.
**Background:** Distal pancreatic resections are intricate operations with the potential for significant morbidity. Controversy remains on the appropriate setting for complex pancreatic surgery based on surgeon and hospital volume. Minimally invasive pancreatic surgery has garnered support based on several positive outcomes. We report our experience with both open and laparoscopic distal pancreatectomy in a community-based, academic-affiliated teaching hospital.

**Methods:** A retrospective comparative study included all patients who underwent laparoscopic distal pancreatectomy (LDP) and open distal pancreatectomy (ODP) for both benign and malignant pancreatic pathology between June 2004 and October 2017. Both groups were compared for perioperative characteristics, techniques of pancreatic parenchymal resection, and outcomes. The costs of the procedures were also compared.

**Results:** A total of 138 patients underwent distal pancreatectomy during the study period. The distribution of LDP versus ODP was 68 and 70, respectively. Multivisceral resections other than splenectomy were performed in 34 patients, while the spleen was preserved in 13 patients; ODP cases had a higher proportion of multivisceral resections (p<0.01). Splenic vessels were ligated en bloc in 52 patients with the estimated blood loss (EBL) noted to be significantly lower in the en bloc group (p=0.04). Operative time (146-min vs. 174-min), EBL (139-mL vs. 395-mL), and mean length of stay (4.8 days vs. 8.0 days) were significantly lower in the laparoscopic group. The overall Clavien Grade 2 or 3 morbidity (based on 30-day outcomes) was 13.7% (19/138). The incidence of clinically significant pancreatic fistula (Grade B/C) was 6.5% (9/138) with no difference between open and laparoscopic groups. There were no 30-day and 90-day mortalities. Malignant neoplasia was found in 61 out of 138 resections. The mean tumor diameter was greater for ODP (6.4 cm vs. 2.9 cm), but there was no significant difference in the mean number of harvested nodes between ODP and LDP (8.6 vs. 7.4 respectively). The cost of hospitalization (including readmissions) and surgery was significantly lower for the LDP ($7,558 vs. $11,610).

**Conclusion:** The study reports data on a large series of distal pancreatic resections that compared ODP and LDP in a community-based, academic-affiliated, teaching hospital. A shorter hospital stay, less operative blood loss, and reduced costs were demonstrated in the LDP group, with comparable morbidity and oncologic outcomes between the two operative strategies. When possible, en bloc transection of the splenic vessels and parenchyma should be considered to reduce blood loss and achieve a low pancreatic fistula rate. Complex pancreatic resections, including minimally invasive approaches, are feasible and safe within the confines of a dedicated and well-constructed hepatobiliary (HPB) program.
Background: Carbon-ion radiotherapy (C-ion RT) is a type of radiotherapy. C-ion RT can provide a more conformal dose distribution to the target because of its lower degree of lateral scattering, and better biological effects due to high linear energy transfer compared to X-ray therapy. The aim of this study is to evaluate the efficacy and safety of C-ion RT for local recurrence after surgery for pancreatic cancer.

Methods: From November 2015 to July 2019, 20 consecutive patients who underwent C-ion RT for local recurrence after surgery for pancreatic cancer were retrospectively analyzed. C-ion RT was performed with 55.2 Gy (RBE) at 12 fractions in 3 weeks. The median age of the patients was 67 (49-84) years old. The recurrent sites were around celiac and/or superior mesenteric artery in 13 patients, residual pancreas in 6 patients, and around an aortic artery in 1 patient. Fourteen patients except for 6 residual pancreatic recurrence were unresectable due to invasion around the main artery. The interval between primary surgery and C-ion RT was 22.4 (8.8-74.2) months.

Results: In all patients, planned C-ion RT was completed. In 19 patients (95%), concurrent chemotherapy with gemcitabine or S-1 was performed. Initial failure sites were local recurrences in 3 patients and distant metastases in 5 patients. The 1- and 2-year overall survival (OS) rates were 77% and 64%, respectively. The median OS was 32.9 months. Grade 3 toxicity was observed in only 2 patients (anorexia and leukopenia). There was no grade 4 or 5 toxicity.

Conclusion: C-ion RT for local recurrence after surgery for pancreatic cancer can be safely performed and results in relatively long survival. Future prospective clinical trials are warranted.
P 158. PANCREATICODUODENECTOMY IN A COMPLETE SITUS INVERSUS PATIENT
E Alonso, J Gerry, AM Schneider, PH Newell, ML Babicky, V Wagner, PD Hansen
Presenter: Emilio Alonso MD | Providence Portland Medical Center

Background: Pancreaticoduodenectomies have increasingly been performed with lower morbidity and mortality. Despite the propagation of biliopancreatic operations, there have been few pancreaticoduodenectomies in complete situs inversus patients reported in the literature. Here we report a pylorus preserving pancreaticoduodenectomy in a complete situs inversus patient for a distal cholangiocarcinoma.

Methods: After completion of a staging laparoscopy with intra operative ultrasound, an open approach was elected given the rarity of the case. The position of the main operating surgeon was to the left of the patient, while the first assistant stood on the right. For exposure, the mount of the Thompson retractor was placed on the left. A double layer, continuous running, end to side, duct to mucosa pancreaticojejunostomy was completed. While the biliopancreatic anastomosis was completed in an end to side, duct to mucosa, interrupted fashion. A hand-sewn double layer, anti-colic duodenjejunojunostomy was constructed.

Results: The patient was a 78-year-old female who was diagnosed with an early stage, distal cholangiocarcinoma while undergoing work up for obstructive jaundice, weight loss, and fatigue. Patient underwent preoperative staging with a multiphase CT scan of the abdomen as well as an EUS with FNA/FNB. Biliary decompression was obtained endoscopically with placement of an endobiliary stent. A staging CT of the chest and pelvis were also obtained. Serum Ca 19-9 was 3. During her staging laparoscopy, there was no evidence of peritoneal disease. An intraoperative operative ultrasound of the liver was also obtained. A small surface liver nodule was wedged and sent for frozen sections. No evidence of malignancy was noted. The decision was made to proceed with an open pylorus preserving pancreaticojejunostomy. Operative time was 3 hours and 14 minutes, estimated blood loss 500 ml. Patient resumed normal diet on POD #3, and her surgical drain was removed after there was no evidence of a biochemical leak. She was discharged on POD #7. Formal pathology was consistent with a 3 cm, moderately differentiated distal cholangiocarcinoma with no evidence of disease on 23 examined lymph nodes, pT3N0. Postoperative patient completed adjuvant chemotherapy and continues to do well while undergoing surveillance.

Conclusion: In conclusion, a pancreaticoduodenectomy could be safely performed on a complete situs-inversus patient with minimal adjustments by an experienced surgeon in a high volume center for pancreaticobiliary surgery.
Background: Robotic hepatectomy is safe and feasible when performed by trained surgeons. Universal adoption is limited due to the complexity of the operation and the steep learning curve as well as inherent risks associated with liver resection including bleeding. We describe in our series consecutive robotic hepatectomies performed in a community hospital with emphases on evaluating the predicted (ACS NISQUIP) and observed outcomes.

Methods: Consecutive patients undergoing liver resection surgery by a robotic fellowship trained HPB surgeon at a community hospital setting were evaluated for demographics, pathology, post-operative complications, length of stay, ACS NISQUIP risk score for any and serious complications, 90-day mortality, 30-day readmission, preoperative embolization as well as conversion to open surgery. All liver surgeries performed by the surgeon are done using the robotic Da'Vinci XI platform.

Results: 22 consecutive patients underwent robotic hepatectomy surgery. Median: Age was 56.5y, BMI was 29.5. Median expected LOS was 6 days and actual LOS 3 days. Median ACS risk for any complications was 20% and for serious complications was 18%. Median for observed rates of any complications was 13.7%. Major hepatectomy was performed in 31.5% and post-operative bleeding occurred in 4.5% and infection in 13.7%. There was an associated major procedure (Colon resection, pancreaticoduodenectomy etc.) in 18.7% of patients. There was no mortality and 4.5% readmission rates. There was 87.7% R0 resection rates in this cohort.

Conclusion: Although this is not a large series, it does demonstrate that robotic hepatectomy is safe to perform even in a community hospital setting provided there is technical expertise to do. The outcomes are superior to open surgery as predicted by the ACS NISQUIP risk calculator. In addition, the outcomes are seen even in the learning curve phase of a fellowship trained HPB surgeon.
P 160. CURRENT STATUS AND CHALLENGE OF ROBOTIC MAJOR HEPATECTOMY IN OUR INSTITUTION
T Uemura, L Machado, K Tabar, R Tindall, N Thai
Presenter: Tadahiro Uemura MD, PhD | Allegheny Health Network

Background: Robot-assisted laparoscopic surgery is rapidly expanding in many surgical fields. However, robotic liver resections are still performed only in specialized centers. It is not clear whether robotic liver surgery is safe and effective. We retrospectively analyzed our robotic major hepatectomy.

Methods: Total of 49 robotic liver resection were performed at our institution from May 2017 to June 2019. Eleven cases (6 right hepatectomy and 5 left hepatectomy) were robotic major hepatectomy and da Vinci Xi system was used.

Results: Median operative time was 495 mins (380-770 min). Median blood loss was 500ml (200-2200ml). Median hospital stay was 6 days (4-12 days). No conversion to open was experienced. One patient had post iterative bile leak. Median follow up was 390 days (60-710 days) and all cases are alive (Table). In our robotic liver major hepatectomy, one gel port is placed under umbilicus. Through the gel port, one robot port and one 12 mm assistant port are placed. The other 3 robot ports are placed in lower abdomen. We perform robotic liver resection in a similar fashion of open liver resection. A demarcation line is confirmed after hepatic artery and portal vein are controlled. When the demarcation line is unclear, indocyanine Green is injected and the demarcation line is confirmed under fluorescence. Harmonic scarpel or vessel sealer are used for hepatic parenchymal dissection with anterior approach. Bleeding from liver parenchyma is controlled with bipolar forceps or stitches. Bile duct hilar and plates are divided with Endo GIA stapler.

Conclusion: Robot major hepatectomy can be safely performed with similar fashion of open liver resection. Robotic liver surgery has advantage of bleeding control because it has easier stitch handling under stable camera with high resolution 3D pictures. However, there is no favorable device for liver parenchymal dissection, and it leads longer operative time and more blood loss.

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Disease</th>
<th>Hepatectomy</th>
<th>OR time</th>
<th>EBL</th>
<th>Hospital stay</th>
<th>Conversion</th>
<th>Complication</th>
<th>Survival</th>
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</thead>
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<tr>
<td>68</td>
<td>F</td>
<td>Liver met.</td>
<td>Right</td>
<td>9hr 40 min</td>
<td>200ml</td>
<td>6 days</td>
<td>no</td>
<td>no</td>
<td>25M alive</td>
</tr>
<tr>
<td>68</td>
<td>F</td>
<td>Liver met.</td>
<td>Right</td>
<td>8hr 35 min</td>
<td>500ml</td>
<td>12 days</td>
<td>no</td>
<td>no</td>
<td>22M alive</td>
</tr>
<tr>
<td>94</td>
<td>M</td>
<td>HCC</td>
<td>Left</td>
<td>7hr 47 min</td>
<td>800ml</td>
<td>5 days</td>
<td>no</td>
<td>Bile leak</td>
<td>22 M alive</td>
</tr>
<tr>
<td>72</td>
<td>F</td>
<td>Liver met.</td>
<td>Right</td>
<td>6hr 49 min</td>
<td>300ml</td>
<td>7 days</td>
<td>no</td>
<td>no</td>
<td>18 M alive</td>
</tr>
<tr>
<td>75</td>
<td>M</td>
<td>Liver met.</td>
<td>Left</td>
<td>6hr 29 min</td>
<td>700ml</td>
<td>8 days</td>
<td>no</td>
<td>no</td>
<td>13 M alive</td>
</tr>
<tr>
<td>75</td>
<td>M</td>
<td>IHC</td>
<td>Left</td>
<td>6hr 52 min</td>
<td>700ml</td>
<td>6 days</td>
<td>no</td>
<td>no</td>
<td>13 M alive</td>
</tr>
<tr>
<td>67</td>
<td>M</td>
<td>Liver met.</td>
<td>Left</td>
<td>7hr 11 min</td>
<td>400ml</td>
<td>6 days</td>
<td>no</td>
<td>no</td>
<td>12 M alive</td>
</tr>
<tr>
<td>69</td>
<td>F</td>
<td>IHC</td>
<td>Left</td>
<td>9hr 1 min</td>
<td>500ml</td>
<td>4 days</td>
<td>no</td>
<td>no</td>
<td>11 M alive</td>
</tr>
<tr>
<td>40</td>
<td>F</td>
<td>Liver met.</td>
<td>Right</td>
<td>12hr 50 min</td>
<td>2000ml</td>
<td>6 days</td>
<td>no</td>
<td>no</td>
<td>10 M alive</td>
</tr>
<tr>
<td>57</td>
<td>F</td>
<td>Benign bile duct stricture</td>
<td>Right</td>
<td>7hr 21 mins</td>
<td>500ml</td>
<td>6 days</td>
<td>no</td>
<td>no</td>
<td>0M alive</td>
</tr>
<tr>
<td>47</td>
<td>M</td>
<td>Liver met.</td>
<td>Right</td>
<td>10hr 42 mins</td>
<td>2200ml</td>
<td>4 days</td>
<td>no</td>
<td>no</td>
<td>2M alive</td>
</tr>
</tbody>
</table>
P 161. EMOTIONAL INTELLIGENCE IN HEPATITIS C PATIENTS IS IMPROVED IN 8 WEEKS
F Ramirez, N Nedley, D Fernandez, D Burkitt, R Gallant
Presenter: Francisco Ramirez MD | Nedley Clinic

**Background:** Assess change in emotional intelligence (EQ) with those affected with Hepatitis C, after an 8-week community-based lifestyle change program. EQ has been linked to success in life.

**Methods:** From 7008 participants that finished the program the lifestyle intervention 89 participants reported having hepatitis C and were used for the study, average age of 55.2 SD 11.8. The educational program met once every week for two hours. One session was committed to education on principles of cognitive behavioural therapy by trained and certified facilitators. The weekly program included video presentations of health professional, small group discussions and hands on exercises emphasizing mental and physical habits such as positive thinking, exercise, diet. At baseline and at the end of the program every participant filled out a 75-item questionnaire which included a standardized mini EQ test, and demographics.

**Results:** Average group EQ at the beginning was 96.3, SD 13.7, mode 98, median 98. By end average EQ was 104.9, SD 14.5, mode 108, median 106. The improvement in EQ after the program was significant.

**Conclusion:** The educational lifestyle change program, with trained facilitators, effectively improves EQ by an average of 8.6 points in 8 weeks. Further follow up is needed to evaluate long-term change.
Background: The adoption of laparoscopic techniques in liver surgery has lagged behind that in other fields. Scoring systems, such as the Iwate Difficulty Score have been developed to predict the difficulty of laparoscopic liver surgery and the risk of conversion to an open surgery, and have been used to select cases appropriately at different stages of the learning curve. At our institution, a Canadian tertiary care center, only a small minority (7%) of liver surgeries was performed laparoscopically over the past 7 years. Our hypothesis is that this proportion can be significantly increased with programmatic implementation of laparoscopic liver surgery (PILLS). The objective of this investigation is to determine the distribution of Iwate Difficulty Scores of patients undergoing liver surgery at our Canadian tertiary care center between 2012 and 2017 and to define benchmarks for selection of cases for laparoscopic liver surgery at different parts of the implementation of our laparoscopic liver surgery program.

Methods: Patients who underwent liver resection between January 1, 2012 and December 31, 2017 were reviewed retrospectively. A LLR difficulty score was calculated for each patient based on tumor location, extent of liver resection, tumor size, proximity to major vessels, and liver function.

Results: From 2012 to 2017, 218 patients who underwent liver resection were included. Thirty (13.8%) were scored as low difficulty, forty-one (18.8%) were scored as intermediate difficulty, and 147 (67.4%) were scored as high difficulty.

