PPL24-001

BOWEL OBSTRUCTION MIMICKING THE CHILAIDITI’S SIGN FOLLOWING HEPATECTOMY

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Introduction: Demetrius Chilaiditi had been first described in 1910, is a radiographic finding that the bowels is interposed between the diaphragm and the liver. The identification of this entity is important because air under the diaphragm seen on plain radiograph usually represents pneumoperitoneum. We report an uncommon case of this radiographic finding.

Method: A 65-year-old man with a history of right hepatectomy for hepatocellular carcinoma 11 months ago, visited our Emergency Department with symptoms and signs of mechanical ileus. A picture like a Chilaiditi’s sign was demonstrated on computed tomographic scan study.

Results: Following our active conservative treatment for adhesion ileus, he recovered smoothly and discharged 1 week later.

Conclusions: The common predisposing factors usually are anatomical alterations of the intestine such as elongation of the colon and a history of prior abdominal surgery. The clinical symptoms were due to the intestinal obstruction. This presentation may be attributed to the adhesions among the diaphragm and the small bowels because of an empty space following the due to previous hepatectomy. It is different from those cases published before.

PPL24-002

STAGING SYSTEMS FOR HEPATOCELLULAR CARCINOMA: A NOVEL PROPOSAL

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Introduction: Clinical staging systems for cancer provide guidelines for patient assessments and treatments. A proper staging is essential for objective comparison between the outcomes of different treatments. While the prognosis of most solid tumors is generally dependent on tumor stage at presentation, prediction of prognosis in hepatocellular carcinoma (HCC) patients is somewhat more complicated due to various aspects affecting patient survival including cirrhosis and underlying liver function. Up to date, at least eight staging systems have been proposed for HCC, but the optimal staging system for HCC is still under intense debate.

Method: Each existing staging system, characterized by the patient population based on which it was constructed, may have different predictive power for HCC patient in different area of the world, roughly the East and the West. The lack of a consensus on HCC staging systems is mostly in part related to the heterogeneity in treatment modalities at diagnosis. Therefore, we hereby propose a novel staging system for HCC, named as the Eastern staging, based on the authors’ previous study with a large cohort of Chinese patients undergoing surgical resection.

Results: Compared with the six existing staging systems, including CLIP, TNM, JIS, BCLC, CUPI and Okuda, the Eastern staging appears to have the best predictive ability for mortality at 1, 3, and 5 years.

Conclusions: We believe the Eastern staging to be a simple and practical system for prognostic factor evaluation, risk level determination, and prognosis assessment after surgical resection in patients with HCC.

PPL24-003

ADVANCES IN PROTON BEAM THERAPY FOR HEPATOCELLULAR CARCINOMA

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Introduction: Hepatocellular Carcinoma (HCC), one of the most common malignancies with high prevalence and mortality rate, usually results in poor prognosis and limited survival duration.

Method: Combined and comprehensive analysis on numbers and location of tumor, Child–Pugh grade, and Barcelona Clinic Liver Cancer system will lead to appropriate therapy and better prediction of prognosis. A majority of patients are complicated with cirrhosis, enlarged tumor, multiple lesions, vascular invasion and even the cancer embolus in portal vein. Considering this, with the growth knowledge about the radio tolerance of normal tissue and the advances in radiotherapy techniques, radiotherapy plays a more significant role in tumor degradation and cure.

Results: Thus, proton beam therapy (PTB) tend to be a novel available approach for the management of HCC among various radiotherapies, which, benefited from the effect of Bragge Peak from PTB, effectively decreased the toxicity of liver, barely do any harm to the uninvolved liver tissue or the surrounding structures and intensify the destruction in targeted malignant lesions. Furthermore, several previous results for treatment of hepatocellular carcinoma with PBT revealed excellent local control. In this review, we discuss the distinctive biophysical attributes in the treatment of HCC. We also review the available literature regarding clinical outcomes and toxicity of using PBT for HCC.
Conclusions: Current evidence provides a limited indication for PBT, which suggests that further study for the relationship between liver function and PBT is required for the sake of its indication and standardization.

PPL24-004
COMBINED RESECTION FOR HEPATOCELLULAR CARCINOMA AND CONCOMITANT EXTRAHEPATIC METASTASES: DOES IT BRING SURVIVAL BENEFIT?
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Introduction: Although recognized as poor prognostic factor, concomitant EHM is no more considered an absolute contraindication to surgery for patients with HCC. However, the survival benefit of combined resection of HCC and EHM has remained unclear.

Method: From 881 patients who underwent hepatectomy for HCC between 2001 and 2008, 51 (5.8%) also underwent concomitant resection of EHM. We investigated the pattern of resectable EHM, the surgical outcome, and the prognostic factors of these patients who underwent combined resection of HCC and EHM.

Results: Of the 51 patients, 20, 18, 5, 5, 2, 2, and 1 had metastatic lesions in lymph node, diaphragm, peritoneum and/or omentum, adrenal gland, lung, spleen, and ovary, respectively. Less than 5 cm of intrahepatic HCC seemed to have better outcomes when resected than those with not <5 cm (5-year OS: 33.3% vs 8.7%, \(p = 0.070\), and 5-year DFS: 30.0% vs 2.4%, \(p = 0.044\), respectively). In the group of patients with lymph node metastases, patients with adjuvant radiotherapy after surgery experienced better survival than those without(1-year OS: 80.0% vs 50.0%, \(p = 0.008\), and 1-year DFS: 60.0% vs 20.0%, \(p = 0.064\), respectively).

Conclusions: Combined resection of hepatocellular and EHM, which is the only potentially curative treatment of HCC patients with concomitant EHM, should be actively considered if the HCC and EHM are completely resectable. The role of adjuvant radiotherapy after complete resection of lymph node metastases and HCC is worthy of exploring in the future.

PPL24-005
RISK FACTORS OF SURGICAL SITE INFECTION AFTER HEPATECTOMIES: A PROSPECTIVE STUDY OF 7388 PATIENTS
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Introduction: Surgical site infection (SSI) is a common postoperative complication which is associated with increased morbidities, hospital stay, and overall cost. Determining the risk factors of SSI may provide information on improving outcome.

Method: A prospective study was conducted on 7388 consecutive patients who underwent hepatic resection between 2011 and 2012. The incidence and the risk factors of SSI were studied.

Results: The incidences of overall, incisional, and organ/space SSI were 9.4%, 5.5%, and 4.9%, respectively. Independent risk factors of overall SSI were obesity, diabetes mellitus, American Society of Anesthesiologists (ASA) score ≥2, cirrhosis, repeat hepatectomy, hepatolithiasis, length of abdominal drainage ≥5 days, and intraoperative blood transfusion. Although independent risk factors of incisional SSI and organ/space SSI differed, hepatolithiasis, cirrhosis and intraoperative blood transfusion were common factors between them.

Conclusions: SSI was common in patients after hepatic resection. Patients with hepatolithiasis or cirrhosis should be taken more cautious care for. Early removal of abdominal drain, as well as minimizing intraoperative blood transfusion, may lower SSI rates.

PPL24-006
PROGNOSTIC ANALYSIS OF CURATIVE LIVER RESECTIONS FOR LIVER MALIGNANCIES COMBINED WITH BILE DUCT THROMBI
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Introduction: To evaluate the safety and effect of curative liver resections for primary liver cancer (PLC) combined with bile duct thrombi (BDT), and to analyze prognostic risk factor affecting postoperative overall survival.

Method: From 2000 to 2008, a total of 48 patients with PLC and BDT who underwent curative hepatectomy were retrospectively analyzed.

Results: The overall morbidity and mortality were 31.3% and 0%, respectively. The 1-, 3- and 5-year recurrence-free and overall survival rates were 42.8%, 20.2% and 8.1%, and 56.3%, 31.3% and 20.2%, respectively. Survival analysis showed that more than 5 cm of maximum tumor size, portal vein tumor thrombosis, multiple or diffuse tumor, involving extrahepatic bile duct of BDT were independent risk factors affecting long-term overall survival after hepatectomy.

Conclusions: Curative hepatectomy appears to be a safe and effective treatment modality for patients with PLC and BDT. However, the overall prognosis is unsatisfactory, and the survival rates after operation is low. Involving extrahepatic bile duct of BDT is an independent risk factor for postoperative overall survival.
PPL24-007

WORLDWIDE LAPAROSCOPIC HEPATECTOMY FOR LIVER MALIGNANCY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Introduction: With the development of surgical technique, laparoscopic liver resection (LLR) is now regarded as a feasible alternative to conventional open liver resection (OLR). Nevertheless, short- and long-term outcomes between LLR and OLR specifically for liver malignancy remain to be investigated.

Method: A systematic literature search was conducted to detect relevant studies comparing short- and long-term outcomes between LLR and OLR for patients with liver malignancies. Meta-analyses were performed using fixed-effects model or random-effects model. Odds ratio (OR) and weight mean difference (WMD) were calculated with 95% confidence intervals (CI).

Results: Fifty-one studies reporting LLR for primary liver malignancy were included for a meta-analysis. All included studies in the meta-analysis were non-randomized control trials with no significant difference in baseline characteristics. Compared with OLR, LLR resulted in lower blood loss (WMD = -189.14; 95% CI = -266.11 to -112.17), fewer requirements for transfusion (OR 0.35; 95% CI 0.21–0.59), decreased length of hospital stay (WMD = -4.23; 95% CI -5.83 to -2.64), and reduced postoperative complications (OR 0.50; 95% CI 0.39–0.65). Negative tumor resection (R0 resection) was more frequently achieved in laparoscopic group (OR 3.08; 95% CI 1.98–4.79). No statistical significant difference was found between LLR and OLR in hospital mortality, tumor recurrence rate, overall survival and disease-free survival.

Conclusions: LLR, performed by experienced surgeons, for selected patients with liver malignancy is superior to OLR regarding relatively better short-term outcomes, as well as equivalent long-term outcomes.

PPL24-009

LAPAROSCOPIC MAJOR HEPATECTOMY: TECHNIQUE AND OUTCOME

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Introduction: Laparoscopic liver resection (LLR) is now a well-accepted treatment option for both benign and malignant disease of the liver. While, laparoscopic approach is widely adopted in minor resection, the role in major hepatectomy remains to be established. The objective of this study is to share our institutional experience in laparoscopic major hepatectomies and the patient outcome.

Method: Laparoscopic liver resection was started in our institution in 2006. All patients underwent LLR from March 2006 to June 2013 were identified in a prospectively collected database. Major hepatectomy was defined as resection for more than or equal to 3 liver segments and right posterior sectionectomy. The demographic data and operative outcome of patient who underwent laparoscopic major hepatectomy were collected and the result of earlier half and later half of the period were compared.

Results: Between March 2006 and June 2013, 124 LLR was performed for 108 patients in Department of Surgery, Kwong Wah Hospital. They were 75 (69.4%) male and 33 (30.6%) female and the median age was 64.5. For final histological diagnosis, 14 were benign disease, 15 were colorectal liver metastases, 4 were intrahepatic cholangiocarcinoma and 75 were hepatocellular carcinoma (HCC). There were 34 laparoscopic major hepatectomies including 14 right hepatectomies, 266.11 to 112.17), fewer requirements for transfusion (OR 0.35; 95% CI 0.21–0.59), decreased length of hospital stay (WMD = -4.23; 95% CI -5.83 to -2.64), and reduced postoperative complications (OR 0.50; 95% CI 0.39–0.65). Negative tumor resection (R0 resection) was more frequently achieved in laparoscopic group (OR 3.08; 95% CI 1.98–4.79). No statistical significant difference was found between LLR and OLR in hospital mortality, tumor recurrence rate, overall survival and disease-free survival.

Conclusions: LLR, performed by experienced surgeons, for selected patients with liver malignancy is superior to OLR regarding relatively better short-term outcomes, as well as equivalent long-term outcomes.
11 left hepatectomies and 9 right posterior sectionectomies. Patients who underwent major hepatectomies were separated into two periods to compare the results. Laparoscopic-assisted procedures or conversion were less performed in the later period. The median blood loss (1200 mL vs 600 mL), complication rate (58.8% vs 41.2%), and hospital stay (10 days vs 7 days) were also significantly reduced in the later period.

**Conclusions:** Totally laparoscopic major hepatectomies are feasible with growing experience. The outcome of patient improved over time and experience on major LLR. Further refinements of surgical technique may be required to further improve the outcome in major LLR.

PPL24-010

**SIMULTANEOUS SPLENECTOMY AND HEPATECTOMY FOR PATIENTS WITH HEPATOCELLULAR CARCINOMA AND HYPERSPLENISM: SAFETY AND OUTCOMES**

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**Introduction:** Traditionally hypersplenism was considered as a contraindication to liver resections in HCC patients. The aim of this study is to evaluate the role of simultaneous splenectomy and hepatectomy in patients with hepatocellular carcinoma (HCC) in terms of safety, and long-term outcomes.

