Conclusions: Psychiatric disease and substance abuse are highly prevalent among veterans with HCC. Most patients are surviving on very meager income. These profound socio-economic and psychosocial problems must be recognized when providing care for HCC to this population to provide adequate treatment and surveillance.

SATURDAY, MARCH 14, 2015, 7:30AM–9:30AM
LONG ORAL G – BASIC/TRANSLATIONAL/EDUCATION

LO-G.01 TAUROUSDOEXYCHOLIC ACID ALLEVIATES ISCHEMIA/REPERFUSION INJURY IN STEATOTIC MOUSE LIVER

University Of Mississippi Medical Center, Jackson, MS

Background: Tauroursodeoxycholic acid (TUDCA) decreases endoplasmic reticulum (ER) stress, autophagy, and cell death in cultured rat hepatocytes. We hypothesized that TUDCA could reduce the injury caused by total warm ischemia reperfusion (WIR) in steatotic mouse liver.

Methods: Male ob/ob mice underwent 100% hepatic warm ischemia by clamping the portal triad for 30 minutes. For the experiment group, 200 mg/kg TUDCA was injected IP 1 hour before the surgery. Animals were sacrificed at 12 hours and 48 hours after reperfusion. Quantitative real time PCR measured ER stress markers such as C/EBP homologous protein (CHOP), glucose regulated protein 78 (GRP78), protein kinase dsRNA-dependent-like ER kinase (PERK), and activating transcription factor-6 (ATF6). Western blot examined autophagy marker microtubule-associated protein 1 light chain 3 (LC3 II). ELISA determined interleukine-6 (IL6) levels.

Results: Compared to controls, WIR increased ER stress in the liver [CHOP (∼3 fold, p = 0.004), GRP78 (∼4 fold, p = 0.001), PERK (∼2 fold, p = 0.005), and ATF6 (∼1.5 fold, p = 0.004)] at 12 but not 48 hours. LC3 II protein levels were increased at both 12 (∼3 fold, p = 0.019) and 48 hours (∼4 fold, p = 0.025). Serum IL6 levels were increased at 12 (∼40 fold, p = 0.034) and 48 hours (∼33 fold, p = 0.034). TUDCA treat ment decreased LC3 II at 12 (p = 0.018) and 48 hours (p = 0.034), decreased serum IL6 at 12 (p = 0.025) and 48 hours (p = 0.025), and improved animal survival (median 26 hours vs 41 hours, p = 0.02). ER stress levels were not changed.

Conclusion: TUDCA improves survival and reduces the inflammation following WIR in steatotic liver through a non-ER stress pathway.

LO-G.02 CHARACTERIZATION OF A PORCINE MODEL FOR ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS)

Mayo Clinic, Rochester, MN

Background: Publications using the ALPPS procedure have demonstrated a future liver remnant (FLR) growth of 40–160% in only 6–9 days. The present study aimed to develop and describe the first large animal model of ALPPS that can be used for future studies.

Methods: A total of 13 female domestic swine were studied. ALPPS stage 1 (portal vein division and parenchymal transection) was followed by ALPPS stage 2 (completion left extended hepatectomy) 7 days later. An abdominal CT scan was performed immediately prior to ALPPS stage 1 surgery and again 7 days later to assess hypertrophy immediately prior to ALPPS stage 2 surgery. Blood samples as well as tissue analysis were performed.

Results: On CT volumetric analysis mean size of the FLR prior to ALPPS stage 1 was 21.4 ± 1.8% and 39.8 ± 4.6% prior to ALPPS stage 2. Median degree of hypertrophy was 74.5% with a median kinetic growth rate of 10.6% per day. Liver weights at autopsy correlated well with CT volumetric analysis (p = 0.65). There was no significant difference in mean lab values (AST, ALT, ammonia, INR or bilirubin) from baseline until immediately prior to ALPPS stage 2. Post ALPPS stage 2 there was a significant increase in INR from baseline 1.1 ± 0.1 and 1.6 ± 0.1 (p = 0.005), respectively. No post-operative deaths secondary to liver failure were observed.

Conclusion: The present study describes the first reproducible large animal model of the ALPPS procedure. Degree of hypertrophy and kinetic growth rate were similar to that which has been demonstrated in human publications. This model will be valuable as future laboratory studies are performed.

LO-G.03 PREOPERATIVE ANAEMIA AND POSTOPERATIVE OUTCOMES AFTER HEPATECTOMY: A RETROSPECTIVE COHORT STUDY

S. Tohme, P. Varley, M. Khreiss, A. Tsung
University Of Pittsburgh, Pittsburgh, PA

Background: Preoperative anemia is associated with adverse outcomes after surgery in general but outcomes after hepatectomy specifically are not well established. We aimed to assess the effect of preoperative anemia on 30-day post-operative morbidity and mortality in patients undergoing major hepatectomies.

Methods: All elective hepatectomies for the period 2005–2012 recorded in the NSQIP database were evaluated. We selected to study partial lobectomies, total left, total right, and trisegmentectomies and exclude minor procedures. We obtained anonymized data for 30-day mortality and morbidity, demographics, and preoperative and perioperative risk factors. We used multivariate logistic regression to assess the
adjusted and modified effect of anemia, which was defined as (hematocrit <39% in men and <36% in women), on postoperative outcomes.