Conclusion: This single-centre retrospective analysis of the LLR difficulty score demonstrates potential for increasing the proportion of liver surgery performed laparoscopically at a Canadian academic centre. Understanding the spread of difficulty scores can enable safe patient selection in the early phases of implementing a laparoscopic liver surgery program.
P 163. ALPPS AND MINIALPPS. ALTERNATIVES BETWEEN LIVER HYPERTROPHY TECHNIQUES. PRESENTATION OF TWO CASES IN LIVER DISEASE OF NON-COLORECTAL ORIGIN
F Vergara, C Tarazona, M Duque, M Corrales
Presenter: Fabio Vergara MD | IPS Universidad de Antioquia, Clinica Leon XIII

Background: Liver resections are the treatment of choice for most liver tumors. Thanks to liver regeneration, various procedures have appeared to stimulate liver hypertrophy in cases where it is required. Among them is the ALPPS (Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy), which consists of performing a hepatectomy in two stages, achieving faster hypertrophy and in less time. This surgical technique can have high morbidity and mortality rates, so it is very important to properly select patients. In recent years, groups from Chile and Argentina have developed a variant in this technique which they have called Mini-ALPPS, where the hepatic transection is minor, thus reducing the morbidity that this part of the surgery can bring.

Methods: We present two cases of ALPPS and Mini-ALPPS in liver disease of non colorectal origin. The first case of a two-stage hepatectomy using ALPPS is a 65-year-old male patient, with MRI of the abdomen shows a giant liver in the right lobe and part of segment IV compatible with probable hepatocarcinoma over non-cirrhotic liver. Hepatic volumetry show insufficient hepatic remnant, it was decided to perform an ALPPS with the aim of obtaining a faster hepatic hypertrophy. The first time was performed by laparoscopic technique, achieving right portal ligation and hepatic transection. At 10 days, a new abdominal tomography was performed to assess hypertrophy. Then proceed to the second time of the ALPPS, with an open approach. Hepatic transection is completed with right hepatic artery ligation, right bile duct control and right hepatic vein section. In the second case we used de Mini-ALPPS strategy. A 52-year-old woman with a history of resected retroperitoneal sarcoma. In the follow-up hepatic recurrence of sarcoma. MRI confirms presence of hepatic bilobar disease in the right lobe and segment IV with a single lesion in the left lateral section. It was decided to perform MiniALPPS with resection of the metastasis of the left lateral section, right portal ligation and hepatic section of 3cms deep in the first stage. At 10 postoperative days a CT scan of the abdomen shows compensatory hypertrophy of the left lateral section. In the second stage an extended right hepatectomy was performed.

Results: In the two cases the procedure was uncomplicated, did not require blood transfusion or vasopressor support, extubation and transfer to the ICU was achieved for surveillance. The ALPPS case had no signs of liver failure, he was discharged after 8 days. The pathology shows a hepatocarcinoma on non-cirrhotic liver. The MiniALPPS case has present type B postoperative liver failure, it required vasopressor support and blood transfusion. The pathology confirmed sarcoma metastases.

Conclusion: ALPPS and MiniALPPS are an alternative in the treatment of liver tumors where the liver remnant is insufficient. They can use when the cause of its tumor biology and we need a hypertrophy is less time or when the other ways of generating hypertrophy are failed. However, it is a procedure that can have high morbidity and mortality, so it is important to select patients in a multidisciplinary team.
P 164. SHOULD LAPAROSCOPY BE THE INITIAL APPROACH FOR COMPLETION CHOLECYSTECTOMY IN RECURRENT CHOLECYSTITIS AFTER SUBTOTAL CHOLECYSTECTOMY?
I Horattas, A Guzowski, N Ali, J Gabra, D Eng
Presenter: Ileana Horattas MD | Cleveland Clinic, Akron General

Background: Subtotal cholecystectomy has become a widely accepted alternative for patients presented with acute cholecystitis resulting in significant inflammation and anatomic distortion. Recurrent cholecystitis of the remnant gallbladder is an accepted complication of this procedure. International studies have shown completion cholecystectomy to be the definitive management of recurrent cholecystitis. Few investigators in the United States have focused on management of this scenario, and to this point open surgical approach has been recommended.

Methods: Cholecystectomies undertaken by one hepatobiliary surgeon over a two-year period from 2017-2019 were reviewed. Cases of patients with previous cholecystectomy who then presented with acute cholecystitis and underwent laparoscopic completion cholecystectomy were compiled and reviewed to determine interval from initial cholecystectomy, operative time, use of intraoperative cholangiography, use of intraoperative indocyanine green (ICG), placement of drain, and total length of hospital stay (LOS).

Results: Seven patients met inclusion criteria. The mean interval from initial cholecystectomy was 22 months (range 3-89 months with one patient presenting an unknown length of time from initial operation). Mean operative time was 119 minutes (range 79 minutes to 141 minutes). Five patients had an intraoperative cholangiogram and one case was completed with intraoperative ICG. A drain was left at the completion of three out of seven cases. Average LOS was less than one day (range 0-2) with three patients discharged in good condition post-operative day 0. No patients required an open operation.

Conclusion: Laparoscopy is a safe and effective approach to completion cholecystectomy for patients with recurrent cholecystitis that avoids an open surgical procedure.
P 165. WHIPPLE'S WHIPPLES: HOW INSULINOMAS CHANGED THE COURSE OF HEPATOPANCREATOBILIARY SURGERY  
BP Lovasik, SC Kim, BA Sayed, JK Srinivasan  
**Presenter:** Brendan Lovasik MD | Emory University

**Background:** Allen Oldfather Whipple, known as the 20th Century’s major innovator in pancreatic surgery, is only part of a long heritage of pioneering pancreatic surgeons that have contributed to the development of the pancreatoduodenectomy.

**Methods:** Here, we explore the history of pancreas surgery leading to Whipple’s now-eponymous operation.

**Results:** Early pancreatic operations by Trendelenburg (first distal pancreatectomy, 1882), Billroth (1884), and Senn (1886) were important contributions to early approaches to pancreatic operations. The first successful resection of ampullary carcinoma would be performed by William Halsted (1899), though the patient died shortly thereafter of local recurrence. Walter Kausch would follow this experience with the first major partial duodenectomy en-bloc with the pancreas (1909) in a two-stage operation for ampullary carcinoma. Whipple’s major breakthrough in pancreatic surgery came from a series of insulinoma resections (1933-35), a favorable pathology for curative pancreatic surgery, demonstrating excellent results. In 1935, Whipple reported the first case of complete duodenal excision and head of the pancreas in a 2-stage procedure for ampullary carcinoma. In 1940, Whipple reported his first one-stage pancreatoduodenectomy for insulinoma during a demonstration at the American Surgical Association. Whipple would continue to perform 37 pancreatoduodenectomies in his career, including 30 for cancer. Other important contributions to Whipple’s surgical legacy were his development of the porto-caval shunt (1935-46) with Arthur Blakemore and leadership of the Columbia Department of Surgery for 25 years, where he was the first to offer Charles Drew a position in academic surgery. Charles Child would continue this legacy as the first to perform pancreatoduodenectomy with portal vein resection.

**Conclusion:** The history of pancreatic surgery has rich and colorful history, and includes contributions from several famous surgical leaders. The legacy of the pancreatoduodenectomy demonstrates the application of centuries of dedicated anatomical, pathologic, and surgical study to produce an elegant operation to treat diseases of the pancreas.
P 167. RESECTED PANCREATIC NEUROENDOCRINE TUMORS PATIENTS HAVE SIMILAR POST-OPERATIVE AND SURVIVAL OUTCOMES BETWEEN CAUCASIANS AND AFRICAN AMERICANS

H Fang, S Awad, A Kashash, F Gleason, M Heslin, T Wang, S Vickers, S Reddy, J Rose

Presenter: Hua (Amanda) Fang | University of Alabama - Birmingham

Background: Pancreatic neuroendocrine tumors (pNET) are rare neoplasms arising from specialized neuroendocrine cells within the pancreas. The incidence of pNETs has increased over the last decade, with African Americans (AA) reportedly having worse survival compared to Caucasians. AA represent only 13% of patients in most prior series. This study aims to determine if oncologic outcomes in AA are worse at a high volume institution with a large population of AA.

Methods: Retrospective review and analysis of all patients with resected pNETs with curative intent from a single institution were identified by billing code between the years 2010-2019. Clinicopathologic variables and recurrence free survivals (RFS) were compared between Caucasian and AA. Median incomes of patient home zip codes were determined from US census data.

Results: There were 127 patients undergoing pNET resection in the study period, with 25% (n=32) AA and 75% (n=95) Caucasian. No difference in age, sex, BMI, type of resection, or subtype of tumor were noted. AA were more often single while Caucasians were more likely to be married (p=0.008). No difference was found in post-operative length of stay, disposition, morbidity, 30-day mortality, or 30-day readmission rate. Pathologic evaluation of resected specimens showed no difference in margin status, lymph node positivity, perineural invasion, lymphovascular invasion, tumor grade, or degree of differentiation. AA had larger tumors than Caucasians (3.2 cm vs 2.5 cm; p =0.011). There was no difference in RFS between cohorts with 84% and 81% of AA and Caucasians still alive at 5 years, respectively. Median income and poverty were also analyzed. AA patients had a lower median income of $34,926 compared to Caucasians’ of $51,449 (p= < 0.0001). Median of 25% of AA patients were in poverty compared to median of 14% of Caucasians (p = < 0.0001).

Conclusion: While AA presented with larger tumors, we found no difference in post-operative outcomes or RFS compared to Caucasian counterparts. AA patients were more often single, have less income, and be under the poverty line compared to Caucasian counterparts as well. These data support that there are no differences in outcome based on race in this population based large cohort of patients.
Recurrence Free Survival

Cumulative Survival vs Months From Date of Diagnosis to Date of Last Contact for Caucasian and African American populations.
Background: Laparoscopic treatment of liver cyst was first reported in 1991, nowadays can be considered the standard of care. In many cases they are found incidentally on imaging performed for other reasons. Their management varies depending on the diagnosis, risks and symptoms caused.

Methods: We present a case of a 52 years old woman, in a check-up ultrasound revealed a 5 x 5.8 cm liver cyst, in 2011; the patient was asymptomatic, so a conservative management was preferred. 8 years later she presented with right back pain, a CT scan showed a enlargement of 13 x 11.5 x 9.7 cm liver cyst; which was punctured obtaining 750 ml of serous liquid. 2 months later a new CT scan was made revealing the same giant cyst. A laparoscopic unroofing cyst was scheduled, on the operating table, the surgeon was placed between the legs, a 10-mm trocar for laparoscope was inserted above the umbilicus, another 10 mm -trocar was placed 5 cm above the first one, a 5-mm in right flank for lifting up the liver and other 5-mm trocar port for work; Enseal G2 curved (Johnson & Johnson) was used, during surgery a large cyst was observed, it occupied segments VI, VII and VIII of Coinaud; intraoperative ultrasound was used at start of surgery for adequate location and to observe relationship with structures; once the cyst was completely unroofed the laparoscopic ultrasound was used to verify adequate drainage and for excluding another possible cyst. Patient was discharged on day 2.

Results: Simple cysts are the most common nonparasitic cystic lesions of the liver and are estimated to occur in approximately 5–18% of the population, with a slight female predominance. They occur as a simple fluid-filled structure, has thin walls, and it is lined by cuboidal epithelium, and up to two septa. Treatment is limited to highly symptomatic patients or those in whom complications occur. Symptoms usually arise as a result of a mass effect, as cyst increase in size, they may become symptomatic. Complication of liver cyst include: intracystic hemorrhage, rupture, torsion, infection, biliary obstruction or compression of adjacent structures and are more likely in larger cysts. Treatment includes nonsurgical procedures such as percutaneous aspiration (with a 100% likely of recurrence), with or without alcohol injection; and surgery: partial excision, complete excision, marsupialization, or liver resection.

Conclusion: Laparoscopic unroofing of the cyst wall is particularly indicated in cases of large solitary cysts, or a limited number of cysts located in the anterolateral segments of the liver, sometimes cysts located in the antero and posterosuperior segments of the right liver are frequently assumed to be beyond laparoscopic access. This video shows the feasibility of laparoscopic unroofing liver cyst even in posterosuperior segments.
P 169. RURAL RESIDENCE DOES NOT PREDICT OUTCOME FOR RESECTED PANCREATIC ADENOCARCINOMA

Q Chu, Y Chu, M Hsieh, T Lagruff, G Zibari, H Shokouh-Amiri, J Gibbs, T Tan, X Wu

Presenter: Quyen Chu MD, MBA | Louisiana State University Health Sciences Center - Shreveport

**Background:** Studies are equivocal on the role of rural residence in cancer outcome. Whether rural residence has an influence on outcome following resection for pancreatic cancer is not clear. We hypothesize that rather than being an independent predictor of survival, rural residence serves as a proxy for other socioeconomic determinants.

**Methods:** A cohort of 32,319 patients with Stage I-III pancreatic adenocarcinoma diagnosed from 2003-2011 who underwent resection were evaluated from the National Cancer Database. Sociodemographic, clinico-pathological, and treatment variables were compared between rural and urban residences. The 5-year overall survival (OS) was calculated using the Kaplan-Meier method. Cox regression model was used to assess factors associated with OS. P-value ≤ 0.05 was considered significant.

**Results:** In univariable analysis, rural residence was a predictor of OS; rural (N=634) had significantly lower OS than urban (N=31,688). The 5-yr OS for rural and urban was 17.2% and 22.0%, respectively and the median survival time (months) was 18.8 and 21.3, respectively (P < 0.007). In multivariable analysis, residence was not a significant predictor of OS (P=0.63). Independent predictors of worse OS were male (P < 0.0001), old age (P < 0.0001), high comorbidity index (P < 0.0001), low income (P < 0.0001), low education level (P < 0.00001), community cancer program (P < 0.0001), advanced stage (P < 0.0001), high grade (P < 0.0001), great circle distance ≥ 50 miles (P=0.003), and lack of receipt of chemotherapy (P < 0.0001).

**Conclusion:** Rural residence was not associated with worse outcome for resected pancreatic adenocarcinoma. Socioeconomic and tumor factors were independent determinants of pancreatic cancer outcomes.
Background: Distal pancreatectomy traditionally has been performed using an open approach, but minimally invasive (MI) techniques have become increasingly more popular, due to reduced time to functional recovery. Utilization of hand assistance during minimally invasive distal pancreatectomy (HA-MIDP) may decrease operative time and minimize blood loss. We analyzed our experience with HA-MIDP and evaluated predictors of clinical outcome including conversion to open.

Methods: We retrospectively reviewed 87 patients undergoing planned MIDP at Advent Health Orlando between 2012 and 2018. We compared patients who underwent conversion to open pancreatectomy (Con-DP) with those that remained minimally invasive. A 6 cm supraumbilical midline hand port was utilized in all cases (HA-MIDP) and conversion to open was achieved with extension of that incision. All patients underwent placement of closed suction drain in the operative bed and none received somatostatin analogues. Continuous and categorical variables were analyzed utilizing Students T-test, Chi-square and Fisher’s Exact test where appropriate.