**Method:** From January 1999 through February 2013, 182 patients associated with cirrhotic hypersplenism underwent simultaneous hepatectomy and splenectomy or hepatectomy alone. Patients were divided into two groups non-randomly. 62 patients were performed simultaneous hepatectomy and splenectomy (Sp group) and the other 120 patients performed splenectomy alone served as control (non-Sp group).

**Results:** Background characteristics were compared between the two groups. Except for white blood cell (WBC) count, there were no significant differences in other variables. Estimated blood loss and cases needed for transfusion were similar in two groups. Pathological characteristics, postoperative morbidity, mortality, and postoperative hospital stay did not show a statistical significance between the two groups as well. No portal vein or remnant splenic vein thrombosis was observed in any patients. Liver function recovered after surgery in both groups and showed no differences. The 1-, 3-, 5-year survival rates for the Sp and non-Sp groups were 82.6%, 67.8%, 54.7% and 88.5%, 62.1%, 48.5%, respectively. There was no difference in the cumulative survival rates between the two groups (p = 0.657).

**Conclusions:** Simultaneous splenectomy and hepatectomy is a safe and effective treatment strategy for patients with HCC and cirrhotic hypersplenism. By ameliorating liver function, patients with HCC and hypersplenism who undergo splenectomy and hepatectomy may have superiority of long-term survival. Due to the limits of nonrandom study design and sample size, a prospective study with a larger sample will be necessary in future.

PPL24-011

**IS THERE AN IMPACT OF NEOADJUVANT CHEMOTHERAPY ON HYPTERTROPHY OF THE FUTURE LIVER REMNANT IN ALPPS?**

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**Introduction:** Associating liver partition and portal vein ligation for staged hepatectomy (ALPPS) has been demonstrated as feasible procedure in the clinical routine of extended liver resection to successfully increase the volume of the future liver remnant (FLR). Chemotherapy is toxic to liver and may impair hepatic regeneration. Since most patients with colorectal liver metastasis undergo neoadjuvant chemotherapy this analysis was performed to assess its effect on hypertrophy of the FLR during ALPPS.

**Method:** Thirteen consecutive ALPPS patients were prospectively analyzed between September 2011 and September 2012. Patients included in the study presented with multifocal colorectal liver metastasis (54%), cholangiocarcinoma in Klatskin position (38%) and gallbladder carcinoma (8%). Hepatectomy was performed within 6–12 days after hepatic partition. Extended right hepatectomy was performed in 11 cases. Right hepatectomy was needed in 2 patients with previous substantial hepatic resection. A hepatico-jejunostomy was performed in 5 the cases (39%) at the time of hepatectomy. Volumetry was performed twice (before liver partition and prior to hepatectomy).

**Results:** Liver partition and portal vein ligation induced sufficient hypertrophy of the FLR with an increased volume of the FLR of 73 ± 39%. Patients underwent hepatectomy after a median of 8 days. R0 resection was achieved in all cases. Neoadjuvant chemotherapy impaired the hypertrophy of the liver and may impair hepatic regeneration. Main surgical complications included wound infection, fluid collection and biliary leakage but did not differ between the two groups.

**Conclusions:** Neoadjuvant chemotherapy impaired the hypertrophy of the liver with no clinical consequences in this series. Still, careful selection of patient is warranted.

PPL24-012

**EARLY EXPERIENCE WITH A NEW HAEMOSTATIC PATCH IN LIVER PROCEDURES**

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Conclusions: Veriset™ haemostatic patch has received CE Mark approval for use in open solid organ and soft tissue procedures. This new technology is 100% free of human or animal components. The objective of this study is to evaluate its ease of use and effectiveness in achieving haemostasis during liver procedures.

Method: Consecutive patients undergoing various liver procedures were treated with a new haemostatic patch after traditional means of achieving haemostasis were applied. Bleeding severity and time to haemostasis were assessed.

Results: Data for 6 procedures performed by one surgeon were collected. Procedures included hemihepatectomy (n = 3) and right lobe liver transplants (n = 3). Haemostasis was first attempted by electrocautery (100%), sutures (100%), clips (67%), staples (33%), Argon (33%), and Clamp (17%) prior to haemostatic patch application. Intraoperative bleeding severity was evaluated as oozing (n = 1), low (n = 2), and medium (n = 3). All liver transplants had medium bleeding, and as standard of care received blood, plasma, and platelet transfusions prior to and after product application, which occurred near the end of each procedure. After patch application, haemostasis was successfully achieved in 100% of patients with a mean of 42 ± 13 seconds (range 25–80 seconds). One application of a 5 cm by 10 cm patch was required in 5 of 6 (83.3%) patients with a maximum time to hemostasis of 40 seconds in this patient subgroup. The one transplant patient requiring 80 seconds for haemostasis required a second application of the patch due to initial compromised adherence. No patch repositioning was required, although in all 3 transplant patients the bleeding site was described as a hard to reach surface. Surgical and application techniques will be discussed with accompanying procedural video clips.

Conclusions: In our early experience, Veriset™ haemostatic patch is easy to apply and effective in obtaining hemostasis during liver procedures.

PPL24-013

HEPATECOTOMY COMBINED WITH MICROWAVE ABLATION OF SPLEEN FOR TREATMENT OF SPLENOMEGALY AND HYPERSPLENISM COMPLICATED WITH HEPATOCELULAR CARCINOMA

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Introduction: To investigate the security and curative medium-term effect of hepatectomy combined with microwave ablation of spleen for treatment of splenomegaly and hypersplenism complicated with liver cancer.

Method: Retrospectively analysis of clinical characteristics of 13 patients treated with microwave ablation of spleen combined with hepatectomy for hypersplenism secondary to hepatitis cirrhosis complicated with liver cancer. Splenic volume and ablated volume were calculated according to contrast-enhanced CT scan. Routine blood test (WBC count and PLT count) and liver function (ALT, AST, T-Bil, ALB, ACE) test results were examined before and after the operation. The complications and changes of routine blood test were observed in the follow-up period (6 months).

Results: The proportion of destructed volume to the total volume of spleen was (34.20 ± 1.72) %; Alanine aminotransferase and aspartate aminotransferase increased in the first day after operation (p = 0.039, 0.001; p < 0.05), and recovered to normal level or baseline in 1 week (p = 0.222, 0.303; p > 0.05); Total bilirubin increased slightly, albumin and cholinesterase decreased mildly in the first day, and no statistically significant differences were found compared with pre-operative (p = 0.069, 0.073, 0.066; p > 0.05); The count of white blood cell increased in the first day after operation, then decreased slightly, and it was still higher compared with that after 1 week, 2 weeks, 1 month, 2 months, 6 months (p = 0.001, 0.001, 0.028, 0.037, 0.034; p < 0.05); The count of blood platelet increased significantly in the first day and 1 week after operation (p = 0.908, 0.274; p > 0.05), and increased significantly 2 weeks later (p = 0.005, p < 0.05), it also increased significantly after 1 month, 2 months, 6 months compared with preoperative (p = 0.012, 0.016, 0.02; p < 0.05); No severe complications, such as liver failure, hepatic encephalopathy, liver section errhysis, upper gastrointestinal bleeding, spleen abscesses, spleen rupture, and portal vein thrombosis, developed after operation. No upper gastrointestinal bleeding was found in the postoperative follow-up period.

Conclusions: Hepatectomy combined with microwave ablation of spleen for treatment of splenomegaly and hypersplenism complicated with liver cancer is safe and the medium-term effect was excellent.

PPL24-014

MICROWAVE TERMAL ABLATION FOR BREAST CANCER LIVER METASTASIS

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Introduction: More than 50% of patients with breast cancer will develop liver metastases but only 5% of cases the liver is the only metastatic site. Chemotherapy is the gold standard for metastatic breast cancer with poor outcome, and selected patients could benefit from metastasectomy of liver disease in association with chemotherapy, leading to a median survival ranged from 27 to 63 months, with 5-year overall survival up to 61%. When resection is not possible, minimally invasive liver ablation can be used in selected patients. We evaluated technical success, and effectiveness following percutaneous or videolaparoscopic microwave ablation for breast cancer liver metastases.

Method: Twenty female patients (mean age 53 years, range 32–72) breast cancer liver metastases with primary cancer previously treated (time to metastases: 28.05 months, range 0–168) and 39 liver metastases (diameter of 17.6 mm, range 6–40) treated with a
microwave ablation under ultrasound guidance in 27 different procedures (14 percutaneous, 12 videolaparoscopic). The average ablation time was 7.2 ± 3.2 minutes.

Follow-up with abdominal CT-scan at 1, 3 and 6 months after surgery. An analysis on mortality, perioperative complications (within 30 days), overall survival and disease free survival were also evaluated.

Results: In the radiological follow-up (mean 19.5 months) we achieved a complete ablation of 91.2%, 90%, 86.2%, respectively at 1, 3 and 6 months. The overall survival after microwave ablation was 19.5 months (range 4–46) with a disease-free survival of 11 months (range 1–40); 6 of 20 patients died from systemic progression of disease. No patient died in the perioperative period. In the 26 procedures 3 minor complications occurred (Clavien I).

Conclusions: Microwave liver ablation is safe and effective in selected cohorts of patients with liver metastases from breast cancer, achieving good results in terms of overall and disease-free survival after procedure in patients with multiple previous treatment.

PPL24-015
PERCUTANEOUS APPROACH FOR SIMULTANEOUS TREATMENT OF COMBINED FISTULA OF BILE SYSTEM AND DUODENUM AFTER MAJOR SURGERY

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Introduction: Symptomatic biliary fistulas in patients undergoing hepatic resection heal spontaneously in most cases, however, sometimes it persists, and associated with deterioration of the patient’s quality of life and impaired metabolic status. Duodenal stump fistula after gastrectomy is also a potentially devastating complication with a high morbidity and mortality which needs a very long period of hospitalization. Surgical management of these postoperative complications poses challenges to the surgeon because patients are often septic or malnourished, may have a hostile abdomen, and persistent leakage after reoperation is fairly frequent. Therefore, we described an interesting case of a patient who had persistent biliary fistula and duodenal stump leakage, treated simultaneously by percutaneous transhepatic biliary stent.

Results: A 43-year-old male diagnosed as infected thrombosis within inferior vena cava (IVC) combined with fistula between IVC and posterior wall of duodenal bulb that he underwent thrombectomy, fistulectomy and subtotal gastrectomy with gastrogrenostomy. He had no postoperative complication and discharged after 1 months of operation. After 5 months of operation, he re-admitted with fever and general weakness for complicated fluid collection suggesting duodenal stump leakage. Percutaneous drainage (PCD) was performed and combined biliary leakage from small caudate duct to same cavity by tubography. Abscess cavity was decreased during 5 months of drainage, then two plastic stents were inserted from cavity to duodenum. After 1 week later, cavity was nearly totally obliterated and external PCD was removed. The patient discharged without any complication and there was no evidence of infected fluid collection for 3 months.

Conclusions: Percutaneous approach can be considered for simultaneous treatment of combined fistula of bile system and duodenum instead of deteriorate surgical re-exploration.

PPL24-016
THE ASSOCIATION BETWEEN POST HEPATECTOMY LIVER FAILURE AND POST OPERATIVE INFECTION

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Introduction: Post hepatectomy liver failure (PHLF) is a feared complication following liver surgery and has benefited from a recent standardised definition. The aim of this study was to explore the association between post operative infection and the development of PHLF.

Method: Consecutive patients undergoing resection of 4 or more liver segments over a 9 year period were identified from a prospectively maintained database. All patient records were reviewed to identify all postoperative abdominal drain and blood culture results. The ISGLS definition of PHLF was used; for the purpose of this abstract all categories of PHLF (A, B and C) were grouped together.

Results: PHLF affected 162/777 (20.8%) patients. Increasing patient age and the number of resected hepatic segments were associated with PHLF. Patient sex, presence of diabetes, hypertension, use of Pringle manoeuvre, underlying pathology, intraoperative transfusion were not associated with PHLF.

A positive post operative drain culture was significantly associated with the number of resected segments. No other variable was significantly associated.

A positive intra-operative microbiology sample was not significantly associated with the development of PHLF (4.8% vs 3.7%, no-PHLF and PHLF groups respectively, p = 0.568) though positive drain cultures following the operation was (14.4% vs 42.6% p < 0.001) as were blood cultures (19.2% vs 38.9%, p < 0.001). There was no significant difference in the cultured organisms taken from drain samples between the groups. Enterococcus species were the most common positive drain culture (185/246, 75.2%). In blood cultures however enterococcus was less common in the PHLF group (71/86 vs 138/146, p = 0.007) and MRSA/VRE were more common (9/86 vs 0/146, p < 0.001).

Conclusions: The development of abdominal infection is strongly associated with PHLF. Institutional review of microbiology data should be performed to optimize antibiotic prophylaxis. Whether patients at risk of PHLF would benefit from extended duration of antibiotic prophylaxis is unclear.
PPL24-017

LAPAROSCOPIC LIVER RESECTION FOR HEPATOCELULAR CARCINOMA

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Introduction: We have continued to perform laparoscopic liver resection as a means of surgical therapy for hepatocellular carcinoma (HCC).