**Results:** We obtained data for 13,198 patients, of whom 4,383(33.2%) had preoperative anemia. Postoperative mortality at 30-days was higher in patients with anemia than those without anemia (odds ratio[OR]2.15,95%CI 1.70–2.71). Morbidity at 30-days was also higher in patients with anemia (for any complication1.93;1.79–2.09; for serious complications 2.05,1.90–2.22). After adjustment for predefined clinical and laboratory risk factors, postoperative morbidity was higher in patients with anemia than in those without anemia (adjusted OR any complication 1.48,1.36–1.61, serious complications 1.54,1.41–1.68). Postoperative mortality was similar in both groups after adjustment (1.09, 0.836–1.433).

**Conclusion:** Preoperative anemia is independently associated with an increased risk of morbidity in patients undergoing hepatectomy. Therefore, it is crucial to readdress preoperative blood management in anemic patients prior to hepatectomy. Anemia was not an independent predictor of mortality which may be due to the rare event of 30-day mortality after elective hepatectomy.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No Anemia</th>
<th>Anemia</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>13,815</td>
<td>4,383</td>
<td></td>
</tr>
<tr>
<td>Age, mean (SD)</td>
<td>63.1 (13.3)</td>
<td>63.3 (11.5)</td>
<td>0.292</td>
</tr>
<tr>
<td>Male</td>
<td>6,935 (66.7%)</td>
<td>2,812 (64.6%)</td>
<td>0.363</td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>Black</td>
<td>Asian</td>
</tr>
<tr>
<td></td>
<td>8,815 (78.0%)</td>
<td>638 (14.5%)</td>
<td>331 (6.9%)</td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>26.9 (4.6)</td>
<td>26.8 (4.5)</td>
<td>0.597</td>
</tr>
<tr>
<td>ASA</td>
<td>ASA I/II</td>
<td>ASA III</td>
<td>ASA IV</td>
</tr>
<tr>
<td></td>
<td>3,645 (34.1%)</td>
<td>1,842 (32.9%)</td>
<td>299 (6.8%)</td>
</tr>
<tr>
<td>Diabetes Medication</td>
<td>No</td>
<td>Yes</td>
<td>1,842 (32.9%)</td>
</tr>
<tr>
<td>Smoker within 1 Year</td>
<td>No</td>
<td>Yes</td>
<td>402 (44.1%)</td>
</tr>
<tr>
<td>VHS of drink/day within 2 weeks</td>
<td>No</td>
<td>Yes</td>
<td>262 (44.1%)</td>
</tr>
<tr>
<td>Oxygen</td>
<td>No</td>
<td>Yes</td>
<td>393 (10.9%)</td>
</tr>
<tr>
<td>Functional Status Prior to Surgery</td>
<td>Independent</td>
<td>Partially Independent</td>
<td>Totally Independent</td>
</tr>
<tr>
<td>Severe COPD</td>
<td>No</td>
<td>Yes</td>
<td>883 (17.0%)</td>
</tr>
<tr>
<td>Acidosis (within 30 days)</td>
<td>No</td>
<td>Yes</td>
<td>189 (2.6%)</td>
</tr>
<tr>
<td>Hypertensive Variance (within 6 months)</td>
<td>No</td>
<td>Yes</td>
<td>10 (0.2%)</td>
</tr>
<tr>
<td>CHF (new or symptoms within 30 days)</td>
<td>No</td>
<td>Yes</td>
<td>21 (0.5%)</td>
</tr>
<tr>
<td>MI within 6 Months</td>
<td>No</td>
<td>Yes</td>
<td>7 (0.2%)</td>
</tr>
<tr>
<td>History of Percutaneous Coronary Intervention</td>
<td>No</td>
<td>Yes</td>
<td>144 (2.6%)</td>
</tr>
<tr>
<td>History of Cardiac Surgery</td>
<td>No</td>
<td>Yes</td>
<td>158 (2.5%)</td>
</tr>
<tr>
<td>Angina within 1 month</td>
<td>No</td>
<td>Yes</td>
<td>17 (0.3%)</td>
</tr>
<tr>
<td>Hypertension Requiring Medication</td>
<td>No</td>
<td>Yes</td>
<td>2794 (52.9%)</td>
</tr>
<tr>
<td>History of Prior Vasovagal Episode or Ablation for PVD</td>
<td>No</td>
<td>Yes</td>
<td>27 (0.4%)</td>
</tr>
<tr>
<td>Current CVA (pre-op)</td>
<td>No</td>
<td>Yes</td>
<td>35 (0.6%)</td>
</tr>
<tr>
<td>History of TIA</td>
<td>No</td>
<td>Yes</td>
<td>56 (0.7%)</td>
</tr>
<tr>
<td>History of CVA w/ Deficit</td>
<td>No</td>
<td>Yes</td>
<td>44 (0.6%)</td>
</tr>
<tr>
<td>History of CVA w/ Deficit</td>
<td>No</td>
<td>Yes</td>
<td>31 (0.1%)</td>
</tr>
<tr>
<td>Diabetic Nephropathy</td>
<td>No</td>
<td>Yes</td>
<td>1,017 (18.4%)</td>
</tr>
<tr>
<td>Chronic Renal Disease</td>
<td>No</td>
<td>Yes</td>
<td>131 (2.4%)</td>
</tr>
<tr>
<td>&lt;10% Weight loss within 6 months</td>
<td>No</td>
<td>Yes</td>
<td>330 (6.0%)</td>
</tr>
<tr>
<td>Transient &gt;= 20% reduction within 72h (pre-op)</td>
<td>No</td>
<td>Yes</td>
<td>77 (1.0%)</td>
</tr>
<tr>
<td>Head</td>
<td>1,451 (1.3%)</td>
<td>1,501 (1.3%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Any Complication</td>
<td>2,298 (2.2%)</td>
<td>18,394 (4.2%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Serious Complication</td>
<td>3,957 (22.7%)</td>
<td>16,267 (37.1%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Minor Complication</td>
<td>785 (6.9%)</td>
<td>516 (1.2%)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