Results: The majority of patients (90.8%) underwent distal pancreatectomy with splenectomy. The average age was 60 ± 13.95 years and a majority of patients were women (64%). No differences were found in age (p= 0.95), gender (p= 0.66), BMI (p= 0.26) or ASA score (p= 0.575). Conversion to an open approach was required in 13 cases (14.9%). Pathology was confined to the pancreatic tail in 71 patients (82%) while the remainder involved pancreatic body and tail. Average tumor diameter was 3.65 cm. Adenocarcinoma was found in 17 patients (19.5%). Operative time was 155.3 ± 42.9 min for HA-MIDP vs 219.6 ± 40.4 min for Con-DP (p= < 0.0001). Intraoperative blood loss was 62.03 ± 70.2 ml for HA-MIDP vs 242.5 ± 281 ml in the Con-DP (p = 0.003). The ICU admission and complication rates between the groups were similar (p= 0.14 vs. p=0.45, respectively). Average length of hospital stay was 5.19 ± 2.34 days for HA-MIDP vs. 5.75 ± 1.86 days for the Con-DP (p=0.17). The rate of postoperative pancreatic fistula (POPF, type B) was 24% in the HA-MIDP vs. 15% in the Con-G (p= 0.47). There were no type C POPFs. The predictors for conversion to an open approach were: prior abdominal surgery (OR 17.7, 95% CI 1.076 - 291.4), (p=0.04), surgery for malignancy (OR 14.08, 95% CI 1.51-131.3, p=0.02), location of tumor (p=0.0003) and intraoperative blood loss greater than 97 ml (p=0.0017). Readmission rate overall was 30%; 21 patients in MIDP and 5 patients in Con-DP; p= 0.464. Two patients in the HA-MIDP required re-operation (for bowel ischemia and fascial dehiscence respectively); and 30-day mortality was 1.15% (HA-MIDP, n=1).

Conclusion: HA-MIDP is feasible and safe approach associated with shorter operative times and decreased blood loss. There is an acceptable rate of conversion to open DP, which may be anticipated in patients with previous abdominal surgery, those with pancreatic body involvement and those with malignant pathology. Overall, hospital length of stay, complication rate; including incidence of POPF, readmission, and mortality may not be significantly impacted by converting to an open approach.
Background: Despite mortality in pancreatic surgery has decreased over the last decade, morbidity still remains high. One of the most important causes for this is the occurrence of pancreatic fistula. Recent studies have demonstrated the importance of fluid management during the post-operative period in major abdominal surgeries. This finding was observed in colonic surgery as well, demonstrating that the overcharge of fluids increases post-operative complications. We aimed to evaluate the impact of fluid management on post-operative complications after videolaparoscopic distal pancreatectomy (VDP).

Methods: Descriptive, retrospective study of a prospective database of patients who underwent VDP from November 2011 to September 2018. Thirty patients were evaluated and divided into two different groups according to the fluid management protocol used (restrictive or liberal). The data were collected from the anesthesia’s protocols and nursery reports (until 3rd post-operative day). Demographics, length of stay, kind of fluid management and complications were analyzed. For statistical analysis SPSS®v.21 was used (p= < 0.05 was considered significant)

Results: Out of 30 patients, 17 (%) were male, mean age was 55 years (r 19-82); 17 patients (57%) were included in liberal group (LG) and 13 (43%) in restrictive group (RG). Twenty-three patients developed complications; 16 (53 %) belonged to LG whereas 7 (23 %) to RG (p=0.01). Fourteen patients of LG vs. 6 patients of RG had post-operative pancreatic fistula (p=0.04). There were 7 patients (23 %) in LG and 4 (13 %) patients in RG with POPF-CS (13 %, p=ns). 90-day-mortality was 3.3 %

Conclusion: After videolaparoscopic distal pancreatectomy, liberal fluid administration at the perioperative period is associated with an increase in the incidence of complication, specially the development of POPF.
**P 172. LAPAROSCOPIC TOTAL PANCREATOSPLENECTOMY FOR DIFFUSE MIXED-TYPE IPMN**

*A Brañes, E Briceño, M Dib, J Martinez, N Jarufe*

**Presenter:** Alejandro Brañes MD | Pontificia Universidad Católica de Chile

**Background:** Total pancreatectomy is currently a rare surgical indication as parenchyma-sparing surgeries are usually done. However, there are some pathologies that benefit from this type of surgery and a minimally invasive approach can be an option.

**Methods:** We present the case of a 75-years old male patient with a previous medical history of insulin-dependent type-2 diabetes mellitus. He consulted to the outpatient clinic for a two-month history of abdominal pain and anorexia. Contrast-enhanced abdominal computed tomography revealed a diffuse mixed-type IPMN which compromised the entire pancreatic parenchyma.

**Results:** A laparoscopic total pancreatosplenectomy was performed. He was discharged at postoperative day 5 without complications.

**Conclusion:** Even though total pancreatectomy is currently performed infrequently, there are still some indications for it and a minimally invasive approach can be done safely.
Background: A 29 years old lady underwent an abdominal ultrasound for an aspecific pain and an incidental paracaval liver lesion was found. Subsequent contrast-enhanced US and MRI were strongly suggestive for a liver adenoma. The MRI with Primovist showed a 3.3 x 3.2 cm adenoma in S9 with interesting proximity both to the confluence of a big inferior right hepatic vein into the IVC and to the posterior aspect of the right portal pedicle. The patient did not have a surgical indication but the clinical scenario was complicated by the strong desire of the patient to get pregnant. The management of liver adenomas smaller than 5 cm during pregnancy is not clear in the Literature, as some Authors suggest only active surveillance. Our decision was to perform a laparoscopic resection of the adenoma with the aim to avoid its risk of rupture due to increased hormone-induced growth during pregnancy.

Methods: Patient was placed in a standard French position and 5-operative 12 mm trocars were placed in the abdomen, resembling a reverse J shaped letter. The extracorporeal Pringle manouvre was prepared by encircling the hepatic pedicle with an umbilical tape, extracted through a chest tube from the left flank. Mobilization of the right hemiliver is crucial for the exposure of the operative field and for this purpose the falciform, posterior coronary and right triangular ligaments were interrupted. The right lobe was lifted up through the partial incision of the lower aspect of the hepatocaval ligament with a caudal approach and following the IVC axis. The parenchymal transaction was performed using a combination of an ultrasonic dissector and an energy device.

Results: The transaction line followed the margin of the pseudocapsule of the adenoma, from left to right. Bloodless transaction was allowed thanks to the hypovolemic state managed by keeping the stroke volume variation between 15 and 20%.

Conclusion: The final histopathology showed a hepatocellular adenoma of steatotic type with focal dysplastic hepatocytes, in the context of a microvescicular steatosis.
P 174. SURVIVAL OUTCOMES OF PANCREATIC CANCER RESECTION USING THE ROBOTIC APPROACH: A NATIONWIDE COMPARISON TO OPEN SURGERY
I Nassour, C Hester, A Yopp, A Zureikat
Presenter: Ibrahim Nassour MD | University of Pittsburgh Medical Center

**Background:** The use of robotic surgery in pancreatic cancer is increasing. The safety of this platform has been studied but the long-term oncologic efficacy has not yet been determined.

**Methods:** This is a retrospective study using the National Cancer Database from 2010 to 2016. We compared the overall survival of robotic pancreaticoduodenectomy (RPD) and distal pancreatectomy (RDP) for pancreatic adenocarcinoma to the open approach. We developed a Cox proportional hazard model to adjust for patient, tumor and treatment characteristics in order to determine if robotic surgery is independently associated with survival.

**Results:** We identified 20,549 resections for pancreatic cancer. For PD, 17,205 (96%) were OPD and 626 (4%) RPD. For DP, 2,386 were ODP (88%) and 332 (12%) RDP. The use of the robotic platform increased by 6 folds for PD and 7 folds for DP between 2010 and 2016. The median overall survival for RPD (22.0 months) was similar to OPD (21.8 months, Log Rank p = 0.755). The 1-, 3- and 5-year overall survival rates for RPD were 74%, 33% and 19%; and for OPD were 73%, 31% and 19%. The adjusted HR was 1.014 (95% confidence interval (CI): 0.903-1.139). The median overall survival for RDP (35.3 months) was higher than ODP (24.9 months, Log Rank p = 0.001). The 1-, 3- and 5-year overall survival rates for RDP were 81%, 49% and 37%; and for ODP were 76%, 38% and 25%. The adjusted HR was 0.741 (95% confidence interval (CI): 0.632-0.868).

**Conclusion:** Use of the robotic platform for distal pancreatectomy for pancreatic adenocarcinoma was associated with improved overall survival in comparison to the open approach. Survival outcomes of robotic and open pancreatoduodenectomy were comparable.
Background: Hepatitis C can have an impact on mental health, increasing the risk of sleep problems. This study documents the response of an 8-week program on the sleep quality of individuals with a history of hepatitis C.

Methods: Participants from four continents who finished a depression and anxiety educational program was studied. From 7008 participants that finished the program, 89 patients had hepatitis C, 30 males, and 59 females. They participated on a once a week for 8 weeks for 2-hour program. It consisted of a 45-minute DVD presentation by a physician experienced in the treatment of deprived and a small group, facilitated discussion together with weekly practical assignments. The program was available in Spanish and English. No doctor-patient relationship was established. The program was offered by previously trained facilitators who were certified. This program focused on educating participants on healthy behaviors such as exercise, plant-based diets, sleep hygiene, and others. Each participant answered at the beginning and at the end of the program the Depression and Anxiety Assessment Test, a 85-question questionnaire that measured depression based on The Diagnostic and Statistical Manual of Mental Disorders Volume 5 (DSM 5), the test also measure patient hepatitis C history and demography and evaluated the level of concentration and quality of sleep. The sleep was classified into four categories.

Results: At baseline from the 89 patients with hepatitis C, that group mean age was 52.1, standard deviation was 15.7. Regarding their sleep quality at baseline 25 participants reported excellent sleep, 45 good sleep 45, 1 below average and 10 bad sleep. From this group, baseline depression scores were 14.5, SD 6.8. After the end of the program 31 had excellent sleep, 31 had good sleep, 1 below average and 9 had bad sleep. End depression scores were 7.8, SD 6.1.

Conclusion: The intervention effectively improves sleep quality and depression in most of the participants. This model should be studied further and a long-term follow-up should be performed.
**P 177. PANCREATIC CARCINOSARCOMA: A SURVIVAL ANALYSIS OF THE SEER DATABASE**

*PL Quinn, A Alhatem, W Xia, RJ Chokshi*

**Presenter:** Patrick Quinn BS | Rutgers University

**Background:** Pancreatic carcinosarcoma is a biphasic tumor composed of both adenocarcinoma and sarcomatous differentiation. Due to its rarity, only case reports exist within the literature regarding its prognosis. The purpose of our study was to identify any potential predictive elements associated with cancer-specific survival.

**Methods:** The National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) database was queried for cases of pancreatic carcinosarcoma from 1973 to 2016 using the histologic code from the International Classification of Diseases for Oncology (ICD-O-3). Extracted cases were analyzed for patient demographics, tumor characteristics, stage, surgical intervention, and survival. Kaplan-Meier and Log Rank analyses were applied to assess survival. Univariate and multivariate Cox proportional hazard regression models and the Wald test were utilized to investigate prognostic factors.

**Results:** Thirty-nine cases of pancreatic carcinosarcoma were identified within the SEER database. The median age of the cohort was 68 years with a slight female predominance (53.8%). Majority of patients presented with regionally invasive or metastatic disease (89.7%). The median overall survival for the entire cohort was six months. There was no statistical significance for overall survival based on age or sex. Tumor staging showed significantly decreased overall survival with increased tumor extension, accounting for a median survival of three months for metastatic disease, compared to eleven and nine months for localized and regionally invasive disease respectively. Surgery was also shown to meaningfully affect survival (p=0.004), with those that underwent surgery having a median survival of 8 months compared to 2 months for those that did not undergo surgery. Sub-analysis of those that underwent surgery demonstrated that lymphadenectomy was significant (p<0.001), with a median survival of 8 months in those with lymph nodes removed and 1.1 months in those without lymph nodes removed. However, nodal positivity did not have an imperative effect on survival (p=0.7) in those that underwent lymphadenectomy. The univariate analysis resulted in a hazard ratio (HR) of 9.14 for those with distant metastasis versus localized disease (HR=1.00, p=0.01), and a hazard ratio of 0.33 for patients undergoing cancer-directed surgery versus no surgery (HR=1.00, p=0.01). With multivariate analysis, only metastatic disease (HR=5.93, p=0.04) remained a significant predictor of survival.

**Conclusion:** Pancreatic carcinosarcoma carries a poor prognosis, with median survival under one year from the time of diagnosis. Metastatic disease was a significant predictor of early mortality as identified by both univariate and multivariate analysis. Evidence also indicates that surgery may have a beneficial effect on survival, suggesting that those who are good candidates for surgery should undergo resection.
P 178. ROBOTIC HEPATIC CYST MARSUPIALIZATION IS EQUIVALENT TO LAPAROSCOPY
M Watson, M Baimas-George, P Salibi, E Baker, L Ocuin, D Vrochides, D Iannitti, J Martinie
Presenter: Michael Watson MD | Carolinas HealthCare System

Background: Minimally invasive approaches are increasingly utilized for surgical treatment of simple hepatic cyst disease. We evaluated the characteristics and surgical outcomes for patients with simple hepatic cystic treated at our institution.

Methods: Patients undergoing treatment of simple hepatic cysts (complicated or not) at our institution between January 2008 to July 2019 were identified by retrospective record review. Demographic data, preoperative symptoms, cyst characteristics, surgical details, and postoperative outcomes were determined from retrospective review. Patients undergoing open surgery are infrequent (n=6), therefore they were excluded from analysis. Patients undergoing laparoscopic and robotic surgery were compared. Student’s t-test was used for comparison of continuous variables and Chi-squared was used for comparison of categorical variables.

Results: For the 114 patients treated with minimally invasive surgery, 23 (20.2%) underwent robotic surgery and 91 (79.8%) underwent laparoscopic surgery. Age (p=0.103) and female gender (p=0.834) were similar between groups. The robotic group had a higher rate of polycystic kidney disease (21.7% vs 3.3%; p=0.002) and higher proportion of patients with ASA class 3 (65.2% vs 41.8%; p=0.044). Mean cyst size was similar between both groups (12.6±6.1 vs 11.7±5.3; p=0.485) with similar rates of large cysts over 6 cm (91.3% vs 93.4%; p=0.724). Patients in the robotic group were more likely to be symptomatic (100% vs 83.5%; p=0.037) with abdominal pain being the predominant symptom (100% vs 80.2%; p=0.020). Estimated blood loss was similar between groups (302.6 mL vs 152.2 mL; p=0.124) while operative time was greater for robotic (156 min vs 112 min; p<0.001). The rate of simultaneous hepatectomy was higher for the robotic group, however this was not a statistically significant difference (34.8% vs 17.6%; p=0.071). There were two conversions to open in the laparoscopic group and none in the robotic group. Length of stay (2.26±1.45 vs 2.36±3.36; p=0.888), time to initiation of diet (1.78±1.17 vs 1.87±2.36; p=0.867), and return to normal activities (14.4±7.86 vs 18.0±9.17; p=0.087) were similar between both groups. Rate of Clavien-Dindo class 3 or greater complications (4.3% vs 11.0%; p=0.335) and reoperation rates (8.7% vs 3.3 %; p=0.259) were similar between groups.

Conclusion: In the past decade at our institution, we have utilized minimally invasive surgical approaches to the treatment of simple hepatic cystic disease. Robotic surgery is associated with similar outcomes compared to laparoscopic surgery and is an effective treatment of large hepatic cysts and polycystic liver disease, especially if hepatectomy is required.
Background: Surgery on cirrhotics is challenging given the underlying frailty and comorbidities these patients exhibit. There is little data on cirrhotics who undergo non-transplant procedures focusing on their preoperative optimization, intraoperative variables such as fluid resuscitation, and the causes of morbidity and re-admissions after the index procedure. We investigated our experience for cirrhotics who underwent surgery at our institution.

Methods: A single surgeon’s experience was queried for cirrhotic patients from 2014-2018. Outcomes measured included pre-operative factors, intraoperative evaluation, and post-operative outcomes.