Method: Between March 1997 and May 2013, 349 patients underwent laparoscopic and laparoscopy-assisted liver resections in our institution for HCC, metastatic liver cancer, benign diseases, and living donor. Preoperative diagnoses were HCC (n = 118), metastatic liver tumor (n = 146), other malignant disease (n = 18), benign disease (n = 27), and living donor (n = 39). We evaluated the degree of invasiveness and analyzed the outcomes of laparoscopic hepatectomy compared with open hepatectomy for HCC.

Results: There were notable differences with respect to blood loss and postoperative hospital stay compared with open hepatectomy cases. Concerning the survival rate and disease-free survival rate, there were no significant differences between procedures.

Conclusions: Laparoscopic hepatectomy for HCC was safe and feasible, and its survival rate was acceptable.

PPL24-018

FIRST TIPS EXPERIENCE IN THE TRANSPLANT CENTER

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Introduction: Currently, the TIPS procedure is the one of the methods of treatment of variceal bleeding, ascites, Budd-Chiari syndrome and hepatic hydrothorax.

Method: Forty-two TIPS placement were done from August 2010 to August 2013. Mean age was 46.4 years. 29 pts had Child–Pugh C and 13 B grade. The etiology was: PBC (n = 1), HCV (n = 18), cryptogenic (n = 3), alcohol (n = 20).

Indications: recurrent variceal bleeding (n = 9), refractory ascites (n = 4), ascites with recurrent hemorrhoidal vein bleeding (n = 2), intractable ascites with recurrent variceal bleeding (n = 24), nonocclusive portal vein thrombosis (n = 3). The procedure was successful on the first try in 40 patients, on the second try in 1 patient, and on the third try in 1 patient. The anastomosis was formed between the right hepatic vein and the right branch of portal vein (n = 28), the middle hepatic vein and the right branch of portal vein (n = 12), the left hepatic vein and the left branch of portal vein (n = 2). Stent-grafts VIATORE, JAGUAR, SMART, MarisPlus and Missago were used. To prevent hepatic encephalopathy L-ornitin, lactulose and rifaximin were used.

Results: The average duration of procedure was 2.5 (2.5–5), the average hospital stay was 10 days (2–45). Overall survival is 91%. There were 2 hospital (8 and 17 days after TIPS) due to hepatic failure, and 2 late (27 and 120 days) due to variceal bleeding. Hematobilia occurred in 1 patient and was managed medically. Rebleeding occurred in six patients (14.3%) at 1–21 months (mean 5.5 months) after TIPS. Six patients (14.3%) underwent balloon angioplasty for anastomotic stenosis at 1–21 months after TIPS. Four patients subsequently underwent LT.

Conclusions: TIPS is an effective treatment of complications of portal hypertension and liver cirrhosis.

PPL24-019

CLINICAL ANALYSIS OF HEPATIC EPITHELIOID HEMANGIOENDOTHELIOMA

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Introduction: Hepatic epithelioid endothelioma (HEHE) is a rare tumor of vascular origin which demonstrates a variable natural course. The rarity and variable outcomes are the reasons for the lack of consensus on diagnostic and treatment modalities of the disease.

Method: From 1994 to 2010, 17 HEHE patients had been diagnosed in Seoul national university hospital (SNUH) and National cancer center (NCC). Four patients underwent surgery (one transplantation, right hemihepatectomy, left lateral sectionectomy, and tumorectomy each), 5 administered with chemotherapy, 3 had transarterial chemoembolization (TACE), 2 received radiofrequency ablation (RFA) – five patients received more than one modality of treatment. Six patients did not receive any treatments at all; four patients were terminally ill at diagnosis and 2 waited for transplantation.

Results: Five patients are alive at the moment, 5 are dead and 7 are lost to follow up.

Conclusions: The rare incidence of this entity renders large scale study difficult – most studies on this disease rely on cases or cases series. A large scale meta-analysis is imperative in gathering an optimal and universal medical treatment for inoperable tumors. In addition we summarized all HEHE cases with outcome in the English medical literature.

PPL24-020

PREDICTIVE FACTORS OF PALLIATIVE RADIOOTHERAPY RESPONSE IN PATIENTS WITH SPINAL METASTASES FROM HEPATOCELULAR CARCINOMA

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Introduction: The spine is the most common site of bone metastases from hepatocellular carcinoma (HCC). Spinal metastases often severely limit the quality of life.
by causing severe pain and neurological deficits. The purpose of this study was to evaluate the palliative effect of radiotherapy (RT) for spinal metastases from HCC and to identify predictive factors of survival in HCC patients with spinal metastases who received RT.

**Method:** A retrospective analysis was performed on 192 patients with spinal metastases from HCC who received RT between April 1992 and February 2012. Multivariate analyses were used to identify predictive factors for pain response and overall survival (OS) after diagnosis of spinal metastases.

**Results:** Of 192 patients with spinal metastases from HCC, overall pain response to palliative RT occurred in 187 (97.4%) patients. Higher biologically effective dose (BED) and more advanced RT technique were identified as predictive factors for complete pain response (CR). The 1-year and 2-year OS rates were 18.1% and 6.3%, respectively, and the median survival time was 4.5 months. Long OS was associated with good performance status, a controlled primary HCC, absence of extrahepatic metastases, and a higher BED.

**Conclusions:** RT provided effective palliation for patients with painful spinal metastases from HCC. In particular, RT with a higher BED was associated with improved pain control and OS. Our results provide information regarding pain control, survival outcomes, and predictive factors for the prognosis of HCC patients with spinal metastases treated with RT.

**PPL24-021**

**AN ASSOCIATION STUDY BETWEEN TRANSFORMING GROWTH FACTOR-ß1 -509C>T AND +915G>C POLYMORPHISMS AND CHRONIC HEPATITIS B IN IRANIAN PATIENTS**

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**Introduction:** Chronic hepatitis B is one of the world’s health problems. The cause of this infection is hepatitis B virus (HBV) which could escape from immune system. Transforming growth factor beta 1 (TGF-ß1) can act against HBV by suppressing replication of this virus. Also, TGF-ß1 plays a role in preventing of liver damage in patients with chronic hepatitis B. The aim of this study was to evaluate the association of +915G>C and -509C>T polymorphisms with chronic hepatitis B in Iranian patients.

**Method:** A population-based case–control study was conducted in Taleghani hospital. 220 patients with chronic hepatitis B and the same number of healthy control subjects formed patient and control group. PCR-RFLP method was used for genotyping of both polymorphisms. About 10% of control samples were sequenced to confirm the results.

**Results:** There were no statically significant differences in genotype distribution and allele frequency at both polymorphisms between healthy control and patients with chronic hepatitis B. The age range of case and control groups were 11–88 and 14–83, respectively. The mean age of case group was 46.62 ± 17.105 and this was 43.38 ± 15.399 for control group.

**Conclusions:** There was no association between TGF-ß1 -509C>T and +915G>C polymorphisms with chronic hepatitis B and may have no role in increasing the risk of this infection in Iranian patients.

**PPL24-022**

**LAPAROSCOPIC LIVER RESECTIONS: OUR EARLY EXPERIENCE OF 30 MONTHS**

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**Introduction:** Laparoscopic liver resection has evolved and widened in its scope. We review our initial experience in laparoscopic liver resection to assess the early outcomes and feasibility of the procedure.

**Method:** Retrospective analysis of prospectively collected data of all laparoscopic liver resections for various indications at our institute between January 2011 and July 2013. Liver and biliary pathologies, primary gall bladder cancer (GBC) in selected fit patients, who after evaluation and/or staging underwent laparoscopic liver resection, were included. Duration, intraoperative blood loss and postoperative outcomes were recorded.

**Results:** Of the 64 patients in whom laparoscopic liver resection was attempted, majority were for GBC (26) followed by hepatic hydatidosis (16), hepatocellular carcinoma (HCC) (10), besides others. Five patients with hydatid cyst were converted due to technical difficulty and one patient with GBC was converted for anesthesia considerations. Median duration of surgery in minutes for GBC, hepatic hydatidosis and liver tumour was 330 (240–1000), 240 (180–300) and 195 (150–270) respectively. The corresponding median (range) blood loss in mL was 150 (100–300), 110 (50–250) and 200 (100–300) respectively. The median hospital stay was 5 (3–8) days. Median lymph node yield in GBC patients was 10 (4–31). Liver resection margins were free in all patients. No postoperative mortality was encountered. Morbidity in GBC included Grade A (ISGLS) bile leak (1), intraabdominal collection (1) and minor chyle leak (1). No patient suffered postoperative liver failure. One patient with HBV related CLD, who underwent a non-anatomical resection of segment 6 HCC developed ascites, which was diuretic-responsive. At a median follow up of 12 (1–21) months, one patient of GBC developed lymph nodal recurrence. During a median follow up of 16 (1–23) months, one patient with HCC had a locoregional recurrence 9 months post surgery, treated with TACE.

**Conclusions:** Laparoscopy liver resection is safe and feasible in selected patients.
PPL24-023

LAPAROSCOPIC MANAGEMENT OF HYDATID CYST SHOULD BE AIMED AT COMPLETE RESECTION!

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Introduction: Total excision of hydatid disease of Liver or resectional surgery (cystopericystectomy or formal resection) is the treatment of choice as it reduces the incidence of recurrence and also decreases the incidence of cavity related complications. This is often performed by conventional open surgery. To analyze our experience of radical resectional surgery for hydatid disease of the liver performed laparoscopically.

Method: We analyzed the prospectively collected data on hydatid cyst of the liver who were managed at our centre with laparoscopic total excision (cystopericystectomy, formal liver resection).

Results: Fourteen patients were planned for laparoscopic resectional surgery. There were 11 females. Mean age was 34.14 years (19–56 years). In 5 patients, the cysts were located in the right lobe, in 6 patients, the cysts were located in the left lobe and in 3 patients, the cyst was involving both the lobes. Four patients had Gharbi type I cysts, 4 patients had type II cysts and 6 patients had type III cysts. Average size of the cysts was 6.96 × 6.85 cm. Nine patients underwent successful complete resection (4 left lateral hepatectomy and 5 cystopericystectomy) and 5 patients were converted to open surgery. Mean intra-operative blood loss was 111.11 mL (50–250 mL) and mean operating time was 243.33 minutes (180–300 minutes). Bile leak did not occur in any of the patients. There were no wound infections or post operative cavity related complications. Four out of five patients who were converted had cysts located in the posterior segments of liver. Anteriorly placed cysts had higher chances of being completed laparoscopically compared to posteriorly placed cysts (66.6% vs 12.5%). There has been no recurrence till date.

Conclusions: Laparoscopic total excision/resection is a feasible option with excellent post operative outcomes for selected cases of hydatid cyst of liver. Anteriorly placed cysts are better suited for laparoscopic resection.

PPL24-024

POSTOPERATIVE PLEURAL EMPYEMA AFTER LIVER RESECTION: A RARE BUT SERIOUS COMPLICATION

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Introduction: Postoperative pleural empyema following liver resection has not been thoroughly described in literature yet. Hence, we aimed to describe characteristics of patients experiencing this postoperative complication.

Method: Characteristics and outcomes of 19 patients who developed pleural empyema after liver resection, defined as a bacteriologically proven pleural infection with clinical and inflammatory signs requiring antibioticotherapy and thoracic drainage, from 1996 to 2013 were retrospectively analyzed.

Results: Overall incidence of pleural empyema was 0.96%. Eleven patients were males and median age was 53 years (range 18–69). Eighteen (95%) patients underwent right or extended right hepatectomy (with hepatojunostomy n = 6). Major indication for liver resection was malignant or benign biliary obstruction (n = 7, 37%) requiring preoperative biliary drainage in 6 cases. All 19 patients developed postoperatively pleural effusion and 12 (63%) developed infected abdominal collection (biliary fistula n = 4 and infected ascites n = 4). Sixteen (84%) patients required a percutaneous pleural drainage and 9 (47%) an abdominal drainage (repeat laparotomy n = 2), before diagnosis of pleural empyema. The diagnosis was made in presence of a persistent sepsis state with bacteriologically proven pleural infection requiring thoracic drainage. Accidental diaphragmatic effraction was observed in 4 patients (intra-operatively n = 3, transdiaphragmatic drainage n = 1). Treatment included 16 procedures of percutaneous drainage and 4 (21%) patients underwent a thoracotomy for surgical drainage after a median delay of 43 days (range 21–62). The median length of stay was 43 days (range 15–106) and postoperative mortality was 16% including 3 patients who developed septic shock. No patient treated by thoracotomy died postoperatively.