**LO-G.05 INTERACTION OF GLYOCOGEN SYNTHASE KINASE-3 AND NOTCH1 IN PANCREATIC CANCER**

M. Kunnimalaiyaan, S. Kunnimalaiyaan, T. Gamblin
Medical College Of Wisconsin, Milwaukee, WI

**Abstract:** Glycogen synthase kinase-3 (GSK-3) can act as either tumor promoter or suppressor by its inactivation depending on the cell type. There are conflicting reports on the roles of GSK-3 isoforms and their interaction with Notch1 in pancreatic cancer. We hypothesize that GSK-3α stabilizes Notch1 in pancreatic cancer cells thereby promoting cellular proliferation.

**Methods:** Pancreatic cancer cell lines MiaPaCa2, PANC-1, and BxPC-3 were treated with 0–20 μM of AR-A014418 (AR). Cell growth was determined by MTT assay and

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Live-Cell Imaging. The levels of Notch pathway members (Notch1, HES-1, survivin, cyclinD1), phosphorylated GSK-3 isoforms, and apoptotic markers were determined by Western blot. Immunoprecipitation was performed to identify the binding of GSK-3 specific isoform to Notch1.

Results: AR-A014418 treatment had a significant dose-dependent growth reduction (p < 0.001) in pancreatic cancer cells compared to control. The growth suppression effect is due to apoptosis. Importantly, reduction in GSK-3 phosphorylation leads to a reduction in Notch pathway members. Over expression of active Notch1 in AR-A014418-treated cells resulted in negation of growth suppression. Immunoprecipitation analysis revealed that GSK-3α binds to Notch1.

Conclusions: This study demonstrates for the first time that the growth suppressive effect of AR-A014418 in pancreatic cancer cells is mainly mediated by reduction in phosphorylation of GSK-3α with concomitant Notch1 reduction. GSK-3α appears to stabilize Notch1 by binding and may represent a target for therapeutic development. Furthermore, down regulation of GSK-3 and Notch1 may be a viable strategy for possible chemosensitization of pancreatic cancer cells to standard therapeutics.

LO-G.06 NOVEL CONCEPT OF ELECTROCOAGULATION & TUMOR CELL IMPLANTATION: CREATION OF MINIMALLY INVASIVE ORTHOTOPIC MURINE MODEL OF PANCREATIC CANCER

J. S. Bhullar1, Y. Cozakov1, N. Varshney2, S. Bindroo1, S. Chaudhary1, J. Tilak1, M. Decker3, M. Jacobs1, V. K. Mittal1
1Department Of Surgery, Southfield, MI; 2Department Of Pathology, Toledo, OHIO; 3Department Of Patient Care Research, Southfield, MI

Background: Orthotopic murine models of pancreatic cancer represent an important tool for evaluating treatment strategies. Several genetically modified mouse tumors and xenograft models have been reported. Genetic models have unpredictable growth & variable waiting period, while orthotopic models are operative ones, difficult to create and result in irregular metastasis. There is a constant endeavor to create an orthotopic model which replicates the human disease process.

Study Design: Orthotopic pancreatic tumors were induced in 20 SCID mice using a novel technique. Low dose electrocoagulation of pancreas under laparoscopic guidance (using Coloview-mouse colonoscope) with thin electrode, followed by injection of 0.1 cc BxPC3 pancreatic cancer cells was done (n = 12, study group). Control mice underwent electrocoagulation alone (n = 4, group 1) and tumor cell injection alone (n = 4, group 2). Mice were evaluated for tumor growth and metastasis by necropsy (4 and 8 week for experimental group; 8 weeks for control group).

Results: Tumors were detected in 11/12 mice in experimental group, 1/4 in control group 2, and none in control group 1. Over time there was an increase in tumor growth, tumor volume, lymphovascular invasion of pancreas, with metastasis to lymph nodes and surrounding organs.

Conclusions: We report a novel concept of tumor cell implantation at site of electrocoagulation of pancreas. Combined with the minimally invasive technique, yields a replicative orthotopic murine model of pancreatic cancer. Our model is minimally invasive, easy to create, and overcomes the limitations of the existing models while questions the possibility free floating tumor cell implantation at resection site.

LO-G.08 ADEQUACY OF HPB TRAINING: POTENTIAL DISCONNECT BETWEEN FELLOW AND PROGRAM DIRECTOR PERCEPTIONS?