Results: A total of 75 procedures on 66 patients were performed including 57 hernia repairs, 11 liver resections, and 6 cholecystectomies; 50.6% (38/75) were Child A and B, 62.7% (47/75) were medically optimized before the procedure, and 40% (30/75) underwent emergent/urgent procedures. There were overall 3 deaths in total at 90 days from fulminant liver failure after liver resection, sepsis from spontaneous bacterial peritonitis, and cardiovascular arrest from unclear etiology. Ninety-day re-admission rates were due to anemia, bleeding, and refractory ascites (32%, 24/75). Ten percent (7/46) made it to transplant after their urgent/elective surgery. On linear regression when controlling for estimated blood loss, Na-MELD, and age, intraoperative albumin was associated with increased length of stay (Beta= 0.381, p< 0.005). On multivariate analysis, the only factor associated with mortality when controlling for operative time and MELD score was American Society of Anesthesiologists (ASA) Score (OR 12.9, p= 0.024).

Conclusion: Major morbidity driven by post-operative anemia exists after surgery but mortality was fairly low in this high-risk population. Only 1 death was attributed to surgery specific mortality. Albumin administration was associated with increased length of stay likely because of reasons driven by the need for albumin (e.g. intraoperative hypotension, blood loss). Most importantly, elective surgery allowed patients to avoid complications and make it to transplant for those eligible. More investigation is needed looking at causes of readmission and optimizing intraoperative surgical outcomes, which may be a large cause of the inter-institutional variability in this high-risk population.
**Background:** Sentinel lymph node mapping for pancreatic cancer and their prognostic value is not well studied. A sentinel lymph node must be easily accessible and must have a high negative predictive value. We sought to identify the value of station 8 lymph nodes as a sentinel node for pancreatic cancer and their value in therapeutic decision making.

**Methods:** 153 patients who underwent the Whipple procedure over a 3-year period (2016-2018). In each of these procedures, we routinely sampled the station 8 and 12 lymph nodes in all these cases and sent them separately for pathology evaluation. Patient demographics, pathologic data and postoperative outcomes were then retrospectively evaluated. Incomplete datasets and Whipple procedures performed for indications other than pancreatic adenocarcinoma were excluded, and a data analysis was run on the 95 remaining patients.

**Results:** 95 patients with pancreatic cancer were evaluated. 10.53% (10) of these patients had positive station 8 nodes. Compared to patients with negative station 8 node, patients with positive station 8 nodes were more likely to have perineural invasion (90% vs 74%) and lymphovascular invasion (70% vs 55%). Patients with positive station 8 nodes were also more likely to have a positive portal vein margin (70% vs 16%) and a positive pancreas margin (60% vs 7%). Median disease free survival in patients with positive station 8 nodes was 8 months compared to 9 months in those with negative station 8 nodes. The negative predictive value of a negative station 8 lymph node to predict nodal involvement was only 32%.

**Conclusion:** Based on our data we have ascertained that a positive station 8 lymph node portends to a poor prognosis, particularly with higher perineural and lymphovascular invasion. It can act as a predictor for positive portal vein and pancreatic margin. The utility of a positive station 8 node in therapeutic decision making is yet to determined however given the high margin positivity in this group, it could be used as an indication for methods of margin accentuation. It did not, however, act as a sentinel lymph node with a low negative predictive value in predicting nodal involvement.
Background: Elective and urgent surgery is fraught with risk for cirrhotics. Retrospective studies for umbilical hernia repairs show a mortality of 5% and morbidity of 13%. Few studies look at risk factors for recurrence, pre-operative optimization, intraoperative resuscitation, and causes of readmission. We decided to look at our experience repairing hernias in cirrhotics.

Methods: A single surgeon’s experience was queried for cirrhotic patients from 2014-2018. Outcomes measured included pre-operative factors, intraoperative resuscitation and other factors, and post-operative outcomes. The use of mesh was and type of hernia was also included.

Results: A total of 46 unique patients underwent 57 operations including 8 recurrences. Median age was 60 years old (Range 38-82 years old), 15.1% were female (7/46), and alcohol was the leading cause of cirrhosis at 34.8% (16/46). Median BMI was 25.95 (Range 18-44). Median MELD score was 13 (6-30), 64.9% (37/57) were either Child B or C, and 49% were emergent/urgent procedures (28/57). There were a total of 49 ventral/umbilical hernias and 8 inguinal hernias performed. A total of 41 cases (71.9%) underwent primary repair. In the 25 cases of refractory ascites, 18 of these cases had a paracentesis done while 7 had an intraperitoneal drain before hernia repair. There was one death within 90 days due to spontaneous bacterial peritonitis. On multivariate logistic regression controlling for mesh and Na-MELD score, pre-operative paracentesis/drain placement was associated with hernia recurrence. Of note, 22% of patients (8 / 36) had a transplant done after their surgical intervention.

Conclusion: Refractory ascites requiring pre-operative paracentesis and/or drain placement was a major risk factor for hernia recurrence when controlling for Na-MELD score in this high-risk population. These patients may benefit from receiving their liver transplant first and then repair of their hernia. Moreover, elective surgeries for hernias prevented potential downstream complications with very low mortality allowing eligible patients to eventually receive a liver transplant. More research on the impact of elective surgery to prevent downstream complications and allowing more patients to make it to transplant is warranted to understand the benefit of elective surgery in this high-risk population.
P 182. IR-GUIDED ENDOSCOPIC PANCREATICOJEJUNOSTOMY FOR POST-WHIPPLE PANCREATICOCUTANEOUS FISTULA

E Scott, P Marcin, M Larsen, F Rocha

Presenter: Elliot Scott MD | Virginia Mason Medical Center

**Background:** A 67yF presented with biliary obstruction and computed tomography (CT) suggested a distal bile duct tumor. She underwent an ERCP with brushings for stenting and to but unfortunately developed severe acute pancreatitis (SAP). Although technically resectable after complete staging without evidence of distant disease, she was not felt to be a surgical candidate and was referred for neoadjuvant chemotherapy while. Unfortunately, after one cycle of gemcitabine and cisplatin, her SAP progressed to walled-off necrosis (WOPN) requiring percutaneous and endoscopic drainage. Therefore, after a period of recovery, she was taken to the operating room for an attempt at curative resection. A pylorus-preserving pancreaticoduodenectomy (PD) was performed, however, the pancreas was scarred without a visible duct and adherent to a thrombosed splenic vein with sinistral portal hypertension form WOPN. Decision was made to suture the pancreatic remnant without an anastomosis. The patient did well until POD#4 when a CT performed for abdominal pain revealed a large fluid collection. This was drained percutaneously and was consistent with a pancreatic leak. The patient convalesced from her operation but was left with a pancreaticocutaneous fistula.

**Methods:** Since transgastric internalization was not feasible post-PD, a combined interventional radiology (IR) and gastroenterology (GI) rendezvous approach was utilized. An endoscopic ultrasound (EUS) scope was passed into the afferent limb while a balloon catheter was passed through the drain tract. The balloon was visualized by EUS and punctured in order to grab an IR wire and pass it into the afferent jejunal limb. Two pigtail stents were then deployed in order to create a pancreaticojejunostomy (See Figure).

**Results:** The patient did well post procedure and deemed ready for adjuvant therapy for her T2N1 distal cholangiocarcinoma.

**Conclusion:** This challenging case highlights the multidisciplinary strategy required not only for optimal oncologic treatment of biliary tumors but also to manage the complications of therapy.
P 184. ABERRANT ANATOMY IN ROBOTIC PANCREATICODUODENECTOMY
S Ross, G Rivera-Espineira, I Sucandy, A Rosemurgy
Presenter: Gabriel Rivera-Espineira MD | AdventHealth Tampa

Background: Approximately 20% of the population have variant hepatic arterial anatomy. This video demonstrates the operative approach to 3 different aberrant hepatic vascular anatomy which was identified during Robotic Pancreaticoduodenectomies.

Results: The first operation is of a 75 years old lady with pancreatic head IPMN and a Common Hepatic Artery which is coming off the Superior Mesenteric Artery. The second operation is of a 71 years old man with a pancreatic head adenocarcinoma who was found to have an early bifurcation of the Left and Right Hepatic Arteries with a Gastroduodenal Artery and Right Gastric Artery coming off the Right Hepatic Artery. The third operation is a 58 years old lady with a pancreatic head adenocarcinoma, who was found to have a replaced right hepatic artery coming off the Superior mesenteric artery.

Conclusion: The use of the robotic platform and triple phase 1mm cuts high quality CT scan with reconstructions were crucial in identifying the aberrant anatomy pre and intraoperatively in order to avoid vascular injuries during the operation.
Background: Laparoscopic Roux-en-Y hepaticojejunostomy remains technically challenging. Robot-assisted laparoscopic surgery is rapidly expanding in many surgical fields. We applied robot assisted technique for Roux-en-Y hepaticojejunostomy.

Methods: A 81 year old female presented with right upper quadrant abdominal pain found to have choledocholithiasis. She underwent ERCP twice, but it failed due to tight stricture of lower common bile duct. She was referred to us for Roux-en-Y hepaticojejunostomy

Results: Da Vinci Xi system was used. Four 8 mm robotic ports and one 12 mm assistant port were placed in lower abdomen. After adhesiolysis, common bile duct was exposed. Indocyanine Green was injected preoperatively and common bile duct was also confirmed under fluorescence. Jejuno-jejunostomy was created with Endo GI stapler and staple site was closed with Albert-Lembert suture. Roux limb was brought up to liver hilum retro colic fashion. Common hepatic duct was incised longitudinally incised and stones were removed. Hepatocojejunostomy was created with side to side anastomosis in interrupted sutures. The patient had no post-operative complication and discharged on POD 5.

Conclusion: Robot Roux-en-Y hepaticojejunostomy can be performed with similar fashion of open Roux-en-Y hepaticojejunostomy.
Background: Among the complications of portal biliopathy are digestive bleeding, jaundice and cholangitis. Surgical treatment is an exception when medical management is not possible. Surgery implies a high risk of bleeding given the prominent collaterals present in the hepatoduodenal pedicle secondary to portal cavernomatosis. The objective of this work is to present the experience of 4 cases with serious complications of portal biliopathy treated surgically.

Methods: 4 cases of patient presented serious complications linked to portal biliopathy that required surgical management within the Clinical Hospital of Universidad Católica. The dates were obtained from the clinical report.

Results: Woman 59 years, with necrohemorrhagic pancreatitis (year 1996), biliodigestive bypass (2001) and portal cavernomatosis (2004). She was presenting repeated episodes of upper gastrointestinal bleeding for hemobilia, one of them with hypovolemic shock. In 2005, Warren’s shunt was tried, but it failed. Then, a choledochal devascularization and hepatic-jejunal re-anastomosis intervention was made. She evolved without new bleeding episodes. Died in a car accident (2006).

Man 57 years, with HIV positive and serious pancreatitis in 2007, developed portal thrombosis post inflammatory and cavernomatosis. He presented repeated episodes of cholangitis. Roux en Y biliary reconstruction was made in 2012. Follow-up without new episodes of jaundice or cholangitis. He died due to progression of his primary disease in 2016.

Woman 47 years, with V Leiden factor deficit and portal cavernomatosis antecedents (2012), presented acute repeated cholangitis. After multiple endoscopic stent treatments, given recurrence of cholangitis and jaundice, a Roux en Y biliary reconstruction was performed in 2015. Uneventful recovery up to now.

Man 47 years, with neonatal trombosis and cavernomatosis for omphalitis, had portal devascularization surgery made at 7 and 14 years old, he had repeated cholangitis and progressive cholestasia despite multiple endoscopic attempts. Roux en Y biliary reconstruction was performed. He has not developed new episodes of cholangitis and has normal liver function test. All anastomosis was made in biliar conducts with multiple collateral veins that were handled with bipolar coagulation, ligatures and stitches. On the long term, none repeated episodes of hemobilia or cholangitis.

Conclusion: The surgery could be a definite solution for portal biliopathy complications. However, it has only been made for selective cases because it implies high complexity and risk.
Background: Distal pancreatectomy and splenectomy with en bloc celiac axis resection (DP+CAR) for locally advanced pancreatic cancer with celiac axis encasement is a technically demanding procedure with a reported high risk of postoperative morbidity and mortality. The complications of hepatic and/or gastric ischemia have led to adoption of several adjunctive techniques designed to mitigate these risks, but there is no consensus regarding the utility of these additional measures. Preoperative embolization of the celiac axis to stimulate collateralization of hepatic and gastric arterial blood flow is used in some centers. “Supercharging” the liver with a bypass graft to a hepatic artery is another described method. Laparoscopic ligation of the common hepatic artery several weeks prior to surgery has also been used as a means to stimulate collateral arterial flow, with the added advantage of addressing the concern of occult metastatic disease preoperatively. We report a new method for preoperatively assessing the quality of prograde arterial hepatic perfusion after ligation of the celiac axis, along with the adjunctive use of indocyanine green (ICG) angiography intra-operatively to assess gastric perfusion after ligation of the celiac axis. Utilization of this approach provides insight preoperatively regarding the necessity of any additional measures to improve hepatic arterial blood flow, and capitalizes on a quick and easy tool to identify gastric ischemia intra-operatively.

Methods: Two patients underwent DP+CAR from Nov 2018-Sept 2019. Both patients received neoadjuvant chemotherapy with FOLFIRINOX, and one patient received neoadjuvant external beam radiation. To simulate the altered circulation pattern following celiac axis resection, both patients underwent SMA arteriography concurrently with balloon occlusion of the celiac axis. Patient #1 had classic hepatic arterial anatomy. Prograde arterial flow to the proper hepatic artery from SMA collaterals through the pancreaticoduodenal arcade to the GDA was observed during angiography. Patient #2 had a replaced right hepatic artery off of the SMA. Prograde arterial flow to the left hepatic artery through collaterals was noted on angiography (figure 1). To evaluated gastric perfusion after celiac axis resection, ICG angiography was performed of the stomach with particular attention to the fundus. The right gastroepiploic artery was preserved in both cases and the left gastric artery was ligated. Neither patient was noted to have gastric ischemia when tested with ICG angiography after the celiac axis was resected.

Results: Neither patient suffered ischemic complications in the post-operative period. Patient #1 was discharged on postoperative day (POD) 11 due to issues with delayed gastric emptying, which pre-existed surgical resection. Patient #2 discharged on POD 5. Pathology noted a R0 resection on both.

Conclusion: Preoperative simulation of prograde hepatic arterial flow through collaterals of the SMA as is anticipated after celiac axis ligation is feasible and reliable using our described technique of mesenteric angiography. ICG angiography is useful in evaluating gastric perfusion after celiac axis resection. These tools can be used to prevent ischemic complications following DP+CAR.
Figure 1: superior mesenteric angiography with balloon occlusion of the celiac axis

Patient #1

Patient #2
P 188. ROBOTIC COMPLETION RADICAL CHOLECYSTECTOMY FOR INCIDENTAL GALLBLADDER CANCER
JM Creasy, ME Lidsky, KN Shah, GS Herbert, PJ Allen, S Zani Jr
Presenter: John Creasy MD | Duke University Medical Center

Background: Incidental gallbladder cancer (GBCA) is diagnosed following cholecystectomy for presumed benign disease. In the absence of disseminated metastases, patients typically undergo re-operation with resection of hepatic segments 4b/5 and portal lymphadenectomy. Due to improved visualization, articulation, and precision compared to laparoscopic surgery, robotic platforms are well adapted for re-operation and definitive resection. The purpose of this study is to describe the presentation and perioperative details of patients that underwent robotic completion radical cholecystectomy for incidental GBCA.

Methods: Patients that underwent robotic completion radical cholecystectomy (segments 4b/5 and portal lymphadenectomy) for GBCA were identified from departmental records. Demographics, presentation, and operative details were assessed. Patients were excluded if they had primary GBCA. Complications were recorded according to the Clavien-Dindo classification.