Conclusions: Postoperative pleural empyema is a rare but serious complication occurring mostly after right hepatectomy complicated with intraabdominal sepsis. Late diagnosis in a context of general sepsis contributes to its severity. Pleural paracentesis for diagnosis and treatment should be rapidly considered for these patients. Early thoracotomy for optimal drainage would reduce postoperative mortality.

PPL24-025

TYPE II LEIOMYOSARCOMA OF INFERIOR VENA CAVA

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Introduction: Leiomyosarcoma of the inferior vena cava (IVC) is a rare tumor that presents in an insidious manner with non-specific symptoms. We are reporting a case of leiomyosarcoma of IVC presenting as lump in the right upper quadrant of abdomen. Given its rarity, there are no consensus guidelines to its management.

Method: A 40-year-old lady presented with complaints of right abdominal discomfort for 6 months and vague palpable lump in right upper quadrant of abdomen for 3 months. On examination she had a hard mass of approximate size of 8 × 7 cm in the right hypochondrium.

Results: She was investigated with CECT abdomen which was suggestive of Retroperitoneal mass. She was investigated with FNAC which was suggestive of stromal tumor. Intraoperatively we found a mass arising...
Patients were divided into 2 groups, Group A (n = positive, and 2 HBV- and HCV-negative patients. HBV-positive, 7 HCV-positive, 7 HBV- and HCV-

Between July 2000 and April 2012, 18 patients underwent Hassab’s operation and hepatectomy. To treat portal hypertension. Hassab’s operation consists of splenectomy and devascularization of upper part of stomach and lower part of esophagus. It is not rare to have patients having esophageal varices and hypersplenism as well as hepatocellular carcinoma (HCC). One interesting question in these patients is the timing of Hassab’s operation. In this study, we retrospectively reviewed the clinical data and analyzed outcome of patients with HCC, who underwent hepatectomy and Hassab’s operation simultaneously, and who underwent Hassab’s operation followed by hepatectomy.

Method: Between July 2000 and April 2012, 18 patients with HCC underwent Hassab’s operation and hepatectomy at our department. There were 16 males and 2 females with a mean age of 61 years old. There were 2 HBV-positive, 7 HCV-positive, 7 HBV- and HCV-positive, and 2 HBV- and HCV-negative patients. Patients were divided into 2 groups, Group A (n = 11): patients who underwent hepatectomy and Hassab’s operation simultaneously, Group B (n = 7): patients who underwent Hassab’s operation followed by hepatectomy. Our indication for simultaneous operation is the patients with HCC having preoperative platelet count more than 5.0 × 10000/mm. Preoperative, operative and postoperative data were compared between the 2 groups.

Results: Mean preoperative platelet counts of Group A and B were 6.22 × 10000/mm and 5.00 × 10000/mm, respectively (p = 0.15). There were no significant differences between the two groups, in preoperative total AST, ALT, bilirubin, and albumin. Mean blood loss were 1136 and 769 mL (p = 0.18). No postoperative complication, such as bleeding from surgical sites and rupture of esophageal varices, were observed in the two groups. In Group B, median interval between Hassab’s operation and hepatectomy was 5 weeks.

Conclusions: Simultaneous operation of hepatectomy and Hassab’s operation can be performed safely, as long as the indication is observed and operation is performed with meticulous techniques.

PPL24-027
INTRAOPERATIVE BILIARY FLUORESCENCE IMAGING IN LAPAROSCOPIC FENESTRATION FOR GIANT LIVER CYST
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Introduction: Symptomatic giant liver cyst is considered for interventional and surgical treatments because of no effective medical therapy. Laparoscopic cyst fenestration (LCF) is recently accepted as standard procedure. Although LCF is less invasive and improves cosmetic outcome, it is sometimes difficult to identify bile duct with thinning by liver cyst expansion intraoperatively. The case of intraoperative biliary injury was reported. Recently, fluorescent cholangiography using indocyanine green (ICG) for laparoscopic cholecystectomy and hepatectomy has been developed. We used this technique for LCF in two cases and describe the details in this paper.

Method: The two cases were 71-year-old man (case 1) and 65-year-old woman (case 2), and approximately 10 cm diameter cysts were observed in both of the two patients with biliary strictures, abdominal symptoms, and abnormal hepatic function (case 2). The cysts indicated for LCF were located in left lateral segment in case 1 and liver segment 4 in case 2. In both of the two cases, 2.5 mg of ICG injected intravenously after induction of anesthesia and laparoscopic fluorescence imaging system (Karl Storz, Geman) was used for conventional imaging and near-infrared fluorescence imaging. Fluorescent cholangiography was conducted to detect bile duct in thinning hepatic parenchyma around giant liver cysts and identify good site for safe puncture. After cyst fluid aspiration using SAND balloon (Hakko, Japan), the cyst wall was disected.

Results: Fluorescent cholangiography clearly visualized intrahepatic bile duct around the cysts with illumination, and enable to identify the site where we could safely dissect the cyst wall. After fenestration, fluorescent cholangiography also used to check for bile leak. Operative times were 285 (case 1) and 301 (case 2) minutes and intraoperative blood loss was <10 mL. Postoperative courses were uneventful in both cases.

Conclusions: Intraoperative fluorescent cholangiography using intravenous ICG injection enables LCF safely, and is useful for avoiding biliary injury.

PPL24-028
PORTAL VEIN ANEURYSM RESECTION
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Introduction: The surgical treatment of a case is presented. Aneurysms of the extrahepatic portal vein are rare. Treatment is controversial, because symptoms are frequently unspecific, and most patients have
comorbidities. However, there is a risk of rupture and thrombosis that should be balanced to decide surgical treatment.

**Method:** A review of 26 years at a radiology department in a tertiary care referral hospital, revealed only 8 cases.

A 30-year-old patient was found to have a portal vein aneurysm of 7 cm in diameter. It seemed to be affecting the whole circumference of the vein, but with a lateral saccular shape.

Operation was planned with availability of a venous by-pass pump, which eventually was not used. After dissection of the portal vein and aneurysm, soft rubber tourniquets were applied below and above the aneurysm. The circumferential involvement of the vein was found smaller than it appeared in the preoperative image studies.

The patient tolerated well the cross-clamp of the portal vein, with maintenance of arterial blood pressure and no significant signs of bowel edema. Thus, cannulation for by-pass pump was not realized.

A complete resection of the aneurysm was undertaken including a short segment of involved portal vein, and a venous anastomosis was performed end-to-end with non-absorbable running sutures.

**Results:** Postoperative recovery was uneventful. There were no long term complications.

**Conclusions:** Aneurysms of the extrahepatic portal vein are extremely rare. Surgical resection must be considered if comorbidities do not contraindicate surgery. Patients must be referred to a hospital with experience in portal vein surgery, preferably with the facilities of a liver transplant unit.

PPL24-029

**RESECTION MARGIN STATUS AND LONG-TERM OUTCOME USING RADIOFREQUENCY ENERGY AS A RESECTION TOOL FOR COLORECTAL LIVER METASTASES**

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**Imperial College London, UK**

**Introduction:** Hepatic resection margin involvements in colorectal liver metastases (CRLM) have poorer long-term outcomes. The aim of this study was to evaluate the long-term prognosis of patients with involved hepatic resection margins following resection using radiofrequency energy (RFE) as a liver parenchymal resection tool for CRLM.

**Method:** Between 2001 and 2012, 251 patients undergoing RFE assisted hepatic resections for CRLM were identified. Patients were grouped according to their resection margin status (R0, R1 and R2) and their overall survival (OS) and recurrence rates (RR) were reviewed retrospectively.

**Results:** There were 150 (59.8%) R0, 89 (35.5%) R1 and 32 (12.7%) R2 resections. Median follow-up was 26 (1–135) months. Large tumour size and multiple/bilobar metastases were significantly higher in R2 resections. Overall median survival was 34 (0.3–137) months, significantly higher in the R0/R1 groups compared to the R2 group (55.4, 34.6 and 27 months, p < 0.005). Five-year OSs were 48.5%, 34.8% and 12.5% in R0, R1 and R2 groups respectively, with a significantly lower OS in the R2 group (p < 0.039). RRs were not significantly different amongst groups with a median time to recurrence of 37.2 (1–137) months.

**Conclusions:** R2 resection margin status for CRLM using RFE shows reasonable long-term prognosis compared to R0/R1 resections. The possibility of an R2 resection margin should not lead to the abandonment of a resection.

PPL24-030

**DETERMINING COMPLETE CLINICAL RESPONSE OF RADIOLOGICALLY DISAPPEARING COLORECTAL LIVER METASTASES AFTER CHEMOTHERAPY AND HOW THEY SHOULD BE MANAGED**

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**Introduction:** The aim of this study was to determine if radiologically disappearing liver metastases (DLMs) after chemotherapy correspond to a complete clinical response. The treatment of DLMs was also assessed to determine whether they should be resected or left in situ.

**Method:** A retrospective review was carried out on 342 patients referred for surgery between January 2001 and January 2012. Twenty-eight patients showed evidence of at least one metastasis disappearing radiologically after chemotherapy. Sixteen patients were subsequently eligible for review with a median follow up of 27.6 (range 5.2–113.9) months.

**Results:** Thirty five metastases were identified in 16 patients. Twenty-eight metastases disappeared radiologically. Ten patients had 15 DLMs left in situ and 6 patients had 13 DLMs resected. Complete clinical response was observed in 15 DLMs (53.6%) on follow up. Five showed no recurrence within 1 year in those left in situ (33.3%) and 10 showed complete pathological response after resection (76.9%). A significantly reduced recurrence free survival was observed in the in situ group [6.3 months vs 19.4 months (p < 0.001)], but overall survival was not significantly different between the two groups (p = 0.12).

**Conclusions:** Radiologically DLMs do not necessarily confer a complete clinical response. They should be resected when possible but leaving them in situ can be warranted.

PPL24-031

**AETIOLOGY AND MANAGEMENT OF SPONTANEOUS LIVER HAEMORRHAGE**

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**Introduction:** Spontaneous haemorrhage secondary to non-traumatic rupture of the liver has life-threatening consequences. Hepatocellular carcinomas (HCC) are the commonest cause with an incidence of rupture <3% and 12–14% in Western and Asian countries respectively, the reported mortality being approximately 50% in the latter. The aim of this study was to assess the aetiology and management of patients with spontaneous liver haemorrhages based on the experience of a single institution.

**Method:** Between 2002 and 2013, 39 patients with spontaneous haemorrhage secondary to non-traumatic rupture of the liver were identified. Their aetiology, management and outcomes were reviewed retrospectively.

**Results:** There were 24 men and 15 women of median age 60 (range 17–82) years. Underlying liver pathology was identified in 33 cases of which 22 were malignant (17 HCCs, 2 intrahepatic cholangiocarcinomas and 3 hepatic metastases [choriocarcinoma, pancreatic neuroendocrine and yolk sac tumour]). Eleven had benign liver lesions (adenomas [7], liver cysts [3] and haemangiom [1]). Six patients had no obvious underlying liver pathology despite follow-up imaging. Nine of the 39 patients had coagulopathies secondary to either anticoagulation therapy (6) or thrombocytopenia (3) (pre-eclampsia [2] and leukaemia). Twenty seven patients were successfully managed conservatively with fluid resuscitation, blood transfusion and correction of coagulopathy. Eight patients required transarterial embolisation of which 7 were successful. Surgery was necessary in 5 cases (hepatectomies [3], perihepatic packing [2]). Bleeding was successfully stopped in all cases with no recurrent bleeds but 1 mortality.

**Conclusions:** Spontaneous liver haemorrhage secondary to non-traumatic rupture of the liver is an uncommon presentation. Conservative management alone may be adequate provided there is access to multi-modality treatment in a specialist centre. If no underlying liver pathology is initially identified, then careful follow-up imaging is required to detect a potentially treatable cause.

PPL24-032

SUCCESSFUL SEPARATION OF COJOINED TWINS OMPhALOPAGUSS IN PERU

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**Introduction:** The cojoined twins are a rare condition where identical twins birth joined by some parts of the body and share one or two organs, we report a case of cojoined twins omphalopagus girls born by cesharea at Guillermo Almenara National Hospital Lima Peru; The diagnosis was pre natal By MRI in a 41-year-old woman; post natal studies confirmed that de cojoined twins joined by upper and anterior abdominal wall the only organ joined was the liver so we performed the first successful separation of the cojoined twins, hepatic bipartition and closure of the abdominal wall without us in biological products.

**Method:** This is a retrospective study of a rare case of cojoined twins omphalopagus, we use MRI, US dopler to diagnosis pre and post natal to planify the surgery of separation the bodies including the hepatic bipartion.

**Results:** Abdominal MRI and Ultrasound showed two livers joined only by parenchyma great vessels as IVC, Portal vein, gold blader and Biliary Tree was independ for each cojoined twin, we performed the surgery's separation and hepatic bipartition of the cojoined twins when they were 2 months years old using intraoperative ultrasound to cut the hepatic parenchyma with CUSA excel (Ultrasonic Disector); the closure of the abdominal wall was without use of biological products to expand the skin, the patients had good evolution and they were discharged from hospital at PO 30 and continue they follow up at the outpatient clinic.