A. K. Bressan1, J. P. Edwards1, E. Dixon1, R. M. Minter2, D. R. Jeyarajah1, S. C. Grondin3, C. G. Ball1
1Department Of Surgery, Foothills Medical Center And The University Of Calgary, Calgary, AB; 2Department Of Surgery, University Of Michigan, Ann Arbor, MI; 3Methodist Dallas Medical Center, Dallas, TX

Background: Hepatopancreatobiliary (HPB) fellowship programs have undergone recent significant changes with regard to training standards, case volume thresholds and multimodality educational platforms. The goals of this study were to (1) compare perspectives of residents and program directors on perceptions of readiness to enter practice and (2) identify core HPB procedures that require increased emphasis during training.

Methods: This survey targeted program directors (PDs) and trainees participating in the Fellowship Council / AHPBA pathway. Demographics, education, and career plans were collected. A comparative analysis of PD and trainee opinions on their confidence to perform thirteen core HPB procedures was completed (p < 0.05).

Results: The response rate was 88% for both fellows (21/24) and PDs (23/26). Amongst fellows, 72% believe there is an excessive number of trainees, 81% aim to work in university-based or academic institutions, 90% expect to have an HPB practice combined with non-HPB cases, and 95% do not plan to pursue additional training. For all thirteen HPB procedures, the volume of cases during training was more often considered good or excellent by PDs than by fellows. This difference reached statistical significance for: major hepatectomies (PDs: 87% vs. fellows: 57%; p = .042); pancreaticoduodenectomies (100% vs. 81%, p = .044); and laparoscopic distal pancreatectomies (78% vs. 43%, p = .042).

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Trainees also systematically rated their confidence to perform HPB procedures lower compared to PDs’ perception (Figure 1).

**Conclusions:** This study provides insight into content domains which may require additional attention during fellowship to achieve an appropriate level of proficiency and confidence upon completion of training.

**LO-G.09 WHAT TO EXPECT WHEN YOU'RE EXPECTING A HEPATOPANCREATOBILIARY SURGEON: SELF-REPORTED EXPERIENCE OF HPB SURGEONS FROM DIFFERENT TRAINING TRACKS**

S. G. Warner¹, A. Alseidi², J. C. Hong¹, T. M. Pawlik³, R. M. Minter¹

¹Departments Of Surgery And Medical Education, University Of Michigan Health System, Ann Arbor, MI; ²Department Of Surgery, Virginia Mason Medical Center, Seattle, WA; ³Department Of Surgery, Medical College Of Wisconsin, Milwaukee, WI

**Background:** With a recent increase in fellowships offering HPB training through multiple routes, prospective trainees and employers must understand the differences between available HPB training pathways. This study highlights self-reported fellowship experience and current scope of practice across 3 different training pathways.

**Methods:** A survey was disseminated to 654 surgeons – active AHPBA members and recent graduates of HPB, transplant-HPB, and surgical oncology fellowships using SurveyGizmo®. Descriptive statistics were calculated.

**Results:** 416 (66%) surgeons responded. Most respondents were male (89%), and most (83%) practice in an academic setting. Table 1 demonstrates fellowship operative experience and current case mix in practice. MIS training was the most commonly identified training deficiency, with 47% HPB, 49% transplant, and 52% SSO-trained respondents in agreement. Ultrasound was also a commonly identified training gap with 34% HPB, 40% transplant, and 25% SSO-trained respondents in agreement. Non-HPB cases routinely performed in practice were most commonly GI surgery and general surgery (56% & 49%) for HPB-trained respondents, transplant and general surgery (87% & 21%) for transplant-trained respondents, and GI surgery and non-HPB surgical oncology (70% & 28%) for surgical oncology-trained respondents.

**Conclusions:** HPB surgery fellowship training experiences vary by training pathway, though perceived deficiencies in MIS and US training are common across all pathways. Despite this variability, the ultimate scope of non-transplant HPB practice is similar across training pathways. Thus, selection of a training pathway may best be guided by the desired training experience and planned focus of other components of one’s future practice.

<table>
<thead>
<tr>
<th>Training Experience – Case Domain</th>
<th>HPB (n=43)</th>
<th>Transplant-HPB (n=141)</th>
<th>Surgical Oncology (n=106)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreas</td>
<td>25-50 cases (30%)</td>
<td>&lt;25 cases (62%)</td>
<td>25-50 cases (53%)</td>
</tr>
<tr>
<td>&gt;100 cases (30%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatobiliary</td>
<td>&gt;100 cases (37%)</td>
<td>25-50 cases (28%)</td>
<td>25-50 cases (43%)</td>
</tr>
<tr>
<td>MIV/HIPB</td>
<td>&lt;25 cases (31%)</td>
<td>&lt;25 cases (47%)</td>
<td>&lt;25 cases (64%)</td>
</tr>
<tr>
<td>Transplant</td>
<td>None (28%)</td>
<td>&gt;100 (84%)</td>
<td>None (86%)</td>
</tr>
</tbody>
</table>

**Current Practice – Case Domain**

| Pancreas | <25 cases (63%) | <25 cases (77%) | <25 cases (43%) |
| Hepatobiliary | 25-50 cases (35%) | 25-50 cases (35%) | 25-50 cases (42%) |
| MIV/HIPB | 0-10 cases (37%) | 0-10 cases (59%) | 0-10 cases (44%) |

*Represents responses from all respondents who reported completing specialty HPB training through an HPB, transplant, or surgical oncology fellowship.