Results: From 2016-2019, five patients underwent robotic resection of hepatic segments 4b/5 with portal lymphadenectomy for incidental GBCA. Median age of patients was 61 years old (range 55-77) and the majority were female (n=4, 80%). Median number of lymph nodes excised was 9 (range 5-16) and operative time was 215 minutes (range 183-240) with estimated blood loss (EBL) of 50cc (range 30-100). Adenocarcinoma was the most frequent tumor histology (n=4, 80%). Residual disease (RD) was identified in 3 patients (60%) and was present in the gallbladder fossa (n=2, 40%) or lymph nodes (n=2, 40%). Final pathology demonstrated 3 patients (60%) with T2 tumors and 2 patients (40%) with T3 tumors. Overall, 2 patients (40%) had involved lymph nodes. Resection margins were negative for all patients with RD. One patient experienced a grade 2 complication, cardiac arrhythmia, in the postoperative period. Median length of stay was 2 days (range 1-4).

Conclusion: In routine re-operation and definitive resection for incidental GBCA, robotic surgery was safe and feasible. Robotic completion radical cholecystectomy was performed with appropriate lymph node yield, morbidity, operating times and length of stay. We continue to approach bulky tumors and obvious residual disease with laparotomy at re-exploration. However, in patients that are candidates for minimally invasive surgery, this series suggests that robotics is an appropriate surgical strategy.
P 189. ROBOTIC HEPATECTOMY IS A SAFE AND COST-EFFECTIVE ALTERNATIVE TO CONVENTIONAL OPEN HEPATECTOMY: A SINGLE CENTER EXPERIENCE

J Hawksworth, NP Llore, ML Holzner, P Radkani, E Mesler, E Winslow, R Satoskar, R He, N Haddad, T Fishbein

Presenter: Nathaly Llore MD | MedStar Georgetown University Hospital

Background: The majority of liver surgery worldwide continues to be performed open as laparoscopic hepatectomy is technically challenging with a steep learning curve. Robotic surgery overcomes many of the technical limitations of laparoscopy and improves the ability of hepatobiliary surgeons to safely perform minimally invasive hepatectomy. However, the clinical outcomes and cost effectiveness of robotic liver resection are largely unknown.

Methods: Adult liver resections performed at a single institution from September 2018 to September 2019 were reviewed. Operative data and clinical outcomes between open and robotic hepatectomy were analyzed. Operative and hospitalization costs were compared between the two groups.

Results: There were 25 open and 16 robotic hepatectomies performed during the study period. Clinical characteristics including age, gender, BMI, comorbidities, and presence of underlying cirrhosis were comparable between the groups. Open hepatectomy was performed more often for malignant disease compared to robotic (84% vs. 50%) (P=0.034). Major hepatectomy was performed in 16 (64%) open cases and 9 (56%) robotic cases (P=0.618). Operative time was significantly longer in robotic compared to open hepatectomy (median time 375 vs. 236 minutes) (P=0.038). There were no conversions to open in the robotic group. Estimated blood loss, need for intraoperative transfusion, and major complications (Clavien-Dindo class III-V) were significantly lower in the robotic group (Table 1). Patients undergoing robotic hepatectomy had a significantly shorter length of stay compared to open hepatectomy (median 3 vs. 5 days) (P < 0.001). Operative cost was significantly higher in the robotic group compared to open ($11,759 vs. $7,062) (P < 0.001). However, overall cost (operative and hospitalization) was comparable between the two groups (robotic $15,451 vs. open $18,869) (P=0.106).

Conclusion: In this single-center experience robotic hepatectomy was superior to open hepatectomy with regards to blood loss, intraoperative transfusion, length of stay, and major complications. Although operative time and cost were higher in robotic hepatectomy, the overall cost was comparable to open hepatectomy due to shorter hospitalizations.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Open (n=25)</th>
<th>Robotic (n=16)</th>
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<td><strong>Clinicopathologic characteristics</strong></td>
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<td>Age, median (IQR)</td>
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<td>60 (55-72)</td>
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<td>BMI, median (IQR)</td>
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<td>Cirrhosis, n (%)</td>
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<td>Malignancy, n (%)</td>
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<td>8 (50)</td>
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<td>Size of lesion/tumor (cm), median (IQR)</td>
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<td><strong>Operative characteristics</strong></td>
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<td>Major hepatectomy, n (%)</td>
<td>16 (64)</td>
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<td>Hepatectomy type, n (%)</td>
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<td>Number of segments resected, median (IQR)</td>
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<td>Secondary procedures, n (%)</td>
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<td>Colectomy</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>Pancreatectomy</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Nephrectomy</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Diaphram resection</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Biliary reconstruction</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Operative time (min), median (IQR)</td>
<td>236 (182-292)</td>
<td>375 (234-470)</td>
<td>0.038</td>
</tr>
<tr>
<td>Estimated blood loss, median (IQR)</td>
<td>900 (450-1500)</td>
<td>300 (225-500)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Transfusion, n (%)</td>
<td>11 (44)</td>
<td>1 (6.25)</td>
<td>0.013</td>
</tr>
<tr>
<td>Transfusion units, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>14 (56)</td>
<td>15 (93.75)</td>
<td>0.029</td>
</tr>
<tr>
<td>1</td>
<td>5 (20)</td>
<td>1 (6.25)</td>
<td></td>
</tr>
<tr>
<td>&gt;1</td>
<td>6 (24)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td><strong>Post-operative outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU admission, n (%)</td>
<td>10 (40)</td>
<td>2 (12.5)</td>
<td>0.084</td>
</tr>
<tr>
<td>Major morbidity (grade III-V), n (%)</td>
<td>8 (32)</td>
<td>0 (0)</td>
<td>0.014</td>
</tr>
<tr>
<td>Biliary</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Pulmonary</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Wound</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Liver failure</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Length of stay (days), median (IQR)</td>
<td>5 (4-7)</td>
<td>3 (1.5-4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR cost (dollars), median (IQR)</td>
<td>$7,062 (5928-8238)</td>
<td>$11,759 (8808-13764)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hospitalization cost (dollars), median (IQR)</td>
<td>$8,850 (7375-14750)</td>
<td>$4,424 (2213-5900)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Total admission cost (dollars), median (IQR)</td>
<td>$18,869 (13852-23324)</td>
<td>$15,451 (11189-19651)</td>
<td>0.106</td>
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Background: Hypergiant hepatic hemangiomas are defined as those which are more than 10 cm in size. These are fairly uncommon in clinical practice. We present the case of a young female patient presenting with a hypergiant hepatic hemangioma causing abdominal pain and vomiting.

Methods: Patient is a 33 years-old female, with a previous medical history of early onset type I Diabetes Mellitus and Hypertension. She’s had two c-sections before for complicated pregnancies. She started 6 months before arriving at our center, with intermittent abdominal discomfort and dull, moderate to severe pain over the upper right quadrant, nausea and vomiting one to two hours after food intake. She was sent to our Medical Center to specialized treatment. At our center, lab tests were normal. No Kasabach-Merrit syndrome was found on analytics. Tumoral markers were also in normal values. A triphasic CT scan showed 2 hypodense lesions on the liver: one on segment VI (26 x 24 mm) and another one on left lobe (160 x 120 x 90 mm) with mixed densities and hypodense zones, 27 HU. The showed dynamic enhancement pattern on arterial phase and progressive peripheral enhancement on portal venous phase, suggestive of a hemangioma. Because of the symptomatic giant left liver hemangioma she was proposed to undergo a left hepatectomy. During surgery, a 20 x 15 x 12 cm hemangioma was found on SIII-SIV. A Pringle maneuver was difficult to reach but it was possible and allowed a left hepatectomy with a direct glissonian approach and a parenchyma resection by cavitron ultrasonic surgical aspirator and bipolar sealer. Pringle time was 15 minutes; intraoperative bleeding was 400 ml. There were no adverse events during the surgical procedure.

Results: Patient stayed one day at Intensive Care Unit. She was started on liquids on day two. She underwent a control CT scan on day 5th, that showed a well perfused right hemiliver, minimal right pleural effusion and no abdominal collections. Patient was discharged in excellent conditions at day 7 and remains symptom free at 6 months postoperative. Hepatic hemangiomas are the most common benign hepatic tumors. The incidence of hemangiomas is highest in the third to fifth decade of life and is more common in women. Exposure to high levels of estrogen and progesterone, occurring with multiparty, pregnancy, and oral contraceptive use, are reasons for the increased incidence in women (1). In a recent multicentric series from the U.S it was shown that operative intervention for liver hemangiomas remains an effective therapy and can be performed with low morbidity to the patient. However, aside from abdominal symptoms, prophylactic resections in the setting of hemangioma enlargement, size, or patient anxiety is not advised as the risk of developing life-threatening associated complications is rare (2).

Conclusion: Hypergiant hepatic hemangiomata are very rare benign tumors. On symptomatic hepatic hemangiomas, surgical resection might be an appropriate therapy, in hepatobiliary centers with experience in major hepatic resections, offering a low morbidity and with a very good symptom improvement.
Background: The rate of gallbladder perforation in the setting of acute cholecystitis is 2-11% with the fundus, the most distal location with regard to blood supply being the most common site of perforation. The mortality rate of gallbladder perforation is alarmingly high at 12-16% and attributed to delayed diagnosis due to limitations of modern imaging. A high suspicion of gallbladder perforation and early operative intervention are key to reducing morbidity and mortality. Gallbladder perforation may be managed with laparoscopic cholecystectomy, although there is a high conversion rate due to unclear anatomy. We describe a case of robotic cholecystectomy for gallbladder perforation and discuss the advantages of this operative modality.

Methods: The patient is a 62 year-old male with history of hypertension, type 2 diabetes, pulmonary embolism (on apixaban) and schizoaffective disorder who presented with 3 days of right upper quadrant pain. Computed tomography showed acute cholecystitis and a 6.5 cm subcapsular hepatic fluid collection. Due to current use of anticoagulation he underwent percutaneous drainage the subhepatic fluid collection, which was bilious and suggestive of gallbladder perforation. Magnetic resonance cholangiopancreatography revealed fundal gallbladder perforation with leakage of bile into the subcapsular hepatic space. He subsequently spiked fevers and went into atrial fibrillation with rapid ventricular rate. Collaboration with hepatobiliary surgery was had and it was determined that the benefits of early cholecystectomy outweigh the risks of long-term percutaneous drainage. The patient underwent indocyanine green (ICG) aided robotic cholecystectomy with intraoperative cholangiogram (IOC). IOC showed free flow into the duodenum with normal intra and extra hepatic ducts. Subcapsular hepatic (segments 4a & 5) and subdiaphragmatic abscesses were evacuated.

Results: The subhepatic drain was removed on postoperative day (POD) 3. The patient was transitioned to oral antibiotics and discharged to his group home on POD 5. Pathology showed chronic cholecystitis with transmural fistula. He is doing well two months from surgery.

Conclusion: Acute cholecystitis with gallbladder perforation carries a high mortality rate secondary to delayed diagnosis. Early diagnosis and surgical intervention is key. Management of gallbladder perforation may be performed open or laparoscopically with a high risk of conversion. To our knowledge this is the first video documented case of a robotic cholecystectomy for gallbladder perforation. Robotic cholecystectomy offers unique advantages when compared to laparoscopic or open techniques. The robotic camera allows for 3D images, which enhance the visual field when compared to laparoscopic imaging. This allows for better visualization of anatomy during dissection, which may lead to decreased conversion rates. Additionally, instrument articulation reproduces that of the human wrist, allowing for dissection in more difficult angles. ICG fluorescence helps to define biliary anatomy in real time and reduces the need for radiation exposure from traditional cholangiopancreatography. In this case ICG-cholangiography allowed for visualization of the common bile and cystic ducts, and differentiation of hepatic and gallbladder tissue for safe dissection. Robotic cholecystectomy should not be considered standard, but a valuable tool in experienced hands for management of difficult cholecystectomies.
Background: Primary Neuroendocrine tumours (NETs) of the hilar bile duct are thought to account for only 0.1-0.4% of all NETs. Here we present the case of an 18-year-old female with a history of nephrotic syndrome who was diagnosed with a primary extrahepatic bile duct NET.

Methods: An 18-year-old female with a known history of steroid dependant nephrotic syndrome was investigated following an unexpected relapse of her condition for the first time in 13 years. Whilst under investigation for ankle oedema and facial swelling, an MRI of the abdomen reported an incidental finding of a 25mm exophytic liver lesion in segment IV(b). Further characterisation with contrast enhanced MRI indicated a differential diagnoses of focal nodular hyperplasia or liver adenoma. In the following 2 months, she presented with multiple episodes of right upper quadrant pain and jaundice with acute cholecystitis. Blood results demonstrated a peak ALT of 1,500 IU/L and bilirubin of 77µmmol/L. Subsequent MRCP demonstrated bilobar intrahepatic biliary dilatation secondary to complete compression of the common hepatic duct from the previously noted hepatic lesion (Fig.1). Operative intervention was undertaken 4 months following her first presentation of abdominal pain.

Results: Intra-operatively, a lesion was noted arising from the common hepatic duct. Intra-operative frozen section was undertaken which demonstrated findings consistent with a NET. She underwent open cholecystectomy, with a 26mm section of bile duct excised and ductoplasty performed joining the left and right hepatic duct to form a single hepatico-jejunostomy and Roux-en-Y reconstruction with jejuno-jejunostomy. Operative recovery was uneventful and she was discharged routinely on day 5 post-operatively. Final histology revealed a Grade 2 pT1 pN0 Mx NET of size 17x13x16mm with invasion of the bile duct wall and Ki67 index of 15%. Immunohistochemistry showed expression of chromogranin and synaptophysin. Post-operative Ga68-DOTATATE PET scan demonstrated no evidence of tracer avid disease and therefore final diagnosis was documented as primary common hepatic duct NET. 10 months post operatively she was well with no disease recurrence.

Conclusion: Here we describe a rare condition managed with a limited resection and reconstruction resulting in an R0 resection. The first reported case of a bile duct neuroendocrine tumour was in 1959 and since then there has been roughly 150 cases reported in the literature. They are exceedingly difficult to diagnose pre-operatively due to their rarity and lack of distinguishing features. The mean age of diagnosis is 47.04 ± 17.62 years (6-79 years). To our knowledge, this is only the 8th case reported in children or adolescents and the first case diagnosed with frozen section intra-operatively. Previous studies have demonstrated a possible link between GI NETs and minimal change glomerulonephritis but there is no reported literature stating a link with bile duct NETs. A systematic reviewed showed a mean follow up range of 35.28 ± 42.3 months with no reported cases of recurrence in this time.
Background: Pneumoperitoneum is most frequently caused by hollow viscous perforation, which in most cases requires an exploratory laparotomy. In the event where no perforation can be identified, one must consider other rare causes of pneumoperitoneum.

Methods: We report a case of a woman who presented to the emergency department with severe abdominal pain and nausea.

Results: On initial exam the patient had peritonitis, and the CT of her abdomen & pelvis showed a substantial pneumoperitoneum, with a dilated cecum and ascending colon, and gallstones within a distended gallbladder. Initial exploratory laparotomy showed no hollow viscus perforation, an unroofed left liver lobe abscess, and a distended gallbladder. Further imaging after the initial operation showed significant choledocholithiasis, although her hepatic function tests remained normal. Subsequently the patient underwent ERCP, sphincterotomy, multiple stone extraction and stent placement. Two further exploratory laparotomies were performed for cholecystectomy and drainage of liver abscess, again with no identifiable hollow viscus perforation. Cultures drawn from the peritoneal fluid and abscess grew gas-forming organisms, prominently Klebsiella Pneumoniae. Over the next few weeks the patient decompensated and developed septic shock, and multi organ failure in spite of maximal therapy; she ultimately died from septic shock due to overwhelming hepatic and intraperitoneal abscesses.

Conclusion: This case highlights a very uncommon etiology for pneumoperitoneum in the absence of hollow viscus perforation, from the hepatobiliary tract, associated with ascending cholangitis from an invasive form of Klebsiella Pneumoniae liver abscess syndrome.
P 194. BILIO-BILIARY FISTULA POST BILE DUCT INJURY
PJ Sisco, JE Devoto, L Mosna, MO Gianatiempo, S Romay, NB Perrone
Presenter: Pablo Sisco | Hospital Pirovano

**Background:** Spontaneous bilio-cutaneous, bilio-duodenal and bilio-colonic fistulae have been reported due to bile duct injuries, but bilio-biliary fistula is a very uncommon finding.