**Conclusions:** Multidisciplinary managements is the principal action to treatment these rare anomalies; anatomical studies by MRI and Ultrasound, use of intraoperative ultrasound and ultrasonic disector were very useful to get the hepatic bipartition with minimal lost of blood and the closure of the abdominal wall without tension; the evolucion was good.

PPL24-033

HEPATOCELLULAR CARCINOMA MIMICKING LIVER ABSCESSSES

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**Introduction:** Cystic HCC in the context of a non cirrhotic liver is extremely rare. Also high fever and leukocytosis have been well described as symptoms of HCC.

**Method:** We describe two cases of cystic hepatocellular carcinoma (HCC). Two ladies their age is above 60. One of these patients has high fever 40°C, both of them has hyperleukocytosis. TDM scanner showed a liver hypoechochegne images in both of the patients. One patient was operated on for cholecistitis with abscess around the gallbladder. The second patient was operated on for gallbladder cancer with liver necrosis extension. Per operatively the first patient has a small tumor in the small bowel with carcinomatosis with cholecistitis with bile collection around it, this patient underwent cholecystectomy associated to resection of the collection with resection of the small intestine tumor. The second patient underwent cholecystectomy with resection of the cyst or tumor necrosis around gallbladder.

**Results:** Histological study showed that was a HCC with carcinomatosis associated to gallbladder cancer in one patient and the other it was a HCC moderately differentiated.

**Conclusions:** As the HCC has cyst- like structure, wich were fiber and necrosis. The CT images of the liver masses resemble abscesses or tumor necrosis. We must think at HCC when we have hypoechochegne, cyst lesion even when we have fever and hyperleukocytosis.
PPL24-034
MULTIDISCIPLINARY TREATMENT OF HEPATOCELULAR CARCINOMA AT UNIVERSITY MEDICAL CENTER LJUBLJANA, SLOVENIA: COMPARISON OF TWO-FIVE-YEAR PERIODS
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Introduction: Hepatocellular carcinoma is the most common type of primary liver carcinoma. We made a retrospective analysis of patients with the diagnosis of hepatocellular carcinoma that were surgically treated at our medical center between 2003 and 2012 and the usefulness of BCLC classification in daily routine.

Method: One hundred and sixteen patients with hepatocellular carcinoma were surgically treated from 2003 to 2012. We divided patients in two groups, group 1 (G1) from 2003 to 2007 and group 2(G2) from 2008 to 2012. Decision whether the patient should be operated or not was made based on BCLC classification.

Results: In group 1 42 patients underwent surgical treatment, 13 of them received combined therapy (TACE or lipiodol pre/post operatively) in group 2 74 patients underwent surgical treatment, 21 of them received combined therapy. Median age was 66.2 in females (6 patients, 14.3%) and 61.3 in males (36 patients, 85.7%) for G1 and 59.6 years in females (16.2%, 12 patients) and 63 years in male patients (83.8%, 62) in G2. Predominant etiology factor, as underlying liver disease, in both groups was alcoholic liver cirrhosis (48%) followed by hepatitis C (25%). More liver resection was performed in G1 69% cases 55.4% in G2, intraoperative RFA in 19% and 2.7% respectively, liver transplantation in 4.8% and 20.3%, exploration only was made in 7.2% (3 patients) and 17.6% (13). Hospital stay was 20.9 days for G1 and 18.4 in G2. 38.1% of patients in G1 developed postoperative complications, 33.8% in G2, 56% of them developed Clavien-Dindo classification IIIa or more, mortality rate was 4.6% and 6.7%.

Conclusions: In our study we showed that BCLC classification is still a gold standard for staging as well as for treatment strategy for HCC. Survival rate was significantly higher in group 2 by Kaplan–Meier curve.

PPL24-035
REPEAT HEPATECTOMY AND EXTREME LONG-TERM SURVIVAL IN PATIENTS WITH RECURRENT NEUROENDOCRINE LIVER METASTASES AFTER HEPATECTOMY
Carlos Castro Benitez, Aldrick Ruiz, Nicolás Pedano, Michele Tedeschi, Denis Castaing, René Adam and Antonio Sa Cunha
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Introduction: Neuroendocrine tumor is a rare and silent cancer that is usually discovered when patients have symptoms from systemic dissemination. Liver involvement is accompanied by a steep decline in survival if not treated. Due to advances in chemotherapy but also in surgery, this disease has luckily become almost a chronic disease. In this study we explore the possible benefit of repeat liver resection for recurrent neuroendocrine liver metastases and look particularly at the extreme long-term survival.

Method: Between 1981 and 2011, nineteen patients underwent repeat hepatectomy for recurrent liver metastases for neuroendocrine tumors at our center. Clinicopathological data was retrospectively collected and analyzed for overall survival and prognostic factors.

Results: A repeat hepatectomy after recurrence was performed in nineteen patients after first hepatectomy. This series consisted of 13 female and 6 male patients. Median age at second hepatectomy was 54 years (range 30–71 years). Small intestine and pancreas were the most frequent origin of the primary tumor; 6 (35%) and 5 (29%) patients respectively. Sixty-four percent had a carcinoid tumor. Half of the patients had minor and halve a mayor hepatectomy. Clavien dindo classification was grade I, II, III in 5(29%), 5 (29%), 3 (18%) patients respectively. Three patients died within 3 months of surgery. The median survival was 166 months. The 5-, 10-, 15-year survival was 93%, 93% and 45% respectively. No clinic pathological factor had a prognostic significance in our series.

Conclusions: We particularly noted an extreme long-term survival in our series. Even though this study represents a highly selective and sometimes extreme group of patients, repeat hepatectomy should be considered in patients with recurrent neuroendocrine liver metastases.

PPL24-036
FOLFOX INDUCED SINUSOIDAL OBSTRUCTION SYNDROME (SOS) IS A POTENTIALLY REVERSIBLE CONDITION
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**PPL24-037**

**SIMULTANEOUS OR STAGED RESECTIONS FOR SYNCHRONOUS COLORECTAL LIVER METASTASES: EARLY AND LATE OUTCOMES**

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**Introduction:** The optimal strategy for the treatment of synchronous liver metastases has not been established yet. We studied the outcomes and survival of patients who underwent a simultaneous or a staged resection in our institution.

**Method:** We performed a retrospective analysis of 168 consecutive liver resections for synchronous colorectal metastases performed in our institution and focused on early and late outcomes of patients who underwent either a simultaneous or a staged resection.

**Results:** Only about a third of patients underwent a simultaneous resection. Demographics of the patients, site of the primary tumor and postoperative chemotherapy regimen were similar in both groups. Duration of surgery, blood loss and hospital stay were slightly greater in the simultaneous resection group, but overall hospital morbidity and mortality were similar. There was a trend favoring the simultaneous resection for right sided colon cancers but the analysis showed no difference in outcomes regarding the type of hepatectomy/metastasectomy and colectomy. Overall 5 years survival was not statistically different between the two groups, being 43% and 39% for the simultaneous and staged groups respectively.

**Conclusions:** In our experience, there is no added risk in simultaneous resections for synchronous colorectal liver metastases. It is a safe approach resulting in similar early and late outcomes and should be offered to all patients with this condition. An experienced oncological service with a close collaboration of the hepatobiliary and colorectal surgeons is though a requirement.

**PPL24-038**

**DIABETES MELLITUS IS ASSOCIATED WITH MORBIDITY AND MORTALITY IN ELECTIVE LIVER SURGERY**

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**Introduction:** The incidence of diabetes mellitus (DM) has increased by 30% in the last 10 years. In large parts this is the consequence of an increase in body mass index. While it is well established in elective cardiothoracic surgery that DM is an independent cofactor for morbidity and mortality such studies are missing for liver surgery.

**Method:** Between 2005 and 2013 414 patients underwent elective liver surgery. In 52% of all cases a hemihepatectomy or extended hemihepatectomy was carried out. 69 patients were diagnosed to have DM. DM was defined as fasting blood glucose higher than 126 mg/dL or blood glucose higher than 200 mg/dL. The patient cohort then was subdivided into three post op groups: Group 1 included patients without or minor complications (wound infection, pleural effusions etc.), group 2 included patients with major complications (operative revisions, liver failure, pneumonia etc.) and group 3 included patients that died within 30 days after surgery. For statistical analysis the Chi²-test was used.

**Results:** Three hundred and sixty-three patients (88%) had an uneventful course or minor complications after elective liver surgery. 41 patients (9.9%) patients experienced major complications and 10 (2.4%) patients died within 30 days after surgery. Diabetes was diagnosed in 55 (15%) patients in group 1, in 8 (20%) patients in group 2 and in 6 (60%) patients in group 3 (p < 0.001).

**Conclusions:** The risk of severe morbidity or mortality after elective liver surgery increases significantly in patients with DM. Our data are in line with similar studies in cardiothoracic surgery. Further analyses are needed with regard to DM treatment and perioperative glucose level management.

**PPL24-039**

**LIVER SURGERY AFTER SELECTIVE INTERNAL RADIOThERAPY (SIRT) FOR LIVER METASTASIS**

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Introduction: Selective internal radiotherapy (SIRT) with yttrium 90 microspheres has emerged originally as an effective liver directed therapy for patients with primary non resectable malignancies of the liver. However, tumor downstaging with significant reduction of the hepatic tumor load and induction of hypertrophy in the non-SIRT treated liver parts has been reported previously. Based on these experiences we selected patients with marginally resectable liver metastases for a combination treatment with SIRT and subsequent liver resection.

Method: Since 2010 all patients with liver malignancies were evaluated in an interdisciplinary tumor board. Fourteen patients (8 female, 6 male; median 76 years (32–77) with marginally resectable liver metastasis (colorectal carcinoma n = 12, breast cancer n = 2) were treated with SIRT and subsequent liver resection.

Results: SIRT (mean 1461 MBq (600–1990)) was performed in all patients without complications. In seven patients (50%) additional in situ liver split with portal vein ligation was performed before SIRT to increase the volume of the future liver remnant. At re-evaluation all patients showed a significant decrease in tumor size and no new metastases. Thereupon, right hepatic resection was performed in nine, extended left hepatic resection in three and central liver resection in two patients. The median time interval between SIRT and liver resection was 82 days (38–150). Histological evaluation showed advanced tumor necrosis and central scaring. Liver resection was performed in all patients with a morbidity rate of 26% and no mortality.

Conclusions: The combination of selective internal radiation therapy (SIRT) with modern liver surgery can be performed safely. This new treatment concept could accomplish tumor control with good patient tolerability and might offer curative therapy options for patients with marginal resectable liver metastases.

PPL24-040

A CASE OF CAUDATE LOBE LIVER ABSCESS – LAPAROSCOPIC DRAINAGE AS PRIMARY TREATMENT

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Introduction: Radiologically guided percutaneous drainage of liver abscess is effective and currently is considered the gold standard of care with success rates between 80% and 87% and low morbidity and mortality. In this approach the recovery time is longer and the patients needs several sessions of percutaneous drainage. Laparoscopic drainage is employed for cases where multi-loculated abscesses have failed percutaneous drainage therapy or concomitant biliary pathology is present requiring surgery. We present her a case where the laparoscopic approach was used as a primary approach to treat the caudate lobe pyogenic liver abscess.

Method: Case: A 53-year- old male was found to have caudate lobe liver abscess on investigations for fever and pain in the abdomen. His liver functions were within normal limits and had leucocytosis. A CT Scan showed 5.5 × 3.5 cm caudate live liver abscesses with liquefaction. The percutaneous approach was difficult due to the location. He underwent laparoscopic drainage of the abscess successfully. The operative time was 55 minutes. The abscess cavity was thoroughly drained and the septas was broken with the suction cannula and lavage was given. A drainage tube was kept in the abscess cavity. There was no perioperative complication.

Results: Post operatively patient recovered well. Drains were removed on 4th post operative day and he was discharged. His subsequent Ultrasound showed faster resolution of the residual cavity and he did not require further intervention.

Conclusions: Laparoscopic drainage of caudate lobe abscess is an effective method as it is deep seated, surrounded by major vessels, and radiological guided percutaneous approach is difficult. Endoscopic transgastric drainage has been reported but requires high level of technical expertise. Laproscopic method is commonly available, effective and safe method for liver abscess drainage as a primary treatment in selected cases.

PPL24-041

CLINICOPATHOLOGIC FEATURES AND SURGICAL OUTCOMES OF HEPATIC ANGIOMYOLIPOMA

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Introduction: Hepatic angiomylipoma (HAML) is a rare tumor containing a variable amount of fat, vessels and smooth muscle. The aim of the study was to review the main clinical, imaging and pathological features of HAML.

Method: We retrospectively analyzed the imaging, pathological and clinical features of 20 patients who underwent surgical resection for HAML at our institute between March 2000 and November 2011.