**LO-G.10 TEACHING PREOPERATIVE PLANNING: A NEW EDUCATIONAL INITIATIVE**

N. Zilbert¹, T. Lam², S. Gallinger¹, L. St. Martin², C. Moulton¹,²

¹University Of Toronto Department Of Surgery, Toronto, ON; ²The Wilson Centre, Toronto, ON

**Background:** Previous research has identified the importance that expert surgeons place on preoperative planning. Currently the teaching and assessment of preoperative planning is limited. This video demonstrates a novel education initiative to teach surgical trainees strategies for preoperative planning for complex HPB surgery.

**Methods/Results:** This video reviews one preoperative planning module for a case of a patient with a colorectal liver metastasis requiring a left hemihepatectomy. There are five screens that make up the module. The introductory screen provides a brief clinical history. The second screen allows the trainee to review the patient’s preoperative imaging. The next screen displays two videos of attending surgeons reviewing the same preoperative imaging. The fourth screen displays intraoperative video clips narrated by the operating surgeon. Each video clip focuses on an issue that one of the attendings on the preceding screen. The final screen shows a video from the operating surgeon reviewing the key learning points for the case to reinforce these for the trainee.

**Conclusions:** In conclusion this video demonstrates a novel strategy for teaching preoperative planning for HPB surgery. Following the completion of this module the trainee should have a deeper understanding of the issues and considerations.
that are relevant for left hemihepatectomies. However the ultimate strength of this program is that several different left hemihepatectomy cases will be presented in the same format, so collectively the trainee will gain a richer and more complete understanding of the procedure. The process will be repeated for the other index procedures for HPB surgery.

LO-G.11 UNDERSTANDING SURGICAL ANATOMY OF THE LIVER: THERE IS AN APP FOR THAT
L. M. Postlewait, M. Konomos, J. A. Matlock, T. White, K. A. Delman, S. K. Maithel
Carlos And Davis Center For Surgical Anatomy And Technique, Emory University, Atlanta, GA

Introduction: Surgical anatomy of the liver is complex and difficult to visualize. The two-dimensional renderings available for trainees make translation to practical application challenging. Our aim was to create an interactive App to teach liver anatomy to improve trainee preparation for hepatic surgery.

Methods: Liver model and animation storyboards were created from radiographic images by a certified medical-illustrator under the guidance of a hepatobiliary fellowship-trained surgeon in the education center for anatomy and simulation at the author’s institution. Animations were completed in Adobe Photoshop and Illustrator. 3D polygonal models were completed with detailed attention to liver shape, vessel placement, and internal divisions. Interactivity of the App was designed in Unity3D. The animated video models were UV-Mapped and brought into Cinema 4D. The App was designed for use on the Apple iPad.

Results: The App is an interactive model with a narrated video to teach liver anatomy. The liver rotates in space permitting a better understanding of its 3-D structure. Parenchyma can be removed to reveal vascular and biliary anatomy. A narrated video provides a detailed overview of hepatic anatomy with a logical progression from whole liver topography sequentially down to segmental detail. Initial feedback via internal assessment is exceptional.

Conclusions: This portable, mobile-device based instrument is a novel educational tool to teach liver anatomy via an interactive approach. Studies to assess its educational utility are underway. Integration with cross-sectional imaging is planned to enhance clinical applicability. The current iteration is applicable for student, resident and fellow-level trainees.

LO-H.02 RESECTION IS NOT INFERIOR TO LIVER TRANSPLANTATION IN NODE NEGATIVE INTRAHEPATIC CHOLANGIOCARCINOMA
O. C. Kutlu, S. Garcia, M. V. Williams
TTU HSC Dept Of Surgery, Lubbock, Texas

Introduction: Intrahepatic cholangiocarcinoma (IHCCC) is the second most common malignancy of the liver. Despite the increasing incidence, few studies have been published on therapeutic options and outcomes. Although survival benefits of transplantation are well established for HCC, there is little information on the outcomes between liver transplantation and resection for IHCCC. In this study we investigated the survival of IHCCC in a large population database and identified if there was a survival advantage of transplantation over resection for stage I and II tumors.

Material Methods: SEER database was used to identify IHCCC patients. Patients diagnosed between 1990 and 2008, histologically proven IHCCC, T1 and T2 tumors, N zero, no metastasis, no radiotherapy, and not lost to follow up were included in the study. Analyses were performed using SPSS 20 with Kaplan-Meier statistics and Cox proportional hazards regression.

Results: A total of 297 patients, 221 underwent resection and 76 underwent transplantation met the criteria. Mean survival for resection was 36.8 months and 41.1 months for transplantation. Survival for transplantation vs surgery is as follows, 80% and 78% at one year, 62% and 63% two years, 54% and 51% three years, 45% and 36% four years, 28% and 36% at 5 years respectively. Survival between both groups were similar (p = 0.29).

Conclusion: We evaluated if transplantation offered a survival benefit in patients with early IHCCC. Results showed no difference in survival between resection and transplantation. This study questions the utility of transplantation for stage I and II IHCC in the era of organ shortage.
LO-H.03 A NATIONWIDE ASSESSMENT OF OUTCOMES AFTER BILE DUCT RECONSTRUCTION
Beth Israel Deaconess Medical Center, Boston, MA

Background: Bile duct reconstruction (BDR) is used to manage benign and malignant neoplasms, choledochal cysts and congenital anomalies, trauma and iatrogenic bile duct injuries, and other non-malignant diseases. We compared BDR outcomes overall and by indication.