**Methods:** Fifty six year old female patient underwent to a laparoscopic cholecystectomy. Intraoperative cholangiography was considered normal, but when the surgeon continued with the procedure a biliary leakage was evidenced. New cholangiography showed the site where the bile flowed. Bile duct injury was detected and the surgeon considered it as Strasberg C (Severity grade 2).

Open approach, a catheter was left to drain the duct without performing any maneuver on the main bile duct. Postoperative outcome was uneventful and the drainage output was 400 cc per day. Fortyfive days postoperative the output remained the same. During five months after surgery the patient did not attend to control. At that time, the drainage output was zero and the blood tests only evidenced an increase in alkaline phosphatase the double.

Transcatheter cholangiography showed a bilio-biliary fistula between right and main bile duct that justified the absence of jaundice en output zero.

**Results:** The biliary repair was performed as follows:
1) Right hepatic duct identification and a partial resection of segment IV B to improve the approach.
2) Open the left hepatic duct (Hepp-Couinaud style), make a new biliary confluence and perform a bilio-enteric anastomosis.

A biopsy of the liver was performed and reported periductal fibrosis.

Six months after a postoperative MR evidences a correct anastomosis patency and a complete normal caliber biliary tree. Five years after surgery, normal levels of bilirubin, alkaline phosphatase and transaminases are evidenced.

**Conclusion:** Considering those parameters and the excellent patient’s condition we wondered if surgical treatment was necessary. None similar reports were found. The strategy was based in two instances:
- First, we considered the existence of a right bile duct dilated and the alkaline phosphatase increased plus the patient’s agreement to be operated. - Second, although the main bile duct and the left hepatic duct were not dilated, the high possibility of future stenosis due to the adjacent fibrous process was evaluated.
Background: As hepatic artery aneurysms have the highest reported rate (80%) of spontaneous rupture of all visceral artery aneurysms (VAA), secondly remain remarkably asymptomatic for a long time and thirdly are mostly diagnosed incidentally and delayed, these VAA can cause fatal complications. VAAs occur with an incidence of 0.01-0.1%, of which hepatic artery aneurysms are the second most common. In more than 30% hepatic artery aneurysms are associated with other VAA. The aim of this case report is to evaluate the challenges in the surgical treatment for combined VAA.

Methods: We present a 68-year-old man admitted to the hospital with a pulsatile abdominal mass. Our patient presented important risk factors to develop artery aneurysms such as high blood pressure, smoking, blunt abdominal trauma and iatrogenic manipulation by draining hepatic abscesses. CT angiography revealed an infrarenal aortic dilatation (44x45mm) as well as a 54x47mm large hepatic artery dilatation, reaching 63mm from the celiac trunk to the proper hepatic artery bifurcation. Based on the characteristic clinical symptoms, the typical risk factors and the explicit radiological findings, a clinical diagnosis of hepatic artery pseudoaneurysm combined with aortic aneurysm was made. Aneurysms exceeding 2 cm in diameter require treatment with either endovascular techniques or open surgery. Given the fact that we aimed to treat two large aneurysms, of which the hepatic artery aneurysm was suspect to be a fungal mycotic aneurism, the decision to perform laparotomy was made.

Results: Via percutaneous endovascular catheter a balloon was placed in the ostium of the celiac trunk prior to aneurysm manipulation. The resection of both aneurysms was performed multidisciplinarily by vascular and hepatobiliary surgeons in one procedure. The VAA, stretching from the hepatic artery to the celiac trunk, was (exposed and) excised after ligation of the left gastric and splenic artery. Adequate gastric blood supply was ensured primarily. Our therapeutic approach was to build an end-to-end vascular anastomosis, which due to little flow caused by intraoperative vessel thrombosis, needed to be renewed with a cryopreserved graft placed in between the ostium of the celiac trunk and the bifurcation of the right and left hepatic artery. The infrarenal aortic aneurysm was resected and reconstructed with cryopreserved arterial homografts. In the postoperative management slightly elevated levels of transaminases decreased after two days. The patient did not present signs of liver failure. A postoperative pancreatitis with peripancreatic fluid collections required radiologically guided percutaneous drainage.

Conclusion: This case report illustrates both the challenge to build sufficient vascular anastomosis after the excision of extensive VAA and to prevent postoperative thrombosis in end-to-end anastomosis. It may be discussed whether a repeated perioperative interruption of arterial blood flow to treat combined aneurysms increases the risk to form thrombus in recently connected anastomoses. To provide the best possible surgical treatment for patients with combined VAA, a multidisciplinary interlinked discussion and management is essential and concluded.
P 197. PRIMARY HEPATIC LYMPHOMA  
L García Ruiz, E Ruiz  
Presenter: Jorge Luna-Abanto | Instituto Nacional de Enfermedades Neoplásicas

**Background:** Non-Hodgking lymphoma includes a heterogeneous group of neoplasms, and diffuse large B-cell lymphoma being the most common type. Although the secondary involvement of the liver by this pathology is very common, the primary location in the liver is rare representing less than 1%; Due to its rarity, the treatment and the prognosis are still unclear.

**Methods:** A 79-year-old male patient with treated stage II prostate cancer. At physical examination showed a tumor with defined borders in the right hypochondrium, no collateral circulation, no ascites, no jaundice, no peripheral adenopathies; that in abdomen tomography two solid lesions of neoformative aspect were evidenced that compromises the right hepatic lobe, one of them occupies segment VII and VIII, reaching a size of 7 x 10 cm in intimate contact with the right cava and suprahepatic vein; the other lesion occupies segment VI, V and part of the IVB, which reaches 17 x 17 cm, with capsule rupture, and alteration of adjacent fatty planes of the hepatic angle of the colon; likewise, perilesional lymphadenopathy is observed at the 2 cm hepatic hilum level, and at the 1 cm paraaortic level retroperitoneum. Tumor markers DHL, AFP, CEA, Ca 19 9 and viral serology were negative. An exploratory laparotomy + right trisegmentectomy + Pringle maneuver + Hanging maneuver were performed; In the intraoperative period, a 26 cm tumor was evidenced depending on segments IV B, V, VI and VIII; which infiltrates the right suprahepatic vein and envelops the vena cava, R0 surgery was performed. The histological study reported diffuse large B-cell germinal non-central lymphoma.

**Results:** For an NHL to be classified as a primary liver, it must meet certain characteristics: at the time of diagnosis, the symptomatology is due to the primary involvement of the liver, and no involvement of other organs as well as lymph nodes has been demonstrated within 6 months of diagnosis. (3,15) Most of the lymphomas that primarily affect the liver are B-cell type, the diffuse large cell variety, Burkitt lymphoma, leukemia / lymphoblastic lymphoma B, chronic lymphocytic leukemia / small lymphocytic lymphoma, cell leukemia hair, follicular lymphoma, mantle cell lymphoma and extranodal lymphoma of the marginal area and lymphoid tissue associated with the mucosa. (12) Diffuse large B-cell NHL is the most common subtype in primary hepatic lymphomas, and accounts for 46% to 96% of cases. (5,12) This neoplasm is usually diagnosed in elderly patients and is associated with chronic viral infection and immunosuppression, events that did not occur in the present case. (12) These patients usually present with nodular liver disease, characterized by a diffuse infiltrate of large CD 20 lymphoid cells that erase the hepatic parenchyma. (12, 16)

**Conclusion:** LHP is a rare disease, whose clinical manifestations and laboratory findings are nonspecific, imaging tests are helpful but their diagnosis is based on the pathological result in conjunction with immunohistochemistry, some markers being indispensable. The optimal treatment and prognosis is still debatable and no standardized guideline is evident in the literature.
**Background:** Early stage pancreatic cancer is currently best-managed by surgical resection, with 5-year survival rates approaching 30% when amenable to resection and carried out in a timely fashion. Delays from symptom onset to surgical intervention can be due to a number of factors. A handful of studies have aimed to determine the maximum allowable window of time from diagnosis to treatment.

**Methods:** This retrospective cohort reviewed the practice patterns in a community-based, tertiary care hospital, in patients who underwent pancreatic tumor resection from 2009 to 2018. Parameters investigated were time from radiographic image acquisition to surgical consultation, time from surgical consultation to resection, presenting symptomatology, and number and type of preoperative images performed.

**Results:** In total, 135 patients were seen, evaluated, and treated with surgery at our institution. Of these, 35 patients were excluded for insufficient data. The medial number of days from diagnosis to surgical consultation was eleven days and from consult to surgical resection was also eleven days. On average, 48 days passed before a patient was initially imaged until they underwent surgical resection. The majority of patients presented with pain as one of their initial symptoms (n=58). When stratified for a presenting symptom of jaundice, patients were seen in surgical consultation six days earlier and operated on four days sooner. Patients received, on average, three imaging studies prior to resection. Of these, computed tomography was performed at least once in 89 percent of patients.

**Conclusion:** In this study, we report the real-world time course and pre-operative expectations for patients with pancreatic cancer. Future studies should aim to highlight areas where efficiency may be improved upon.
P 199. RECURRENT GALLSTONE ILEUS IN A SINGLE ADMISSION
MD Burstein, D Alaedeen
Presenter: Matthew Burstein MD, PhD | Cleveland Clinic Foundation

Background: Gallstone ileus is a rare sequelae of cholecystitis and persistent cholelithiasis whereby a fistulous connection forms between the gallbladder and GI tract seeding the narrower portions of the bowel with large obstructing stones. It occurs most commonly in elderly women, and can carry a significant mortality.

Methods: We present here the case of a 70 year old female originally misdiagnosed with a foreign body related obstruction who was taken to the OR for laparoscopic assisted enterotomy and removal of the mid-jejunal object. The object was recognized as a calcified cylindrical gallstone measuring 3 cm in maximum dimension. All pre-operative radiographs, intraoperative laparoscopy, endoscopy, and open enterolithotomy video is available for this case. Post operatively her ileus did not resolve and upon return to OR a second stone was found and removed, again with laparoscopic assisted extracorporeal enterolithotomy.

Results: Regrettably the first simple enterolithotomy failed this patient, likely due to the small fascial defect of the original case keeping the 18 mm spherical stone intracorporeal and hindering localization.

Conclusion: This case highlights some of the diagnostic challenges as well as the importance of clearing all stones should simple enterolithotomy be the selected operation in this patient population.
Background: Primary sarcomas of the gallbladder are rare neoplasms with multiple subtypes. The estimated frequency of primary sarcomas of the gallbladder is 1.4/1000 gallbladder malignancies with a female predominance of 5 to 1. Leiomyosarcoma of the gallbladder is an extremely rare subtype, accounting for only 7% of all gallbladder sarcomas. Limited clinical data suggests these tumors have an aggressive nature and are often found at an advanced stage.

Results: An otherwise healthy 86 year old female presented to the emergency department with abdominal pain, nausea, jaundice and sepsis. Work-up revealed choledocholithiasis and biliary pancreatitis. She eventually underwent an uneventful ERCP with biliary decompression followed by a laparoscopic cholecystectomy the following day. Pathologic evaluation of the gallbladder demonstrated multiple calculi as well as a 2.4 x 2.1 x 1.8 cm friable polyp in the dome. This polyp consisted of spindle cells with prominent osteoclastic giant cells, consistent with a primary low-grade leiomyosarcoma of the gallbladder. The diagnosis was confirmed by an outside pathologist at Brigham and Women’s Hospital. Her case was reviewed at our Tumor Board conference and no further treatment or surveillance was recommended due to the low-grade nature of the tumor and her advanced age. The patient recovered from the surgery without incident and remains well.

Conclusion: Primary leiomyosarcoma of the gallbladder is a very rare tumor that is often at an advanced stage upon discovery. As our patient demonstrates, these can be found at an early, low-grade stage and aggressive therapies are not mandated.
Background: The glomus body is a specialized arteriovenous shunt surrounded by modified smooth muscle cells. They are most commonly found in the dermis of the fingers and toes and are involved primarily in thermoregulation. Glomus tumors are rare soft tissue neoplasms derived from the smooth muscle cells of the glomus body. Typically locations for this neoplasm include the dermal and preoccygeal soft tissue, especially the distal extremities and the subungual regions. Primary glomus tumors of the liver are exceptionally rare with only seven reported cases in the literature.

Results: A 61 year old AA female patient underwent PET-CT scan secondary to a history of rheumatoid arthritis and a chronically elevated ESR level. This revealed an incidental avid liver lesion in segment 4b. CT-guided biopsy of this lesion proved to be a rare primary glomus tumor of the liver. Her case was presented to our multidisciplinary tumor board and resection was recommended. She underwent a laparoscopic partial left hepatectomy with intraoperative ultrasound examination. Final pathologic evaluation of the tumor confirmed a primary glomus tumor of the liver with benign features.

Conclusion: Although exceptionally rare, primary glomus tumors of the liver are possible and resection is warranted. The limited clinical data available suggests that surgical resection is curative.
**Background:** Pancreatic adenocarcinomas (Panc Ca) are often significantly understaged by preoperative computerized tomography (CT) imaging in terms of resectability. Anecdotally, we have found that some Panc Ca are inherently more “Infiltrative” when compared to others that are more “Mass-Forming”, even though preoperative imaging deemed them resectable. We would like to propose a new delineation of Panc Ca – (1) Mass-Forming and (2) Infiltrative. We hypothesize that Mass-Forming Panc Ca offer better surgical outcomes with fewer R1 resections and less lymphovascular invasion.

**Methods:** We present a series of Whipple procedures for Panc Ca. We re-reviewed preoperative images with a dedicated radiologist and categorized them based on objective criteria into “Mass-Forming” and “Infiltrative”. We then reviewed their pathologic outcomes – Lymphovascular invasion and margins.

**Results:** We provide a side by side comparison of these two distinct entities within Panc Ca with their impact on pathologic outcomes, namely lymphovascular invasion and margins. (Images included)

**Conclusion:** This is the first description of this delineation of Panc Ca. Using these cases, we would like to support our proposal to addend the nomenclature for Panc Ca to include “Infiltrative” and “Mass-Forming” as descriptors. This most certainly needs to be investigated further but may prove to be the evidence behind the recommendation for the use of neoadjuvant chemotherapy in patients with the infiltrative type of Panc Ca.
Background: The learning curve for a robotic assisted pancreatoduodenectomy is believed to be between 20 and 30 cases for surgeons who are familiar and proficient in robotic surgery. Surgeons usually start with distal pancreatic work prior to transitioning to the Whipple procedure. We wanted to assess what the learning curve of the distal pancreatectomy is compared historically to the Whipple procedure.

Methods: We retrospectively evaluated our first 20 distal robotic distal pancreatectomy procedures. Preoperative, intraoperative and postoperative outcomes including age, operative time (OR time), blood loss and length of stay were measured. The learning curve was plotted and compared to historical data for robotic pancreatectomy procedures.

Results: The first 20 robotic distal pancreatectomies were performed on patients with a median age of 66 years. Estimated blood loss was an average of 135ml, length of stay was a median of 5.3 days. There was a steady decrease in OR times with successive cases, as plotted on the curve. (Figure 1). When compared to historical data showing learning curves for the Whipple procedure, this appears to be a more predictable, steady and quicker progression.

Conclusion: As expected, the Whipple procedure has a much steeper learning curve and even surgeons comfortable with robotic surgery can take up to 30 cases to gain proficiency.
P 205. PANCREATIC BRONCHOGENIC CYST: EASILY HIDDEN, DIFFICULT TO IDENTIFY
P Jayanthi, S Tolia, J Parikh
Presenter: Prakash Jayanthi MD | Michigan State University College of Human Medicine

Background: A bronchogenic cyst is a rare congenital anomaly, presenting as a cystic mass of nonfunctioning respiratory tissue. Retroperitoneal bronchogenic cysts are extremely rare, and present with non-specific symptoms, cloak themselves as other diseases, or can be an incidental finding on imaging. There have been less than 50 published cases of retroperitoneal bronchogenic cyst, and significantly fewer pancreatic bronchogenic cysts.