Results: Three males and 17 females with a median age of 47 years (range: 23–73 years) were enrolled in the study. HAML was seen as a well-defined, solitary mass on imaging with 4.8 cm of median size (mean diameter, 7.3 cm). Of 20 patients, 4 showed large size of more than 15 cm. Presenting symptoms consisted of abdominal discomfort in 4, indigestion in 2, and fever in one, the others were asymptomatic. On preoperative imaging, 12 patients had characteristic features of hepatocellular carcinoma as well as HAML. Routine blood tests, including those for α-fetoprotein and carcinoembryonic antigen, were normal. No patient was positive for hepatitis B/C and liver cirrhosis. Thirteen lesions were located in the right hepatic lobe, 5 in the left lobe, and 2 in both. All tumors were composed of varying proportions of smooth muscle, adipose tissue, and blood vessels, and showed positive immunohistochemical staining for HMB-45. Seven tumors were positive for smooth muscle actin (7/7) and negative for cytokeratin (0/7) and S-100 protein (0/3). All patients underwent curative resection and there was no evidence of recurrence after a median follow-up of 46 months.
Conclusions: When the diagnosis of HAML is suspicious or hypothesized, surgical resection remains the recommended strategy due to the difficulty in diagnosis preoperatively and the potentially invasive growth of the lesion. The definitive diagnosis of HAML is challenging and depends on the presence of HMB-45-positive myoid cells. HAML is treated effectively with surgery and the prognosis is good.

PPL24-042
EVALUATION OF LIVER AND COLORECTAL RESECTIONS FOR SYNCHRONOUS COLORECTAL LIVER METASTASES IN OUR INSTITUTE
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Introduction: Liver metastasis of colorectal cancer is common. The optimal surgical strategy for the treatment of synchronous resectable colorectal liver metastases has not been defined. The aims of this study were to review our experience with synchronous colorectal liver metastases and to define the safety of simultaneous resection of the colon and liver.
Method: From August 2008 through August 2013, 78 patients were treated surgically for primary colorectal adenocarcinoma and synchronous hepatic metastasis. Clinicopathologic, operative, and perioperative data were reviewed to evaluate selection criteria, operative methods, and perioperative outcomes.
Results: Sixty one patients underwent wedge resections of hepatic metastasis and the remaining major liver resections (3 Couinaud segments) along with simultaneous colorectal resections mainly for right colon primaries. Complication rate was 49% and 7 deaths occurred postoperatively. Median hospitalization was 14 days. The recurrence rate was 68.6%. Recurrences most frequently occurred in liver followed by lung.
Conclusions: Simultaneous colon and liver resection is safe and efficient in the treatment of patients with colorectal cancer and synchronous liver metastases. By avoiding a second laparotomy, the overall complication rate is reduced, with no change in operative mortality. Given its reduced morbidity, short treatment time, and similar cancer outcomes, simultaneous resection should be considered a safe option in patients with resectable synchronous colorectal metastasis.

PPL24-043
SEQUENTIAL TRANSCATHETER ARTERIAL CHEMOEMBOLIZATION AND PORTAL VEIN EMBOLIZATION FOR HCC RESECTION IN CIRRHOTIC PATIENTS IMPROVES OUTCOME AND INCREASES TUMOR NECROSIS: A CASE MATCHED CONTROL STUDY
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Introduction: Liver metastasis of colorectal cancer is common. The optimal surgical strategy for the treatment of synchronous resectable colorectal liver metastases has not been defined. The aims of this study were to review our experience with synchronous colorectal liver metastases and to define the safety of simultaneous resection of the colon and liver.
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PPL24-044
PERIFERAL BILE LEAK
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Introduction: Peripheral bile leak, from an intrahepatic duct disconnected of the main biliary tree, is a challenging condition which can produce serious complications and require complex treatment.
Method: Review of 2 cases of postoperative bile leak, due to an isolated duct of a segment of liver, in which resolution required prolonged treatment.
Results: Case 1: a 35-year-old patient was operated of a giant liver hydatid cyst. Most of the right liver was affected, and a partial pericystectomy was performed. She developed postoperative biliary fistula. Endoscopic papillotomy and biliary stent placement did not resolve the fistula.
After 1 year, four operations and two completion right hepatectomies, the bile fistula persisted, and it was infected. She developed portal hypertension, that resolved after drainage of a subphrenic abscess. RMN showed a patent duct of a remnant of segment 5.
Case 2: a 56-year-old patient with Caroli’s disease affecting right liver underwent a right hepatectomy.
After a few days presented biliary fistula through the suction drain. CT scan demonstrated dilated ducts in a lobe of segment 8. He had an episode of anicteric cholangitis due to obstruction of the drain. Endoscopic papillotomy was disregarded.

In both cases, suction with soft silicone bulb was changed to a rigid suction bottle. Fluid output decreased steadily. When output fell to around 50 mL, the drain was removed, and complete resolution was achieved.

Conclusions: Biliary fistulas of peripheral ducts represent a condition with potentially severe complications. Endoscopic papillotomy does not seem to be effective. First line treatment must be suction drainage, and antibiotic coverage. Although a completion hepatectomy may be necessary, it can be very challenging, and percutaneous treatments such as occlusion of the independent duct, or of the portal branch irrigating the isolated segment, should be evaluated.

PPL24-045
LAPAROSCOPIC RESECTION OF COLORECTAL LIVER METASTASES SHOULD BE PERFORMED BY HAND-ASSISTED LAPAROSCOPIC LIVER SURGERY
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Introduction: Totally laparoscopic liver surgery (TLS) allows only a visual and ultrasonography exploration (US) of the liver. Some publications warning about the existence of an underestimation with this technique regarding the real number and localization of nodules, especially in case of colorectal liver metastasis (CRLM). We think that Hand-assisted laparoscopic surgery (HALS) is more reliable than TLS to stage liver disease in CRLM because the manual palpation of the liver can detect hidden nodules. To analyze the results of a prospective study comparing totally laparoscopic staging versus hand-assisted laparoscopic staging in patients diagnosed with CRLM.

Method: Since January 2003 we have performed 146 laparoscopic liver resection and 90 of them were for CRLM. Each patient was staged preoperative with a CT and PET scan. At the beginning of each operation we performed an intraoperative staging: first we visualized the peritoneal cavity and then we performed a laparoscopic ultrasound through the Handport without touch the peritoneal cavity. We wrote down the number, size and location of nodules. Then we repeated the staging adding surface palpation of the liver and the abdomen. The ultrasound probe was the same in all cases. To assess the staging the number of nodules found in the histological study was taken.

Results: Eight patients were excluded due to cirrhosis (6) or need of two stage liver resection (2). There was no conversion neither mortality. When we added liver and abdominal cavity palpation and an ultrasound guided by palpation, in 8 patients (9.5%) we detected more nodules than in TLS staging. Furthermore in one case we detected a peritoneal implants.

Conclusions: The tumoral staging made by TLS could understaging the number of nodules in CRLM. At our surgical unit, to avoid this problem, we usually perform a HALS.

PPL24-046
DO WE NEED FOR A MORE STANDARDIZED DEFINITION OF BILE LEAKAGE AFTER HEPATECTOMY?: AN PROSPECTIVE OBSERVATIONAL STUDY
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Introduction: Bile leakage after liver resection remains a major cause of postoperative morbidity, often leading to a prolonged hospital stay, and need for additional diagnostic tests and interventions. The international study group of liver surgery (ISGLS) had proposed a uniform definition and severity grading of bile leakage after hepatobiliary and pancreatic operative therapy. The aim of this study was to apply the definition proposed by the ISGLS in clinical practice and search for additional criteria for defining bile leakage after liver resection.

Method: We collected clinical data from patients who underwent liver resection between May, 2012 and August, 2013. Data included drain amount, bilirubin concentration in serum and drain fluid on the first and third postoperative day. Bilirubin concentration in serum and drain fluid was also checked on the day of drain removal.

Results: There were 128 patients during the study period. The mean age was 59.4 years. The mean bilirubin concentration in drain fluid on the first and third postoperative day exceeded 3 times the concentration in serum. All of these patients eventually did not develop bile leakage and were discharged within the tenth postoperative day. There were 3 patients with bile leakage according to the ISGLS criteria. Two patients required radiologic intervention and 1 patient required reoperation. All three patients had bilirubin concentration in drain fluid on the third postoperative day above 3 times the concentration in serum.

Conclusions: The bilirubin concentration in drain fluid on the third postoperative day was more reliable to predict bile leakage than on the first postoperative day. The current definition of bile leak provided by the ISGLS was useful in clinical practice.
PPL24-047
OUTCOMES OF SIMULTANEOUS RESECTION COMPARING TO DELAYED RESECTION IN SYNCHRONOUS COLORECTAL LIVER METASTASIS WITH THE SAME EXTENT OF HEPATIC DISEASE

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Introduction: There has been controversy in surgical management of synchronous colorectal liver metastasis (SCLM) between simultaneous resection (SR) and delayed resection (DR). The recent meta-analysis showed that the resection criteria between these 2 groups were different resulting in the greater extent of metastatic disease severity in DR but the same postoperative complications and overall survival (OS) and concluded that SR can only be recommended in patients with limited hepatic disease. In this study, the SR and DR have the same extent of hepatic disease and the outcomes were reported herein.

Method: The records of the patients with SCLM between January 2000 and January 2012 were retrospectively reviewed. There were 42 SR and 48 DR. Post-operative complications, disease free survival (DFS), and OS were analyzed.

Results: There were 42 SR and 48 DR. The average age were 57 and 59 years old, respectively. The extent of hepatic disease was not different between these 2 groups: number of bilobar disease: 42% and 43%, number of liver lesion: 2.78 and 3, maximal size of liver lesion: 4.3 and 4.2 cm, CEA level: 318 and 120 ng/mL, proportion of major liver resection: 36% and 55% respectively. Liver related complications were also not different. Five years DFS and OS were 20% and 42% in SR and 20% and 40% in DR.

Conclusions: In SCLM, SR may be performed with comparable outcomes with DR even in case of same extent of hepatic disease.

PPL24-048
HEPATECTOMY WITHOUT OPERATIVE MORTALITY. 20 YEARS OF EXPERIENCE.

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Introduction: During the last decades, hepatic surgery has developed dramatically and today hepatic resections can be performed safely, in well-trained and well-equipped surgical units. Safe hepatectomy implies no intraoperative blood loss, a reasonable rate of morbidity (0–10%), no mortality and a short hospital stay.

Method: The aim is to evaluate prospective data from hepatectomies carried out at Hospital Italiano Rosario-IUNIR, Medical School as from May 1993. These hepatic resections were re-defined following the new IHPBA Terminology: Brisbane 2000. And to point out and set indications, technical aspects and results obtained.

One hundred and fifty patients underwent liver resections; 3 required another hepatic resection and 4 a two-step resection. (157 liver resections were performed: traumas were excluded). There were 81 men and 69 women, the mean age was 51 ± 16 years.

Terminology: we used the French school, adapted to the new “IHPBA-Brisbane 2000” terminology. 85 major hepatectomies (3 or more segments) and 65 minor hepatectomies were performed. 2 or 3 Standard techniques were used.

Results: In major hepatectomies (n = 88), surgery time was 3.50 ± 2.7 hours. The Hospital stay was 5 ± 3 days, 46% morbidity, mortality has been null since 1993. Intraoperative blood transfusion demanded the use of 2 U. (±2) from 1993 to 2013.

In Minor hepatectomies (n = 69) surgery time was 2.20 ± 1.5 hours, Hospital stay: 3 ± 3 days, 15% mortality, and 0% mortality. Intraoperative blood transfusion demanded the use of 0.5 U (+0.5) from 1993 to 2013.

Conclusions: After our learning curve (84–92) a safe hepatectomy can be performed in our non transplant surgical center, with no operative mortality in the last 157 consecutive liver resections.

PPL24-049
EFFECT OF NEOADJUVANT CHEMOTHERAPY ON POSTOPERATIVE LIVER REGENERATION FOLLOWING MAJOR RESECTION

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Introduction: In order to analyze postoperative liver regeneration following hepatic resection after chemotherapy, we retrospectively investigated the differences in liver regeneration by comparing changes of residual liver volume in three groups: a living liver donor group; and two groups of patients with colorectal liver metastases, who did and did not undergo preoperative chemotherapy.

Method: This study included 32 patients who had at least segmental anatomical hepatic resection. Residual liver volume, early postoperative liver volume, and late postoperative liver volume were calculated to study the changes over time. From the histopathological analysis of chemotherapy-induced liver disorders, the effect on liver regeneration according to the histopathology of noncancerous liver tissue was also compared between the two colorectal cancer groups using Kleiner’s score for steatohepatitis grading and sinusoidal obstruction syndrome (SOS) grading for sinusoidal obstructions.

