PP 1
Efficacy of a Dual-Ring Wound Protector for Prevention of Incisional Surgical Site Infection After Pancreatoduodenectomy in Patients with Intrabiliary Stents: A Randomized Controlled Trial

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Objective: To evaluate the efficacy of a dual-ring wound protector for preventing incisional surgical site infection among patients with biliary stents undergoing pancreatoduodenectomy.

Methods: This study was a parallel, dual-arm, double-blind randomized controlled trial. Adult patients with a biliary stent undergoing elective pancreatoduodenectomy at two tertiary care HPB institutions were included (February 2013–May 2016). Patients were randomly assigned to receive a surgical dual-ring wound protector or no wound protector, as well as the current standard of care. The main outcome measure was incisional surgical site infection, as defined by the Centers for Disease Control and Prevention criteria, within 30 days of the operation.

Results: 107 patients were recruited (mean age, 68.6 years [standard deviation, 10.6]; 66% male). No significant baseline differences were identified between the intervention and control groups in terms of mean age (67.6 vs. 69.7 years; p = 0.35); BMI (26.8 vs. 24.8 Kg/m²; p = 0.131); ASA group (ASA > 2, 47.4% vs. 52.6%; p = 0.65); estimated intra-operative blood loss (425 vs. 508 ml; p = 0.36); duration of surgery (361.7 vs. 348.5 min; p = 0.65); or other factors (p > 0.05). There was a significant reduction in the incidence of incisional SSI in the wound protector group (21.1% vs. 42.0%; relative risk, 0.50 [95% confidence interval, 0.28–0.91]; p = 0.019).

Conclusion: Among adult patients with intrabiliary stent, the use of a dual-ring wound protector during pancreatoduodenectomy significantly reduces the risk of incisional surgical site infection. Based on recently published infection incidence patterns, this finding can be extrapolated to include all pancreatoduodenectomies (i.e. with or without biliary stents).

PP 2
Proteomic Evaluation of Biliary Exosomes Implicates Exportin7 in the Pathogenesis of Extrahepatic Cholangiocarcinoma

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Objective: Exosomes play an integral role in the evolution of solid tumors through horizontal transfer of functional proteins. We undertook this study to determine if the evaluation of biliary exosome proteins can lead to new insights into the biology of cholangiocarcinoma.

Methods: Serial ultra-centrifugation was used to isolate exosomes from 30 patients with cholangiocarcinoma or benign biliary diseases. Exosomes were quantified using a nanoparticle characterization system, and confirmed by transmission electron microscopy (TEM). Exosomal proteins were identified using liquid chromatography–mass spectrometry (LC–MS) (n = 14), and Exportin7 (XPO7) expression was confirmed with ELISA on an additional 16 patient (non-overlapping) cohort. Tissue microarrays (n = 27) and whole tissue sections (n = 40) were subsequently evaluated using immunohistochemistry (IHC) in mutually exclusive, non-overlapping patient cohorts.

Results: Exosomes were successfully isolated from the bile of 30 patients, and confirmed using TEM. Using LC-MS, XPO7 was overexpressed in the exosomes from patients with cholangiocarcinoma as compared to benign disease by 16-fold. Specifically, XPO7 was detectable in 75% (12/16) of biliary exosomes in patients with cholangiocarcinoma and 0% (0/14) in patients with benign disease. We next interrogated a cholangiocarcinoma tissue microarray by IHC, and identified that 75% (20/27) of cholangiocarcinomas express XPO7. Finally, we confirmed XPO7 expression in 63% (15/24) of cholangiocarcinoma as compared to 0% (0/16) normal livers by examining tissue sections.

Conclusion: This is the first documentation of XPO7 in exosomes, and the first association of this nuclear export protein with any gastrointestinal cancer. Further work to interrogate the functional significance of XPO7 expression in cholangiocarcinoma is warranted.

PP 3
Transplantation Versus Resection for Hilar Cholangiocarcinoma: An Argument for Shifting Treatment Paradigms for Resectable Disease

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Objective: Surgery is the only potentially-curative treatment for hilar cholangiocarcinoma (H-CCA), yet outcomes after resection remain poor. Transplantation is currently reserved for well-selected patients with unresectable disease.