Methods: A 72-year-old female presented originally to her local hospital with complaints of recurrent hematochezia. On CTA abdomen, a 7 cm cystic mass was incidentally discovered, contiguous with the pancreatic tail. She denied any history of pancreatitis, abdominal pain, weight loss, or other issues. She also denied any family history of pancreatitis, or other pancreas-related issues. She underwent an endoscopic ultrasound with fine needle aspiration. Biochemical analysis of the fluid showed an elevated Amylase of 4115 U/L, and a CEA of 2080 ng/ml. Due to these findings, the cystic lesion was thought to be an intraductal papillary mucinous neoplasm. Hence, the patient underwent a robotic distal pancreatectomy and splenectomy. Her post-operative course was uneventful, and she has recovered well since.

Results: Macroscopically, the resected area measured 10.0 cm x 3.5 cm x 2.0 cm, and the cyst measured 8.6 cm x 6.0 cm x 4.5 cm, gray to brown-red in color and encapsulated. The specimen when sectioned revealed a unilocular cyst containing brown to gray-green, inspissated, mucoid material that was turbid. Inner lining of the cyst was pale tan, focally red, and smooth, with a 0.1cm thick wall. The lesion was noted to be adjacent to the superior edge of the resected pancreas, and did not involve the pancreatic duct. Microscopically, the cyst lining consisted of a single layer of benign pseudostratified ciliated respiratory-type epithelium. The cyst wall contained smooth muscle and focal cartilage. The cyst was intact, and did not communicate with the pancreas. As per pathology, this was consistent with bronchogenic cyst, rarely reported in this anatomic location.

Conclusion: Bronchogenic cysts arise from the endodermal foregut. Buds from developing tracheobronchial tree often break off and migrate. These buds usually deposit in the area of the bronchus, commonly in pulmonary parenchyma and mediastinum. However, extremely rarely, the buds may migrate into the abdomen. As the bud must migrate before the diaphragm forms, abdominal cysts are extremely rare; not many cases have been identified and described. Histologically, a pseudostratified ciliated lining, with cartilage or seromucinous glands or both, are necessary for a diagnosis. Reports of other elevated markers on biochemical analysis, including CA-125 and CA-19-9, and also CEA and amylase as in this case. Diagnostic imaging of the cyst seems better performed by MRI, as it allows for ruling out other causes of embryonic cysts, such as teratomas and dermoid cysts, from the differential diagnosis. The usual course of treatment for these cysts is surgical resection.
A. Left image showing a high power field view. B. The right imaging showing a low power field view. Pseudostratified ciliated epithelium is easily notable in A, and the smooth muscle and cartilage of the cyst wall being notable in both A and B. The lack of two-layers of smooth muscle help differentiate it from another foregut cyst, namely esophageal cyst.
P 206. DISTAL SPLENOPANCREATECTOMY AFTER PREVIOUS OPEN LIVER RESECTION. IS THE ROBOT A VALID OPTION?
R Bustos, V Valle, G Aguiluz, A Mangano, M Papamichail, E Fernandes, PC Giulianotti
Presenter: Roberto Bustos MD | University of Illinois at Chicago

Background: The Robotic approach in patients with previous major open abdominal surgery is still a matter of debate. Our experience suggests that, with proper planning, it is safe. Herein, we present a case of distal splenopancreatectomy in a patient with previous abdominal surgery safely managed in a minimally invasive approach.

Methods: A 69-year-old male with PSH of liver cholangiocarcinoma resection one year prior, presents to clinic with a newly diagnosed distal pancreatic mass, discovered incidentally during a CT scan. Before surgery, the patient had 4 rounds of chemotherapy utilizing Fulfirinox. A robotic distal splenopancreatectomy was planned. Initially, trocars were placed in the left lateral quadrant to take down adhesions involving the stomach, liver, small bowel loops, transverse colon and omentum, that were covering the access to the surgical target. After a good surgical space was achieved, the robot was redocked targeting the distal pancreas.

Results: Operative time was 211 minutes and estimated blood loss was 200 cc. The postoperative course was uneventful and the patient was discharged on POD6. Final pathology shows a T1N0 neuroendocrine tumor. The patient had no pain medication requirements and tolerating diet 1 week after surgery.

Conclusion: The operation was accomplished safely and uneventfully. Further studies are needed to draw further conclusions.
Background: Malignant salivary gland tumors are not common and adenoid cystic carcinomas (ACC) represent the rarest histotypes. ACCs have slow but progressive course with high rate of distant metastases. Few case reports about liver metastases from ACC are described in literature and a consensus about optimal management do not exist. We present a case of recurrent ACC to the liver twenty years after primary disease.

Methods: A woman of 58 years old was admitted in June 2018 to Medical Oncology of our Hospital for follow-up. Her anamnesis was characterized by left submandibular excision for adenoid cystic carcinoma (ACC) in 1995, thyroidectomy in 2008 for primitive thyroid carcinoma, pulmonary left lobectomy in 2016 for two different lesions: first was secondary to ACC from submandibular gland and second was primitive neoplasm of lung, hepatic wedge resection of S4 in 2015 for ACC metastasis, pulmonary wedge resection in 2018 for ACC metastasis. When she was admitted medical oncologists performed a control CT scan that showed one lesion in the segment six of the liver (1 cm) and one kidney mass (10 cm). Patient started chemotherapy that was stopped for intolerance after two months and control CT scan showed increase of the liver lesion. The case was multidisciplinary discussed and it was chosen surgery as treatment. Patient initially refused surgical option but after one month CT scan revealed in addition renal progression. In October 2018 she underwent open wedge resection of hepatic lesion between SVI and SVII and right nephrectomy.

Results: Postoperative course was uneventful. At one year follow-up she is alive with no evidence disease.

Conclusion: Adenoid cystic carcinoma (ACC) is a malignant tumor of salivary gland origin. Although the histologic appearance of ACC is low grade, management of this malignancy is a distinct therapeutic challenge because of its tendency for perineural involvement and potential for distant metastasis. Multidisciplinary discussion should be mandatory because specific guidelines do not exist. A regular imaging follow-up is strongly recommended. Surgery represents a potential good option when we have singular metastasis even in recurrent cases.
P 208. FIRST IN THE NATION HEPATOPANCREATEOBLIARY CANCER CERTIFICATION
R Donnelli, R Carreon, L Ocampo, A Chapates, R Jeyarajah
Presenter: Rebecca Donnelli RN, BSN, OCN, NE-BC | Methodist Richardson Medical Center

Background: MRMC experienced a steep increase in patients with HPB cancers with the addition of a surgical oncology group. Training of all staff, education, implementation of disease specific education, ERAS, nutritional services, was begun to provide high quality care to this unique population of patients. The HPB committee decided to pursue certification through Joint Commission for HPB cancer patients. We received certification in October 2018 for HPB cancer patients inpatient and outpatient. Leadership from physicians, nursing, cardiopulmonary, nutrition and physical medicine were involved and committed to providing quality care. Nurse navigators help to coordinate care across the continuum.

Methods: Plan-Do-Study-Act
Data collected on 4 measures: Pre-op Nutrition counseling, management of pain, timeliness of care less than or equal to 21 days and quality of life goals.

Results: Certification for HPB cancer achieved October 2018, 1st in the nation through the Joint Commission.

Conclusion: Forming an interdisciplinary team of committed care givers was critical in the success of the certification. Rohan Jeyarajah, MD lead the team and was available for education of OR, PACU, ICU, surgical nursing staff. His physician team assisted and continues to do grand rounds on HPB patients.
Friday, March 6 - Sunday, March 8, 2020 | ePoster Display, Kiosk #7

P 209. TRIPLE SYNCHRONOUS PRIMARY PANCREATIC DUCTAL ADENOCARCINOMA, HEPATOCELLULAR CARCINOMA, AND INTRAHEPATIC CHOLANGIOCARCINOMA

T Huy, J Keller, P Dinarvand, D Carpenter, MT Nguyen
Presenter: Tess Huy | Saint Louis University

Background: Pancreatic ductal adenocarcinoma (PDA) is the most common pancreatic malignancy, while hepatocellular carcinoma (HCC) and intrahepatic cholangiocarcinoma (ICC) are the most common liver malignancies. Cases of double synchronous primary HCC and ICC or HCC and PDA have rarely been reported. To our knowledge, we report a first case of triple synchronous primary PDA, HCC, and ICC.

Methods: Formalin-fixed paraffin-embedded surgical specimen sections were stained with hematoxylin and eosin, trichrome, and reticulin for morphological examination, and stained with antibodies against CK7, CK19, Hep-par1, CD34, polyclonal CEA, and CD10 for immunohistochemical analysis.

Results: A 61-year-old man with compensated hepatitis C cirrhosis underwent liver magnetic resonance imaging and pancreas computed tomography for abdominal pain. Findings included: 5.2 cm segment VIII liver mass with peripheral arterial enhancement and portal venous phase washout, 9 mm indeterminate segment IVB liver mass, and 1.7 cm pancreatic tail hypodense mass. Serum AFP was >1,210 ng/mL and CA 19-9 < 0.6 U/mL. Endosonographic fine needle aspiration of the pancreatic mass was consistent with adenocarcinoma. Percutaneous liver biopsies of the segment VIII mass were non-diagnostic. Since the segment VIII liver mass imaging characteristics were typical for HCC and associated with high AFP, we proceeded with diagnostic laparoscopy and intra-operative segment VIII liver biopsy. There were no peritoneal deposits. A 1 cm segment IVB mass of similar gross appearance to the segment VIII mass was observed. Frozen section of the segment VIII mass confirmed HCC rather than metastatic PDA. Open distal pancreatectomy with splenectomy and partial hepatectomies of segment VIII and IVB achieved R0 resection. Patient was discharged on day 4, but required drainage and stenting for a persistent pancreatic duct leak. Morphological histologic examination of the pancreatic tail mass showed common features of a well-differentiated PDA with pale eosinophilic cytoplasm, mucin, and perineural invasion (Figure 1A). There was direct extension into the peripancreatic soft tissues and nodal metastasis in 1 out of 20 lymph nodes. Morphological histological examination of the segment VIII liver mass showed features of a moderately-to-poorly differentiated HCC characterized by nests and thickened trabeculae of malignant hepatocytes lined by endothelium (Figure 1B). Morphological and immunohistochemical examination of the segment IVB liver mass supported a diagnosis of ICC. Morphologic features were vastly different from the PDA of the tail evidenced by higher cellularity and pleomorphism. Typical features of HCC were also lacking, as there were no hepatoid cytologic or architectural features such as endothelial-lined nests or trabeculae (Figure 1C). Immunohistochemical staining was inconsistent with HCC as most of the mass was positive for CK7 and CK19, negative for Hep-par1, without a canalicular pattern of polyclonal CEA or CD10, and without a diffuse sinusoidal pattern of CD34. Although a CK7/CK19 positive profile can be found in PDA, the distinctly different morphological features did not support a diagnosis of metastatic PDA.

Conclusion: We report a rare case of triple synchronous primary PDA, HCC and ICC that underwent curative intent resection. Following initial pre-operative diagnostic challenges, we demonstrated the histologic strategies used to differentiate ICC from HCC and metastatic PDA.
Figure 1. Representative histologic sections of A) the pancreatic tail ductal adenocarcinoma, B) the segment VIII hepatocellular carcinoma, and C) the segment IVB intrahepatic cholangiocarcinoma (CK7 positive staining at bottom left corner).
P 210. HEMOSUCCUS PANCREATICUS, A RARE COMPLICATION OF CHRONIC PANCREATITIS
M Pansari, D Forcione, S Steinberg, F Dodson, T Genuit
Presenter: Mridul Pansari MD | Florida Atlantic University

Background: Hemosuccus Pancreaticus is a rare complication of chronic pancreatitis resulting from pseudoaneurysm of peripancreatic vessels and erosion into the pancreatic duct. We present a case of a 60 year old female with chronic calcific pancreatitis (secondary to alcohol abuse and pancreas divisum) with recurrent admissions for melena, requiring multiple blood transfusions, with negative cross sectional imaging, identified to have bleeding from minor papilla and fistulization of the splenic artery with the dorsal duct on upper endoscopy and endoscopic ultrasound. The splenic artery was coil embolized by Interventional Radiology. Following coil embolization, patient had endoscopic retrograde pancreatogrpahy performed with sphincterotomy of the minor papilla, evacuation of stones and clots from the dorsal duct and placement of stents. Patient was recently seen in office and she continues to do well without any more melena or other abdominal complains.

Results: Successful control of bleeding via coil embolization of the splenic artery.

Conclusion: Hemosuccus pancreaticus should be kept in differentials in patients with chronic pancreatitis with obscure upper gastrointestinal bleeding.
Background: A 55 year-old man with hypopituitarism (previous pitutary resection and radiation), CKD Stage III, obstructive sleep apnea, and obesity was diagnosed with incidentally discovered pancreatic cysts. ERCP showed a fishmouth pancreatic duct (PD) dilated up to 12 mm, and pancreatoscope through the ventral duct noted thick mucin from a projection suggestive of main duct IPMN (MD-IPMN). MRCP demonstrated a bifid pancreatic duct with a 1.5 cm dilated duct of Wirsung, which coursed abnormally behind the portal vein to join the pancreatic body superior to the mid splenic vein (Figure 1A).

Methods: The patient was taken for an open pancreaticoduodenectomy (PPD) with possibility of total pancreatectomy. A retropancreatic tunnel was made overlying the portal vein (PV) and the pancreatic head was removed along with the duodenum in a pylorus preserving fashion (Figure 1B). A second, larger retroportal pancreatic head and body with the known dilated duct (and IPMN lesion) was then removed. The splenic vein was ligated for exposure which permitted lateral retraction of the PV, with distal to proximal dissection of the celiac axis and superior mesenteric artery (SMA) from the pancreas. The majority of the resection phase of the operation was devoted to this anatomy, as the retroportal pancreas was adhered to the aorta with numerous small feeding vessels from the adjacent major arteries. The hepatic artery was ultimately utilized to create a second retropancreatic tunnel once these vessels were controlled (Figure 1C). The procedure took 12 hours and had a blood loss of 3 L.

Results: Post operative course was complicated by a bile leak and pancreatic leak, and both were managed with existing surgical JP drains. The patient experienced hypovolemic shock secondary to a splenic artery hemorrhage on POD 5, which required return to the OR. The biliary and pancreatic anastomoses were taken down to control the bleed. A completion pancreatectomy and splenectomy was then performed. A new hepaticojejunal anastomosis was completed on POD 7. The patient was discharged to LTAC following a 21-day ICU course further complicated by pneumonia. He is currently 2 months postoperative and is recovering appropriately. Final pathology noted main duct IPMN in both the ante- and retropancreatic specimens with low-grade dysplasia. The completion pancreatectomy specimen showed low-grade pancreatic intraepithelial neoplasm.