Results: Identified 67,160 weighted patient discharges in which BDR was coded: 2.5% for congenital anomaly, 37.4% for malignant neoplasm, 2.3% for benign neoplasm, 9.9% for biliary injury, and 48% for other non-malignant disease. 68.4% of BDR discharges for neoplasm were elective vs. 60.8% for congenital anomaly, 46.1% for other non-malignant and 37.8% for biliary injury (p < 0.0001). 79.8% of neoplasm discharges were from teaching hospitals vs. 62.3% for other non-malignant disease, 65.2% for biliary injury and 66.1% for congenital anomaly (p < 0.0001). 33.3% of total BDR discharges involved at least one complication and 84.8% were discharges to home. Median length of stay was 9 days (IQR 6, 15) and median cost was $22,230 (IQR 14,399, 38,358). Significant multivariate predictors of inpatient death include indication of biliary injury or malignancy (figure), and predictors of any complication include public insurance and non-elective admission.

Conclusion: This is the first national description of BDR using a large database. In this diverse sampling, both procedure indication and patient characteristics influence morbidity and mortality.

LO-H.04 PREDICTING LENGTH OF STAY AND CONVERSION TO OPEN SURGERY FOR ACUTE CHOLECYSTITIS: VALIDATING THE 2013 TOKYO GUIDELINES IN A US POPULATION
G. Wright1,2, M. T. Hefty1,2, K. Stilwell1, J. Johnson2, M. H. Chung1,2,3
1GRMEP/Michigan State University General Surgery Residency Program, Grand Rapids, MI; 2Michigan State University College Of Human Medicine, Grand Rapids, MI; 3Spectrum Health Medical Group, Grand Rapids, MI

Introduction: Predicting expected patient outcomes based on disease severity is becoming increasingly important in the US healthcare system. The 2013 Tokyo Guidelines (TG13) for the diagnosis and severity of acute cholecystitis were put forward by a consensus panel.

Methods: A retrospective review of patients presenting with acute cholecystitis to a single center from 2009–2013 was performed. The diagnosis and severity of cholecystitis were assigned according to the TG13. The primary outcome measures were length of stay and conversion to open surgery. Regression models were constructed for risk-adjusted analysis.

Results: A total of 445 patients were eligible for study. Patients were divided as follows: 137 (30.8%) grade 1, 191 (42.9%) grade 2, and 117 (26.3%) grade 3. Primary treatment included surgery (n = 256, 57.5%), antibiotics alone (n = 117, 26.3%), and cholecystostomy tube (n = 72, 16.2%). For all patients, length of stay (p < 0.001), disposition to home (p < 0.001), and morbidity (p = 0.003) were related to increasing TG13 grade. For surgical patients, worsened outcomes with increasing TG13 grade were seen for conversion to open (p = 0.001), OR duration (p < 0.001), length of stay (p = 0.009), disposition to home (p < 0.001), and readmission (p = 0.037). On multivariate analysis, TG13 grade was an independent predictor of increasing length of stay (p = 0.009) and conversion to open surgery (grade 2 = OR 7.63 (2.25–25.90), grade 3 = OR 24.2 (5.0–116.37)).

Conclusion: The TG13 criteria for grading acute cholecystitis accurately stratify patient outcomes in a US population. Wide adoption of TG13 can better inform patients, hospital systems, and payers of the expected outcomes of acute cholecystitis.

LO-H.05 TARGETING DEFINITIVE MANAGEMENT IN PATIENTS WITH ACUTE GALLSTONE PANCREATITIS AND CHOLEDOCHOLITHIASIS
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Background: Appropriate management of common bile duct stones in patients with gallstone pancreatitis often varies from recommended guidelines.

Aim: To determine if patients with gallstone pancreatitis with common bile duct stones (CBDS) were appropriately investigated and managed according to guidelines.

Methods: This retrospective study identified 165 patients from 2009–2013 with a first episode of gallstone pancreatitis. Cumulative scoring (0–5) based on age >55 yrs, CBD
LO-H.06 BILE DUCT RESECTION IN THE TREATMENT OF HEPATOBILIARY AND GALLBLADDER MALIGNANCY: EFFECT OF ASSOCIATED PROCEDURES ON OUTCOMES

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Introduction: Resection of the bile duct is required for the treatment of cholangiocarcinoma and sometimes indicated when resecting gallbladder and hepatic tumors.

Methods: The American College of Surgeons National Surgical Quality Improvement Program Participant Use File was used to analyze surgical outcomes in a database of patients with hepatobiliary and gallbladder malignancies undergoing bile duct resection with or without hepatic or vascular resection (n = 787). Patients were divided into three groups based on type of procedure performed: 1) Bile duct resection only (n = 289); 2) Bile duct resection with hepatic resection (n = 454); and 3) Bile duct resection with hepatic resection and vascular resection (n = 44). Postoperative complications were compared between groups and regression-adjusted risk factors were analyzed to produce observed and expected (O/E) morbidity and mortality rates and indices.

Results: Performing additional procedures significantly increased rates of organ space surgical site infection (p < 0.0001), being on ventilator >48 hours (p = 0.0388), acute renal failure (p = 0.0055), sepsis (p = 0.0292), septic shock (p = 0.0208) and overall risk of having at least one complication (p < 0.0001). Thirty-day mortality rates for Groups 1, 2 and 3 were 6.23%, 8.15% and 18.18%, respectively (p = 0.0242). Risk-adjusted morbidity and mortality rates also increased when Group 1 (O/E = 1.27 and 1.64) was compared to Group 2 (O/E = 1.61 and 2.31) and Group 3 (O/E = 1.88 and 8.00).