Methods: All patients with H-CCA who underwent resection from 2000 to 2015 at 10-institutions comprising the U.S. Extrahepatic Biliary Malignancy Consortium were included. Three institutions additionally had active transplant protocols
with similar selection criteria for H-CCA over the same time-period. Primary outcome was overall survival (OS).

**Results:** Of 284 pts with suspected H-CCA, 234 underwent attempted resection and 50 attempted transplant. Excluding incomplete/R2 resections (n = 43) and transplants without confirmed H-CCA diagnoses (n = 5), 191 pts underwent curative-intent resection and 45 attempted transplant (41 completed, 4 aborted). Compared to resection, transplant patients were younger (52 vs 65 yrs; \( p < 0.001 \)), and more frequently had primary sclerosing cholangitis (56 vs 2%; \( p < 0.001 \)) and received chemotherapy and/or radiation (98 vs 57%; \( p < 0.001 \)). Groups were otherwise similar in demographics and comorbidities. Patients who underwent attempted transplant for confirmed H-CCA diagnosis had improved OS compared to resection (3-yr: 72 vs 36%; 5-yr: 64 vs 21%; \( p < 0.001 \); Figure 1A). When considering only patients who underwent margin-negative resections for tumors <3 cm with lymph-node negative disease, transplant was still associated with improved OS (3-yr: 72 vs 67%; 5-yr: 64 vs 38%; \( p < 0.001 \); Figure 1B). Transplant remained associated with improved survival on multivariable Cox-regression analysis (HR 0.39, 95%CI 0.15–0.99; \( p = 0.048 \)), even when controlling for younger age and receipt of chemo/radiotherapy.

**Conclusion:** Resection for hilar cholangiocarcinoma that meets criteria for transplantation (<3 cm and lymph-node negative disease) is associated with substantially decreased survival compared to transplant for the same criteria with unresectable disease. Prospective trials are needed and justified.

**Objective:** Current literature is lacking level 1 evidence for surgical and oncologic outcomes of HCC undergoing laparoscopic versus open hepatectomy. Aim was to compare feasibility, safety, surgical and oncologic efficiency of laparoscopic versus open liver resection in management of solitary small (<5 cm) peripheral HCC in Child A cirrhotic patients.

**Methods:** Patients were randomly assigned to either open liver resection group (OLR: 25 patients) or laparoscopic liver resection group (LRR: 25 patients). All were treated with curative intent aiming at achieving R0 resection using radiofrequency-assisted technique.

**Results:** LRR group had significantly less operative time (120.32 ± 21.58 vs 146.80 ± 16.59 min, \( p < 0.001 \)), significantly shorter duration of hospital stay (2.40 ± 0.58 vs 4.28 ± 0.79 days \( p < 0.001 \)), but similar overall complications (25 vs 28%, \( p = 0.02 \)). LRR had comparative resection time (66.56 ± 23.80 vs 59.56 ± 14.74 min, \( p = 0.218 \)), amount of blood loss (250 vs 230 ml, \( p = 0.915 \)), transfusion rate (\( p = 1.00 \)), R0 resection rate when compared with OLR. After median follow-up of 34.43 (31.67–38.60) months, LRR achieved same adequate oncological outcome of OLR, no local recurrence and no significant difference in early recurrence and number of de novo lesions (\( p = 0.49 \)). 1-year and 3-year DFS rates 88% and 59%, in the LRR comparable to corresponding rates of 84% and 54% in OLR (\( p = 0.9 \)).

**Conclusion:** LRR for solitary small HCC in cirrhotic is superior to the OLR in terms of its shorter operative time and duration of hospital stay and does not compromise the oncological outcomes.

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**PP 4**

**LAPAROSCOPIC VERSUS OPEN LIVER RESECTION FOR SOLITARY HEPATOCELLULAR CARCINOMA LESS THAN 5 CM IN CHILD A CIRRHOTIC PATIENTS: A PROSPECTIVE RANDOMIZED STUDY**

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