Conclusion: Circumportal (CP) pancreas is a described pancreatic variant that occurs in less than 0.8-2.5% of patients in retrospective series of pancreatic imaging. The retroportal antesplenic variant detailed here is exceedingly rare (2-10% of all CP), and even more unusual given the IPMN lesion in the retroportal pancreatic tissue. We present this case as few of these CP variants ever are seen in the operating theatre. The resection of this premalignant lesion in the setting of the radiological described aberrant anatomy was of great difficulty. Had the lesion been in the anteportal tissue the operation would have likely proceeded with little deviation from anticipated norms. Surgeons planning to resect similar lesions should note that the conduct of the operation through ordinary anatomic planes may not be possible and additional technical support may become required.
HA - Hepatic Artery, SA - Splenic Artery, SMV - Superior Mesenteric Artery, SV - Splenic Vein, PD - Pancreatic Duct, PV - Portal Vein
P 212. PANCREATICODUODENECTOMY FOR AN ACTH-SECRETING PANCREATIC NEUROENDOCRINE TUMOR IN A 12 YEAR OLD: CASE REPORT AND LITERATURE REVIEW

JM Creasy, J Lim, DL Sudan, PJ Allen, HE Rice, S Zani Jr
Presenter: John Creasy MD | Duke University Medical Center

Background: In the pediatric population, pancreaticoduodenectomy is an exceedingly rare procedure. The most common indication is a pancreaticoblastoma in younger children or a solid pseudopapillary tumor (SPT) in adolescents. Pancreatic neuroendocrine tumors (PNET) have been reported only limitedly in children. This case report describes the presentation and surgical management of an ACTH-secreting PNET in a 12 year old male. To our knowledge, this is one of the youngest presentations of this malignancy in medical literature.

Methods: A 12 year old male presented with abdominal pain and jaundice. Ultrasound (US) demonstrated a pancreatic head mass and associated intrahepatic and extrahepatic biliary dilatation. On cross-sectional imaging, a 5cm tumor was identified in the pancreatic head with apparent encasement of the hepatic artery and portal vein. Endoscopic US (EUS) with biopsy was performed and revealed an intermediate grade (G2) PNET. Immunohistochemistry stains were positive for cytokeratin, synaptophysin, and chromogranin, and the tumor had a Ki-67 labeling index of 13%. He was started on Capecitabine/Temozolomide (CAPTEM). He developed diabetes mellitus, difficult to manage hypertension, and a Cushingoid appearance. Metabolic workup revealed an elevated ACTH (118 pg/mL, ref 7-63) and elevated Cortisol (40 microg/dL, ref 5-25) with no diurnal variation. Overnight dexamethasone test did not suppress. He was started on insulin, spironolactone, and ketoconazole. Gallium-68 DOTATATE PET/CT showed the known pancreatic head mass and a 1 cm focus of uptake in segment 8 of the liver. He finished neoadjuvant chemotherapy and was scheduled for surgery.

Results: Patient underwent a pancreaticoduodenectomy and hepatic wedge resection. The tumor was able to be dissected off the hepatic artery and portal vein, with no vascular reconstruction required. The estimated blood loss was 300cc and required a 419 minute operating time. He developed a chyle leak that resolved conservatively but no pancreatic leak was identified. He was discharged from the hospital on postoperative day 15. Final pathology demonstrated a 4.5cm well-differentiated neuroendocrine tumor (G2) with lymphovascular and perineural invasion and a 1 cm metastasis in the liver. The retroperitoneal margin was positive and 7/26 lymph nodes were involved. A minority of cells stained positive for ACTH.

Conclusion: Pancreatic neuroendocrine tumors in children are rare, especially functional tumors located in the pancreatic head and requiring pancreaticoduodenectomy. The goal in all cases should be complete resection. ACTH-secreting PNETs are uncommon and the recurrence rate is high. There are no defined adjuvant treatments. Multidisciplinary management of these complex malignancies should be undertaken in centers that perform a high volume of pancreatic resections and have the necessary expertise in pediatric endocrinology and oncology.
Background: Only 2 to 4% of the patients with melanoma will be diagnosed with gastrointestinal metastasis during the course of their disease. The most common sites of gastrointestinal metastatic melanoma include the small bowel, colon and stomach. Metastatic melanoma to the gallbladder is extremely rare and it is associated with a very bad prognosis.

Results: A 56 year-old woman with diagnosis of melanoma with two satellite lesions in 2017 and a PET-CT positive for inguinal adenopathy showed to our hospital. A left inguinal lymph node dissection with wide local excision was performed. Pathology results were positive for nodular ulcerated melanoma with a vertical growth phase, Breslow 9, pT4b,pN3b (5/16 nodes ), pM0. She received radiotherapy finishing in may 2018. Eleven months later she presented with a nodule in her right hand that was excised, reporting a 4mm metastatic melanoma. A new PET-CT showed a heterogeneous gallbladder with solid lesions with hypermetabolism SUV 14. A laparoscopic cholecystectomy was performed without complications. Pathological examination revealed metastatic melanoma of the gallbladder. Till the date, very few cases like this one, treated with this surgical procedure have been reported in literature.

Conclusion: Metastatic melanoma of the gallbladder represents a rare event as the most frequent site of recurrence. Laparoscopic approach has the purpose of making the diagnosis and discard other pathologies such as polyps or a second primary tumor. Intraoperative ultrasound is useful to discard other visceral metastases, such as the liver.
**Background:** Benign multi-cystic peritoneal mesothelioma (BMPM) is a rare neoplasm of mesothelioma cells originating from serosal linings of viscous organs. Here we present a case report of benign multi-cystic peritoneal mesothelioma (BMPM) of the porta hepatis.

**Methods:** We performed a chart review of the patient and collected preoperative findings, imaging, operative findings, and outcomes.

**Results:** A 61-year-old Hispanic woman presented with complaints of several years of chronic abdominal pain. Computerized tomography (CT) demonstrated a multi-cystic abdominal mass located near the porta hepatis. Fine needle aspiration (FNA) demonstrated benign ductal epithelial cells in a background of mucin and bile without the presence of malignant cells. During laparotomy, a large cystic mass seen emanating from the small bowel mesentery and attached to the porta hepatis as well as additional innumerable small cystic lesions through the abdomen were removed. Grossly, the abdominal mass specimen, measuring 26 x 18 x 8 cm, showed multi-loculated cysts filled with serous fluid. The final diagnosis was benign multi-cystic peritoneal mesothelioma (BMPM).

**Conclusion:** This case highlights the difficulty of diagnosing BMPMs and differentiating it from malignant diseases that can present similarly and that can be associated with significantly worse prognosis.
Figure 2 – Multi-loculated cystic surgical specimen measuring 26 x 18 x 8 cm filled with serous fluid.

Figure 3 – Multi-cystic peritoneal mesothelioma with vascular congestion, HE staining x20 (A) and x40 (B).
P 215. LAPAROSCOPIC LEFT LATERAL SECTIONECTOMY FOR A GIANT LIVER HEMANGIOMA
JL Beristain-Hernandez, M Garcia-Sanchez
Presenter: Jose-Luis Beristain-Hernandez MD | "La Raza" National Medical Center

Background: We present the case of a 65 year old female, with a previous history of cholecystectomy and hysterectomy. She was referred to our clinic with a previous history of liver hemangioma for years. History of colicky abdominal pain on upper quadrants, becoming more important during the last few months, presenting almost on a daily basis.

Methods: On CT scan a 15 cm diameter hemangioma on SII-SIII, with classic uptake of contrast on arterial phase. Tumoral markers and hepatitis viral panel was negative. She had no signs of liver insufficiency. A laparoscopic left lateral sectionectomy was proposed.

Results: Surgery was performed. It lasted 140 minutes, an a 300 mL intraoperative hemorrhage was accounted, taking into account the tumor blood. No Pringle manoeuvre was used during the resection. Postoperative course was uneventful and patient was discharged on PO day 3.

Conclusion: The patient remains asymptomatic and tumor free at 6 months postoperatively. Laparoscopic left lateral sectionectomy can be safely performed for giant liver hemangioma in selected patients.
P 216. USING ELECTRONIC HEATH RECORD (EHR) TOOLS TO REDUCE POST-OPERATIVE READMISSIONS AFTER HEPATO-PANCREATEO-BILIARY SURGERIES
D Davis, Y Chun, T Ross
Presenter: Dietrich Davis MSN, FNP | The University of Texas MD Anderson Cancer Center

Background: Cancer is a complex disorder that can require surgical management. Common side effects of surgery can include but not limited to pain, fatigue, reduced appetite, swelling near surgical site, bleeding, numbness, and infection. These side effects often lead patients to local emergency centers seeking treatment which can increase financial burden. Many side effects can be mitigated in an outpatient setting through effective communication tools available through EHRs. In our study we evaluate, 290 HPB patients in the post-operative setting for use of EHR communication tools and readmission rates 30 days post operatively.

We describe how implementing EHR access in the post-operative setting will:
1. Reduce postsurgical readmission rates through effective communication techniques.
2. Provide cost effective and timely interventions which reduce readmission occurrences which can increase financial burdens to families.
3. Improve patient satisfaction scores.

Methods: A retrospective chart review of 290 patients. In this particular study we will compare the readmission rate of patients that used EHR tools to communicate with their surgical teams compared to those that did not communicate at all or rely heavily on phone communication.

Results: We hypothesize that patients who use EHR tools to communicate with their surgical teams will likely have reduced readmission rates after surgeries due in part to timelier interventions.

Conclusion: The role of the EHR communication tools continues to expand and create workflows which benefit patients and care team members. Implementing communication tools into routine outpatient workflows can improve patient satisfaction scores, reduce readmission rates, and decrease the financial burden of illness. By providing EHR tools, patients can access health teams through cell phones and laptops. This immediate communication allows surgical teams to respond in a timelier manner and provide immediate intervention.
P 217. THE ABERRANT COMMON HEPATIC ARTERY IDENTIFIED DURING A WHIPPLE; LESSONS LEARNED FROM A DIFFICULT CASE

M Genz, M Baimas-George, J Sulzer, P Salibi, D Iannitti

Presenter: Michael Genz MD | Carolinas HealthCare System

Background: We report a case of a replaced common hepatic artery originating from the superior mesenteric artery with an anterior course identified during a pylorus preserving pancreaticoduodenectomy. The overall incidence of celiac vascular anatomic aberrancies ranges from 22% - 48%. To our knowledge, there has been only one case report describing this specific anatomic variant that was identified during a planned pancreaticoduodenectomy.

Methods: Our patient is a 56-year-old male who presented with obstructive jaundice and found to have a 3cm mass in the head of the pancreas that was found to be adenocarcinoma on fine needle aspiration. He was taken to surgery for a planned open pancreaticoduodenectomy. Intra-operatively, the common hepatic artery was found to be absent from its usual location, along the superior border of the pancreas originating from the celiac trunk. Instead, we identified the common hepatic artery taking off from the superior mesenteric artery, travelling just anterior to the neck of the pancreas and bifurcating into the right and left hepatic arteries at the superior border of the pancreas. This was confirmed on intraoperative ultrasound. The location of the common hepatic artery was found to be sitting anatomically in the area usually occupied by the gastroduodenal artery. We were safely able to dissect the pancreatic head and neck off the common hepatic artery without injury. We then completed the reconstruction, performing a duct-to-duct pancreaticojejunostomy, hepaticojejunostomy and duodenojejunostomy.

Results: Cross sectional imaging on post-operative day six demonstrated expected contrast enhancement of the common hepatic, right and left hepatic arteries, confirming no injury had been made during the case. He was eventually discharged on post-operative day eleven after resolution of a post-operative ileus.

Conclusion: We feel this case stresses the importance of performing a thorough dissection prior to ligating named vessels during a pancreaticoduodenectomy. Failure to correctly identify this type of vascular aberrancy could lead to a disastrous outcome for a patient with this variant.
Background: Biliary neuroendocrine carcinomas make up approximately 0.2% of neuroendocrine neoplasm cases per the most recent WHO classification. Previous reports document tumors in the gallbladder and extra-hepatic bile ducts. There has been very little documentation of hepatic involvement of biliary NECs and even fewer reports of intra-hepatic biliary NENs. Given the rarity of these tumors, diagnosis can be mistaken for other malignancies such as cholangiocarcinoma, hepatocellular carcinoma or metastasis. Formal diagnosis, and thus targeted treatment, is usually delayed until post-operative pathology identifies the tumor. We present a rare case of poorly differentiated biliary neuroendocrine carcinoma (G3) with extensive hepatic involvement without evidence of distant metastasis.

Methods: A 59-year-old female presented to her primary care office with symptoms of diverticulitis which was confirmed by CT of the abdomen and pelvis. An incidental 9.1cm lesion was identified involving segments 4B, 5, and 8 of the liver. The mass appearing hypodense on non-contrasted phase, with peripheral enhancement in the portal venous phase, was initially concerning for a pyogenic liver abscess secondary to diverticulitis. Differential diagnosis also included intra-hepatic cholangiocarcinoma, and less likely hepatocellular carcinoma or metastasis. A CT guided core biopsy of the lesion suggested a moderately differentiated adenocarcinoma of unknown primary. PET-CT scan showed hypermetabolic uptake of the mass without additional activity to suggest metastatic disease or alternate primary malignancy. Preoperative tumor markers were: CEA = 1.6, Ca 19-9 = 65, AFP = 6. The patient was referred to hepatobiliary surgery for resection. She underwent an en bloc cholecystectomy with central hepatectomy and intra-operative cholangiogram. Total operative time was 346 minutes, estimated blood loss = 600mL, pringle time = 15 minutes with a length of stay of 6 days. Her drain was removed on postoperative day 6.

Results: Final pathology revealed a 12.5cm large cell neuroendocrine carcinoma involving the liver of biliary origin. Ki-67 uptake was present in 90% of tumor cells with 25 mitoses per 10 high power fields. An R0 resection was obtained. Pathology was also sent to University of Pittsburgh Medical Center whom concurred with our pathologists. She completed 4 cycles of adjuvant cisplatin and etoposide with no evidence for

Conclusion: Biliary tract neuroendocrine neoplasms are exceedingly rare entities. It is estimated that approximately 0.5% of all NENs are of primary gallbladder origin and NEC make up 0.5% of all gallbladder carcinomas. Minimal reports of these tumors, make it difficult to identify the proper treatment modalities. In general, a poor survival rate and increased incidence of metastasis has been associated with G3 biliary NEC. We introduce a case of a rare presentation of a 12.5 cm large cell neuroendocrine carcinoma (G3) of biliary origin with hepatic involvement, no distant metastasis and good response to an R0 resection with 4 cycles of adjuvant chemotherapy. Further research, with long term follow up is needed to identify the optimal treatment plan for these rare tumors. However, this case poses a potential benefit for R0 resection with adjuvant chemotherapy.
Background: Acute pancreatitis of hydatid origin are rare and serious, we will report our experience concerning the management of 10 cases of acute pancreatitis on hydatid cyst broken in the bile ducts.

Methods: We managed 10 patients admitted through emergency for diagnosis of acute pancreatitis whose etiology was hydatid cyst of the fistulized liver in the bile ducts.

Results: We had 4 cases in 10 patients pancreatitis associated with cholangitis requiring cooling with antibiotic therapy and 6 cases of benign acute pancreatitis with a correct score, we operated all our patients with a very favorable evolution postoperatively.

Conclusion: Acute Pancreatitis of hydatid origin are rare complications of intrahepatic bilioptic fistulas. In particular, they are rarer than cholangitis. The diagnosis, based essentially on medical imaging, must be evoked before the association of a hydatid cyst of the liver, most often of central seat, of dilated bile ducts with echogenic content, and possibly the demonstration of a Bilioptic fistula that they must be operated in the same hospitalization to avoid aggravation of the patient's clinical condition.
**P 220. PANCREATIC SOLID PSEUDOPAPILLARY TUMORS IN PEDIATRIC AGE - CURRENT MANAGEMENT**

*R Iniguez, Y Pullin, C Derosas, J Chapochnick*

**Presenter:** Rodrigo Iniguez | Clinica Santa Maria

**Background:** SPT of the pancreas are rare in pediatric population, with low malignancy potential but locally invasive.

**Methods:** 5 female patients, age 12-15, presented with SPT in different locations.

**Results:**
- Case 1: SPT tail. Open distal pancreatectomy
- Case 2: 2 SPT (head and body). Total pancreatectomy
- Case 3: SPT head. Pancreatoduodenectomy (Whipple)
- Case 4: SPT body. Laparoscopic subtotal pancreatectomy
- Case 5: SPT tail. Laparoscopic distal pancreatectomy

**Conclusion:** RO resection of SPT is advocated, even if radical surgery is needed.