Conclusion: Hepatic and vascular resection significantly increase morbidity and mortality when performed with bile duct resection for malignancy. Patients undergoing all three procedures experience an 8-fold increase in mortality risk with a morbidity risk that is 2-fold higher.

LO-H.07 CLINICAL AND PATHOLOGICAL FEATURES OF INTRADUCTAL PAPILLARY NEOPLASM OF THE BILIARY TRACT AND GALLBLADDER

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Background: Intraductal papillary neoplasms of the bile duct (IPNB) and intracholecystic papillary neoplasms (ICPN) are rare tumors of biliary epithelium, characterized by papillary growth within lumen that can be associated with invasive carcinoma. Their natural history remains poorly understood. This study examines clinicopathological features and outcomes.

Methods: Patients who underwent surgery for IPNB/ICPN between 2009 and 2014 were identified. Descriptive statistics were generated.

Results: Of 23 patients found to harbor IPNB/ICPN, 43% were male and average age was 68. Most common presentations were jaundice (43%), abdominal pain (29%), and incidental ultrasound finding (14%). Preoperative ERCP with brushing/biopsy showed at least cytologic atypia in 8/10 cases. Tumor locations were: 5 intrahepatic, 3 hilar, 8 extrahepatic bile duct and 7 gallbladder. Mean tumor size was 3.8 cm, 25% had positive lymph nodes, 47% had lymphovascular invasion, and 37% had perineural invasion. The R0 resection rate was 83%. The average number of lymph nodes sampled was 4.8. Epithelial subtypes included pancreatobiliary (52%) and intestinal (48%), and 87% demonstrated invasive carcinoma, either tubular type or mucinous. Median follow-up was 25 months. The 3-year overall and disease-free survivals were 70% and 61%, respectively. Of the 6 recurrences, 4 occurred in patients who had extrahepatic bile duct cancers and 2 in gallbladder cancers.

Conclusion: IPNB/ICPN are rare tumors that spread along the entire biliary epithelium, including the gallbladder. At pathology, the majority of patients demonstrate invasive carcinoma, thus warranting radical resection. Oncologic prognosis may be superior to that of other biliary tract cancers.

LO-H.09 INTRAOPERATIVE NEAR-INFRARED CHOLANGIOGRAPHY: OPTIMIZATION OF TIMING AND DOSE

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Introduction: Intraoperative cholangiography is the gold standard for clear delineation of biliary anatomy. However,
Logistical difficulties lead to its low utilization. Near-infrared fluorescence cholangiography (NIRFC) with indocyanine green (ICG) has been developed for real-time, intraoperative biliary imaging. While several studies have shown its feasibility, dosing and timing for its practical use have not been systematically optimized.

**Objective:** We undertook a prospective observational study with varying doses and elapsed times from injection of ICG to visualization. Image quality of NIRFC and its utility to the operating surgeon were assessed.

**Methods:** Adult patients undergoing laparoscopic biliary and hepatic operations were enrolled. A single intravenous dose of ICG (0.02–0.25 mg/kg) was administered at various times (15–180 mins) prior to planned visualization. The porta hepatis was examined using a dedicated laparoscopic system. Each operating surgeon evaluated the intraoperative recognition of biliary structures using a qualitative scoring system (1-poor to 5-excellent). Quantitation studies were also performed on the images obtained during the operation.

**Results:** Thirty-four patients were enrolled. Visualization scores of the extrahepatic biliary tract improved with increasing doses of ICG up to 0.08 mg/kg. The score also improved with increased time up to 45 min after ICG administration. Similarly the CBD-to-liver intensity ratio increased with both dose and time. These results suggest that a dose of 0.08 mg/kg administered 45 minutes prior to visualization is optimal for visualization, with diminishing improvements with increased dose and time.

**Conclusion:** NIRFC is safe, practical, and effective in delineating extrahepatic biliary anatomy during laparoscopic biliary and hepatic operations.

**LO-I.02 LONG-TERM OUTCOME OF PATIENTS UNDERGOING LIVER TRANSPLANTATION FOR MIXED HEPATOCELLULAR CARCINOMA AND CHOLANGIOCARCINOMA: AN ANALYSIS OF THE UNOS DATABASE**

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**Objective:** To compare long-term outcomes in patients undergoing liver transplantation (LT) for mixed hepatocellular carcinoma/cholangiocarcinoma (HCC-CC) versus those with hepatocellular carcinoma (HCC) or cholangiocarcinoma (CC).

**Methods:** A retrospective analysis of patients undergoing LT for HCC-CC was performed using the United Network for Organ Sharing (UNOS) database from 1994–2013. Overall and disease-free survival (OS, DFS) in patients with HCC-CC, HCC, and CC were compared.