Results: Assuming a preoperative liver volume of 100%, mean late postoperative liver volumes in the three groups (the living liver donor group, and the
PPL24-051
DOES THE LIVER REGENERATE AFTER MINOR HEPATECTOMY?
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Introduction: Liver regeneration (LR) is a physiological mechanism which leads to restoration of the hepatic parenchyma following hepatectomy. Although LR allowed performing major liver resection, up to 80% of liver volume in healthy liver, it can be deleterious, inducing the growth of infraclinic tumors in the remnant liver. LR following minor hepatectomy has not been reported in the literature. Thus, the aim of this study was to analyze whether the liver could regenerate following a minor liver resection such as left lateral lobectomy.

Method: This study analyzed LR in 18 men and 12 women operated on by left lateral lobectomy for hepatocellular carcinoma (19 pts), Liver metastasis (5 pts) or benign tumor (6 pts). Liver volumes were measured using OsiriX softwareO (version 5.5.2) before and after hepatectomy. Total liver volume, right liver, left liver and tumor volumes were assessed using MRI or CT-scan. Post operative evaluation of LR was performed between 3 months and 1 year after surgery. LR was defined as an increased in right liver lobe volume following hepatectomy.

Results: Preoperatively, mean volumes of total liver, right lobe liver, left lobe liver (including tumor volume) and tumor were 1767.6 mL (±502), 1407 mL (±349), 411.2 mL (±315), 122.6 mL (±230) respectively. Postoperatively, LR was observed in 18 patients with an increased volume of right liver lobe of 27 ± 19%. Among 12 patients without liver regeneration, 10 patients presented with underlying liver disease. No relationship between tumor volume and LR was observed.

Conclusions: Knowledge of liver regeneration is important for operative decision in patients with MHCCR and for repeated hepatectomy in patients with cirrhosis. According to our study, in order to prevent growth of metastasis in the remnant liver, local resection or ablation seems preferable to left lateral lobe resection in patients with liver metastasis.

PPL24-052
ACUTE ON CHRONIC EXTRAHEPATIC PORTAL VEIN OBSTRUCTION: A DISTINCT CLINICAL ENTITY
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Introduction: Extrahepatic portal vein obstruction (EHPVO) has been classified into recent and chronic type according to Baveno V consensus statement. In recent type, patients present with abdominal pain, ascites, or fever secondary to portal vein thrombosis in the absence of portal cavernoma. In chronic EHPVO, patients present with features of portal hypertension and is associated with portal cavernoma. However, presentation with acute symptoms in chronic EHPVO is not uncommon. Hence this study was done to analyse the clinical presentation of patients with EHPVO and to propose a new classification system.

Method: Retrospective analysis of prospectively collected database of EHPVO patients managed at our institute from June 2010 to July 2013. Clinical features and imaging findings of these patients were analysed.

Results: Of the 58 chronic EHPVO patients with portal cavernoma 4 patients had evidence of thrombosis within portal cavernoma on ultrasound abdomen. Of the 4 patients 3 were females and the median (range) age at the time of presentation was 24 (21–28). Clinical presentation included acute mesenteric ischemia in 2 patients and ascites in two patients. Patients with acute mesenteric ischemia underwent emergency laparotomy. Intraoperatively in both patients proximal 80 cm jejunum was spared with gangrene of the next 40–50 cm of small bowel. Both underwent resection of gangrenous bowel segment with end stomas. Postoperative recovery was uneventful and both were planned for restoration of bowel continuity. Two patients with ascites were started on oral anticoagulants and high dose diuretics and with medical treatment their ascites resolved in 2 weeks. Proximal splenorenal shunt was performed in one patient and other patient is awaiting shunt surgery.

Conclusions: Chronic EHPVO patients with acute thrombosis is a distinct entity and needs to be reclassified as “acute on chronic EHPVO.” Acute mesenteric ischemia in the setting of chronic EHPVO tend to spare proximal jejunum.

PPL24-053
HYPOXIC PRECONDITIONING OF ADIPOSE-TISSUE DERIVED STEM CELLS ENHANCES THE LIVER REGENERATING POTENTIAL BY RELEASING SECRETOME
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Introduction: Recently, as the adverse effects of cell-based therapy have been revealing, i.e. the potential of...
Hypoxia activate the Wnt/beta-catenin signaling pathway, releasing cytokines and growth factors from stem cells; therefore, the effects of hypoxic preconditioning on the stem cell’s function should be determined.

Method: We therefore examined the effects of preculturing human adipose-derived stem cells (ASC) in hypoxic conditions (1-3% oxygen for 24 hours) to elucidate the best conditions that enhance their liver regenerative potential.

Results: We demonstrated that ASC cultured in hypoxia activate the Wnt/beta-catenin signaling pathway while maintaining their viability and cell cycle rates. We also showed that ASC cultured in hypoxia induced mRNA expression and extracellular release of pro-inflammatory and liver-recovering mediators including IL-6, TNFa, and hepatocyte growth factor. In vivo experiment comparing the mice control, secretome administration, and hypoxic secretome administration mice with hypoxic secretome showed the highest liver regenerating capacity estimated by BrdU, Ki67, and PCNA immunohistochemical stains.

Conclusions: Collectively, these data suggest that preculturing ASC under hypoxic conditions prior to transplantation improves their liver regenerative potential by way of recruitment of secretome content with higher therapeutic potential.

PPL24-054
LIN’S CLAMP REVISITED: A SAFE MODEL OF TRAINING OF LIVER RESECTION

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Introduction: In 1973, Lin described a simplified technique of hepatic resection using a designed clamp and crush method. It allowed regionally vascular control to reduce blood loss during parenchymal transection. This technique aimed at avoiding hilar dissection and vascular clamping thereby preventing ischemic-reperfusion injury of remnant liver.

Method: The outcome of patients who underwent hepatic resection using Lin’s technique was reviewed. Multiple variables were used to statistically compare outcomes between patients with cirrhotic and non-cirrhotic livers and cases performed by junior surgeon (JS) and an experienced surgeon (ES).

Results: Lin’s technique was performed in 29 patients. Eleven and 18 cases were operated by the JS and ES respectively. Transection time was significantly longer in the JS group. Thirteen patients had non-cirrhotic livers whereas 16 patients had cirrhosis. There was also no statistically significant difference in the peri-operative outcomes between cases performed by the JS and ES and between cases of patients with or without cirrhosis. There was no incidence of hepatic failure within 90 days.

Conclusions: Lin’s technique is an alternative and safe approach for hepatic resection and useful to train junior surgeons performing hepatectomy.

PPL24-055
A RARE CASE OF DUODENAL METASTASES FROM HEPATOCELLULAR CARCINOMA

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Introduction: Hepatocellular carcinoma (HCC) is the commonest primary tumor in the liver. It has been shown to have a strong association with hepatitis B and C. HCC not only commonly metastases to the other part of the liver but also commonly metastases to the lung. Involvements of upper gastrointestinal organs are rare. We report a case of hepatocellular carcinoma with duodenal metastases.

Method: A 58-year-old Chinese man with a background history of hepatitis B presented with right hypochondrium pain. No jaundice or any constitutional symptoms noted. Physical exams revealed irregular right hypochondrium mass. No ascites palpable. Most blood investigation was unremarkable except for a raised Alpha fetoprotein of 2920. Imaging studies confirmed a diagnosis of a segment 4B HCC with enlarged portal nodes and left portal vein thrombosis. Despite his Child’s score A, he was deemed inoperable and subjected to chemoembolization. During a subsequent follow up, he developed symptomatic anaemia with hemoglobin level of 6.2 g/dL. He developed multiple episodes of anaemia and Upper GI endoscopy shows a bleeding tumor at first part of duodenum extending to the second. Biopsy revealed as metastatic HCC.

Conclusions: Hepatocellular carcinoma is known to spread via haematogenous, lymphatic or trancoelomic. The usual sites of metastases are lung, regional lymph nodes and bones. Metastases via direct spread are uncommon hence the rarity of metastases to other upper gastrointestinal organs especially small bowel. This presentation imposed a treatment dilemma due to the limited approach to both primary and the metastases lesion.

PPL24-056
BILIARY CYSTADENOMA AND BILIARY CYSTADENOCARCINOMA, A RARE TUMOR

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**Introduction:** Biliary cystadenomas (BCA) or biliary cystadenocarcinoma (BCAC) are rare intrahepatic cystic neoplasms. The clinical feature is not marked but abdominal fullness and mass are the most common symptoms. The tumor is commonly a large multilocular cystic mass which requires hepatectomy for cure. We experienced five cases of BCA and two cases of BCAC.

**Method:** A retrospective review of seven cases of BCA and BCAC who were treated at our department during the last one decade was performed. The clinicopathologic characteristics and surgical treatments are described in detail.

**Results:** Data of 7 patients who underwent hepatectomy for BCA and BCAC was evaluated. Mean age was 57 years and composition of gender was 5 female and 2 male. Abdominal pain was presented in 3 patients, palpable mass in 1 patient and no specific symptom in 3 patients. Before the operation, 6 patients were diagnosed with BCA and 1 patient was diagnosed with simple cyst. Only 2 patients showed an increase of CA 19-9. Three patients underwent right hepatectomy, two performed left lateral sectionectomy, one patient underwent left hepatectomy and the other one patient performed right posterior sectionectomy. There were no postoperative complications and mortality in our series.

**Conclusions:** The treatment of choice for a BCA or BCAC is complete resection. We report seven cases of BCA and BCAC.

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**PPL24-057**

**BENIGN LIVER NEOPLASM. OUR EXPERIENCE IN 101 PATIENTS**

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**Introduction:** Benign liver tumors (solid and non-parasitic cystic) are very common in our setting. The purpose of this study is to evaluate the current tendency to diagnosis and management in our practice.

**Method:** Benign tumors to be discussed include: hyperplasia, adenomas, hamartomas, hemangiomas and non-parasitic cysts. Improvements in diagnosis and management can be defined as: better understanding of the natural history of each type of tumor, modern imaging techniques in assuring a precise diagnosis of tumor nature, and safer liver resections. The difficulty in differentiating an HCA from a well differentiated HCC (by imaging techniques and by biopsies) should be kept in mind.

We will present cases that underwent surgery: Resection (Res.) A tailored therapeutic strategy should be used from a conservative approach for hemangioma and FNH to Res. for HCA.

**Results:** Between 1990 and 2013, we diagnosed benign liver tumors in 101 symptomatic patients in 2 specialized HPB units. 61 of these tumors (35 solid and 26 liquid) were operated (Res.) and 40 are clinically followed (F.Up).

1. Focal Nodular Hyperplasia (FNH) symptomatic and > 10 cm: 5 Res., 7 F.Up in small FNH
2. Hepatocellular adenoma (HCA): 27 Res. and F.Up of 8 asymptomatic with multiple HCA.
3. Solid mesenchymal hamartoma: 1 Res.
4. HEMANGIOMAS: 3 Res. and 15 F.Up
5. Benign liquid
t5.1. simple biliary cysts: type 1: 16 patients: 3 Res. (lobar cysts) and 13 laparoscopic Res. of the dome.
5.2. Polycystosis (PLC): 4 Res.: 3 symptomatic type 2 PLC and 1 type 3 PLC and 10 F.Up

There was no mortality from surgical treatment. Morbidity was 10% (6/61).

**Conclusions:** Close imaging assessment is mandatory due to the natural history of HCA. In some cases, the laparoscopic biopsy with IO frozen in the section study, is the method of choice which leads to an appropriate decision about the tumor nature.

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**PPL24-058**

**ADULT UNDIFFERENTIATED EMBRYONAL SARcoma OF THE LIVER: A CASE REPORT**

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**Introduction:** Undifferentiated embryonal sarcoma of the liver (UESL) is a very rare tumor in adults, with a poor prognosis. Although CT or MRI reveals a large mass, UESL is a potentially treatable tumor. A combination of complete resection, chemotherapy and radiotherapy may prolong the patient’s survival. We report a case of UESL in a 54 year-old man with no prior medical history.

**Method:** The patient was admitted with vague abdominal pain. The physical examination findings were unremarkable and the results of laboratory studies including tumor markers were all within normal ranges. Abdominal CT and MRI showed a 7.5 cm heterogeneous mass associated with a 5 cm hematoma in right lateral side of tumor and hemoperitoneum in right perihepatic, hepatorenal recess, perisplenic space and pelvic cavity. The patient underwent left hepatectomy. After surgery, the patient received two cycles of etoposide+ cisplatin (EP) therapy and an additional radiation therapy to the remnant liver. After the second cycle of EP, the follow-up CT showed 3.5 cm sized right perigastric soft tissue density suggesting tumor recurrence. Subsequently, the soft tissue was excised, and then EP was changed to cyclophosphamide+doxorubicin+ dacarbazine (CAD) therapy. The patient received the sixth cycle of CAD. Follow-up imaging studies including positron emission tomography showed no evidence of recurrence of the disease. He is relatively healthy at 20 months follow-up.