**Results:** Of the 123,167 patients who underwent LT, 4,049 patients had a primary malignancy (94 HCC-CC; 3,515 HCC; 440 CC). Within the HCC-CC cohort 47(50%) had diagnosis of HCV, compared to 1260 (35%) with HCC and 11(2%) with CC. The mean age of the patients with HCC-CC was 57 ± 10 years and 77% were male. MELD at time of listing did not differ among the three groups. Forty-six percent of the patients with HCC-CC recurred. OS at 1, 3 and 5-years for HCC-CC (82%, 47%, 40%) was similar to CC (79%, 58%, 47%) but significantly worse compared to HCC (86%, 72%, and 62% \( p = 0.002 \)). Similarly, DFS at 1, 3, and 5 years, for HCC-CC (78%, 45%, 38%) was similar to CC (75%, 55%, 44%) but significantly worse than HCC (82%, 68%, 54%, \( p = 0.005 \)).

**Conclusion:** LT for mixed HCC-CC have inferior OS and DFS compared to those with HCC, suggesting that HCC-CC outcomes more closely follow the CC phenotype. Attempts should be made to identify HCC-CC patients prior to transplant and if transplanted undergo close surveillance and consideration for immunosuppression modification and/or adjuvant therapy.

**LO-I.03 LIVER TRANSPLANTATION FOR HEPATOCELLULAR CANCER IN HIV POSITIVE PATIENTS**

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**Introduction:** Liver transplantation (LT) is an excellent treatment option for hepatocellular carcinoma (HCC) in many patients, but whether this applies to the HIV+ patient is unknown.

**Aim:** To evaluate the outcomes of LT for HCC in patients with HIV co-infection by analyzing results of a US multicenter trial of solid organ transplantation in HIV+
LO-I.04 PREDICTIVE FACTORS FOR EXTRAHEPATIC RECURRENT OF HEPATOCELLULAR CARCINOMA FOLLOWING ORTHOTOPIC LIVER TRANSPLANTATION

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Background: Recurrence of hepatocellular carcinoma (HCC) in patients treated with orthotopic liver transplantation (oLTX) is associated with diminished survival. Particularly extrahepatic localization of HCC recurrence contributes to poor prognosis.

Patients and Methods: Clinicopathological data of patients who underwent oLTX for HCC between 1989 and 2010 in a high-volume transplant center were retrospectively evaluated and predictors of extrahepatic recurrence were identified.

Results: Three hundred and sixty-seven patients underwent oLTX for HCC. After a median follow-up time of 77 months, 93 patients (25%) were diagnosed with a recurrence. Median time to recurrence was 18.9 months. Recurrence was located exclusively in the liver in 19 cases (20%) and 74 patients (80%) had extrahepatic recurrence. Factors associated with extrahepatic recurrence in multivariate analysis included HCC beyond the Milan criteria (P < .0001) and the presence of major vascular tumor invasion (MVI) (P = .035). In patients with HCC beyond the Milan criteria who developed a recurrence (n = 73), MVI was the only positive predictor of extrahepatic recurrence in multivariate analysis (P = .0001). In patients with HCC within the Milan criteria who recurred after oLTX, DNA-index >1.5 (P = .04) was the only predictive factor for extrahepatic recurrence.

Conclusions: Advanced HCC beyond the Milan criteria and the presence of MVI are associated with an increased risk for extrahepatic recurrence and are currently considered as contraindications to oLTX. In patients with HCC within the Milan criteria, the DNA-index represents a valuable prognostic marker for the development of extrahepatic recurrence and may support the selection of patients for intensive postoperative tumor surveillance.

Saturdays, March 14, 2015, 4:00PM–5:30PM
ORAL POSTER II (PANCREAS, TRANSPLANT)

OP-II.01 PANCREATIC DEBRIDEMENT FOR NECROTIZING PANCREATITIS: NATIONAL OUTCOMES AND PREDICTORS OF MORTALITY

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Background: Necrotizing pancreatitis often requires pancreatic debridement, which can result in a high rate of morbidity and mortality. Risk factors that predispose patients to post-operative complications or death are not well-defined. Using a national surgical database, we sought to identify pre-operative predictors of mortality after debridement.

Methods: The American College of Surgeons’ NSQIP database was queried from 2005–2011 by CPT code for pancreatic debridement. Risk factors for complications and death at 30 days were examined using univariate tests and predictors of mortality were identified using step-wise logistic regression.

Results: 1,162 patients underwent pancreatic debridement. On average patients were middle aged (54.9 ± 14.2 years), male (70.0%), and obese (30.6 ± 8.0 kg/m2). The most common comorbidities included diabetes (33.2%), smoking (22.3%), COPD (6.5%), steroid use (4.0%) and cardiac history (4.0%). Prior to surgery, 21.2% had ascites, 7.6% had acute renal failure, 14.7% had recent >10% body mass loss, and 63.2% had pre-operative sepsis. Emergent surgery occurred in 29.3%. Wound, general, and major complications occurred in 7.2%, 56.6% and 31.3% respectively. Mean length of stay was 34.1 ± 31.0 days. 30 day mortality was 7.7%, and was higher in patients with COPD, cardiac history, ascites, acute renal failure, steroid use, sepsis, older age, higher BMI, and emergent operations (p < 0.05). The table summarizes independent predictors of mortality identified using multivariate analysis.

Conclusions: Nationally, rates of adverse outcomes following pancreatic debridement are high. Patients who are older, with higher BMI, are on dialysis, have COPD, with poor functional status, hypoalbuminemia, azotemia or hyperbilirubinemia have increased odds of mortality following debridement for necrotizing pancreatitis.