**Results:** The pathology report of left hepatectomy was UESL with rupture and free surgical margin. Immunohistochemical analysis showed that the tumor was diffusely positive for vimentin, desmin, smooth muscle actin and HMB45, but it did not express CK, C-kit, CD31, S-100 protein. Recurred tumor mass was also UESL, but the resection margin was not free of tumor.
Conclusions: Although UESL is an aggressive tumor and the standard therapy is still debating, a combination of complete resection, chemotherapy and radiation therapy may prolong the patient’s survival.

PPL24-059
HOW TO TREAT LIVER METASTASES FROM BREAST CANCER IN SURGICAL ASPECT
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Introduction: Liver resection offers the only chance of cure in metastatic liver tumors. However, Breast cancer liver metastases (BCLM) are generally considered as systemic disease. So, the role of liver resection was limited and controversial for liver metastases of breast cancer.

Method: We retrospectively reviewed 17 consecutive patients who underwent hepatectomy for BCLM between January 2008 and August 2013 at Asan Medical Center, Seoul.

Kaplan–Meier curves were used for the survival analysis and the logrank method used for univariate survival analysis.

Results: The mean age was 49 years. The liver resection was R0 in 13 patients. The disease free survival and overall survivals were 14.2 and 26.1 months. Most recurred event occurred between 6 and 12 months. Only R0 resection (p = 0.021) was associated with better survival outcomes on univariate analysis.

Conclusions: Liver metastases from breast cancer are not an absolute contraindication of hepatectomy. With R0 resection of breast cancer liver metastasis, in a few patients the chance of cure can be obtained. Also, recent advances of surgical technique enabled R0 resection of liver metastased from breast cancer.

PPL24-060
LATE LIVER RECURRENT OF FIBROLAMELLAR HEPATOCELLULAR CARCINOMA 11 YEARS AFTER EXTENDED RIGHT HEPATECTOMY
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Introduction: Fibrolamellar hepatocellular carcinoma (FLC) is a rare histologic variant of hepatocellular carcinoma (HCC), was first described by Edmondson in 1956 and accounts for approximately 5% of HCC cases. The diagnosis is often made incidentally and surgical resection is a curative treatment. Recurrence of FLC has been rarely reported after 10 years.

Method: Case report based on our files and literature review.

Results: We present an unusual case of a 21-year-old male underwent an extended right hepatectomy for a large fibrolamellar hepatocellular carcinoma. After surgery the patient was followed with routine check-up scans performed every 6 months to 5 years, and every 1 year after.

After 11 years returned with obstructive jaundice. CT with liver recurrence and MRI showed extrinsic compression of the biliary tree. Underwent a nonanatomic wedge liver resection. The pathological examination showed the recurrence of fibrolamellar hepatocellular carcinoma in liver with negative margin.

After 6 months showed new obstructive jaundice, the recurrences were located in the liver, lymph nodes subdiaphragmatic and lung metastases. Percutaneous transhepatic biliary drainage was performed. Died 13.37 years after the first surgery.

Conclusions: The late recurrence (more 10 years) of fibrolamellar hepatocellular to the liver carcinoma is highly exceptional but possible. Patients should be followed for more 10 years given that late recurrences often occur.

PPL24-061
SURGICAL TREATMENT OF SCIRRHOUS HEPATOCELLULAR CARCINOMA IN NORMAL LIVER: A CASE REPORT
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Introduction: Scirrhous hepatocellular carcinoma (HCC) is an extremely rare variation of HCC. Most scirrhous HCC lesions occur in patients with viral hepatitis and present as moderately differentiated carcinoma, however clinical characteristics and prognosis of this lesion remain unclear.

Method: We experienced surgical treatment for a scirhous HCC that occurred in a normal liver. Herein, we report the pathological findings of this case and review the relevant medical literature.

Results: (CASE) A 55-year-old woman suffering from abdominal pain referred to our institution. In blood chemistry findings, liver enzyme was elevated Test for hepatitis B and C virus were all negative. And serum AFP level was highly elevated to 350 ng/mL. Abdominal computed tomography (CT) scan and magnetic resonance imaging (MRI) showed solitary mass at the left hepatic lobe, and diagnosed intrahepatic cholangiocarcinoma. We performed left hepatectomy with regional lymph node dissection. A diagnosis of scirrhous HCC was made by pathologic findings. And there was no cirrhosis in the adjacent liver parenchyma. The patient recovered uneventfully and discharged on postoperative day 20. She remains well without recurrence for 4 years after the operation.

Conclusions: We experienced a surgical treatment of scirrhous HCC, the extremely rare sub-type of HCC and achieved good result. Clinicians must pay attention to the possibility of the scirrhous HCC when a hepatic mass with atypical clinical findings is encountered.
PPL24-063

LAPAROSCOPIC RESECTION OF HEPATIC ADENOMA: SINGLE CENTER EXPERIENCE

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Introduction: Laparoscopic resection of benign liver diseases has gained acceptance over conventional approach due to the ability to provide adequate surgical treatment associated to a superior cosmetic result. However, to date there are few studies reporting specifically the results of laparoscopic treatment of hepatocellular adenoma (HA). The aim of this study is to discuss treatment strategy and assess feasibility, safety and outcomes of a series of pure laparoscopic resection (PLLR) for patients with HA.

Method: From a prospective database, patients with hepatocellular adenoma were retrieved. Indications for resection were: lesions larger than 5 cm and selected lesions larger than 3 cm in a favorable anatomic position (anterior or lateral segments).

Results: Thirty eight PLLR were performed in 37 patients between September 2007 and July 2013. Mean age was 34.5 years (28–46) and mean tumor size was 6.4 cm (±3.4 cm). Thirty-four patients had a single lesion, one had two, one had four and two had liver adenomatisos. Mean tumor size was 6.4 cm (±3.4 cm). Three right hepatectomies, 13 lateral segmentectomies and one, six wedge resections, five segmentectomies and 6/7 bisegmentectomy were performed. There were no blood transfusions or conversions. Post-operative complications occurred in two (5.2%) patients. Mean hospital stay was 3.8 days. All patients are alive and after a mean follow-up of 24 months (range 3–42 months), no recurrences were observed.

Conclusions: PLLR is safe and feasible and should be considered as new standard of care for the treatment of HA when performed by surgeons with experience in liver and laparoscopic surgery.

PPL24-064

TRANSARTERIAL RADIO EMBOLISATION – OUR INITIAL EXPERIENCE

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Introduction: Transarterial Radio Embolisation (TARE) is a new transarterial approach to manage large inoperable hepatocellular carcinomas. Emerging evidence suggests that Yttrium-90 internal radiation to tumours is an effective way of tumour control and can be performed even in the setting of portal vein thrombosis as this is not embolic like chemoembolisation. We review our initial experience in a single centre.

Method: In this retrospective study we reviewed all our patients who underwent TARE between March 2010 and March 2013.

Results: A total of 18 patients (M-17, Female-1) had 19 TARE procedures performed during this period with age ranging from 28 to 69 years. Fourteen patients were in Childs A and 4 in Childs B. Sixteen patients had portal vein thrombosis (Main-11, Right alone-4, Left alone-1). Twelve patients had bilobar disease and 6 had unilobar disease. The lung Shunt fraction was <10% in 11 patients and 10–20% in 8.

A mean dose of 1.97 GBq was used. None had any immediate adverse effects. Follow up data was available in 17/18 patients. Ten patients expired, with a mean survival of 6.2 months ranging from 2 to 16 months. Seven patients are alive (range from 1 to 11 months) with an overall survival of 6 months. Seven out of 10 patients who died had main portal vein thrombosis and had mean survival of only 3.7 months.

Conclusions: The results of patients with HCC treated with TARE had reasonable survival benefits and provided good palliation. Patient selection is of paramount importance for achieving good results.

PPL24-065

POSTOPERATIVE LACTATE CLEARANCE AFTER EXTENDED HEPATECTOMIES: IS IT WORTHY?

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Introduction: Postoperative plasma lactate clearance has been established as an important prognostic factor for extended hepatectomy (EH) morbidity and mortality.

Method: In this single center retrospective study, a full revision of 45 medical records was performed from patients who underwent EH from 1999 to 2013. Postoperative lactate clearance (ALAC) was defined as lactate at postoperative day 5 minus lactate at ICU presentation (hour 0). ALAC was analyzed in relation to total hospital stay and 90 days’ perioperative morbidity and mortality, using Clavien-Dindo classification, and by presence or absence of previous portal vein embolization (PVE).

Results: Forty-one right and 4 left EH were performed. From these, 17 underwent previous PVE with a mean of 44 ± 29 days-to-surgery time and a 24 ± 8% degree of hypertrophy. In 39 cases (87%) a malignant etiology was the indication for EH. Surgery length was 486 ± 122 minutes with a median of 300 mL of blood
transfusion. In 25 patients a Clavien grade IIIa or worse complication has been experienced, and in 3 cases the death occurred during the first 3 months after EH. The median length of hospitalization was 11 days. In patients with preoperative PVE a significative association with an early post-resectional lactate clearance was achieved (p = 0.01). Conversely, the univariate analysis did not show any significative associations between ΔLAC and a median time of hospital stay major of 11 days (p = 0.08), or the onset of any complications (p = 0.67) and of a Clavien’s grade of complications ≥IIIa patients (p = 0.48). After adjusting for co-variables, results of the multivariate logistic regression analyses confirmed that ΔLAC is not independent or significant predictor for initial poor liver function following EH.

Conclusions: The postoperative lactate clearance has not been served as a prompt and accurate bedside predictor of severe complication after EH. In light of this experience, the early lactate clearance could have a clinical utility in the ICU statement, but in our facility was dramatically reduced during the daily hospital stay after EH.

**PPL24-066**

**A CASE OF HEPATIC BILOMA AFTER LAPAROSCOPIC PARTIAL HEPATIC RESECTION FOR HEPATOCELLULAR CARCINOMA USING MICROWAVE PRE-COAGULATION TECHNIQUE**

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**Introduction:** In a laparoscopic hepatectomy, to control bleeding from liver parenchyma is important. Microwave pre-coagulation technique is effective to achieve good hemostasis during hepatic resection. On the other hand, there is a danger of causing bile leakage and bile duct strangulement by the biliary damage after microwave coagulation.

**Method:** We report a case of hepatic biloma after laparoscopic partial hepatic resection for hepatocellular carcinoma using microwave pre-coagulation technique.

**Results:** A 73-year-old male was monitored for alcoholic liver cirrhosis. During follow-up, an abdominal CT identified a HCC 20-mm in diameter in S5 of the liver. Laparoscopic partial resection of the liver S5 using microwave pre-coagulation technique was performed. Blood loss was 20 mL. Seven months after the procedure, an abdominal CT revealed recurrence of the liver S5. Laparoscopic partial resection of the liver S5 was performed again. Then, biloma formation was observed. The patient was discharged on the 16th post op day.

**Conclusions:** Pre-coagulation method by microwave coagulation for laparoscopic hepatectomy represents a feasible technique with good control of bleeding. However, several reports have demonstrated that the bile leakage occurred more frequently in patients with hepatectomy using microwave pre-coagulation technique. Therefore, it is concluded that adequate use of microwave pre-coagulation technique recommended for laparoscopic hepatectomy.

**PPL24-067**

**THE AQUAMANTYS® SYSTEM AS ALTERNATIVE FOR PARENCHYMAL DIVISION AND HEMOSTASIS IN LIVER RESECTION: A CLINICAL FEASIBILITY STUDY**

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**Introduction:** The objective of this study was to evaluate the clinical feasibility of a new technique for liver resection based on a bipolar sealing device (Aquamantys®) that has shown high performance in the animal setting in both parenchymal ablation and tissue necrosis.

**Method:** Fifteen patients with colorectal hepatic metastasis and twelve cirrhotic patients with hepatocellular carcinoma underwent partial hepatectomies using the proposed technique for both parenchyma division and hemostasis. Main outcome measures were blood loss per transection area and transection speed, and post-operative morbidity (biliary leakage, hemoperitoneum, liver abscesses, etc).

**Results:** Twelve monosegmentectomies, eight bisegmentectomies and seven atypical resections were performed. No blood transfusion was required both intra-operatively and post-operatively. No mortality was observed. One biliary leakage occurred post-operatively and was treated conservatively. One liver abscess after 6–7 bisegmentectomies occurred and was successfully treated by ultrasound-guided drainage. The median blood loss per transection area 0.8 mL/cm² (range 0.1–1.9 mL/cm²). Mean post-operative stay was 6 days (range 5–16 days). No statistically significant differences were found comparing resections in normal liver (secondary tumors) and cirrhotic liver.

**Conclusions:** The proposed bipolar sealing device was shown to be safe and to achieve effective parenchymal division and hemostasis, resulting in reduced blood loss. Comparative trials are needed to confirm our preliminary results.

**PPL24-068**

**“MAXIMAL DIAMETER NOT <3 CM” AND “THREE OR MORE METASTASES” AS A NEW INDICATION OF PREOPERATIVE CHEMOTHERAPY FOR RESECTABLE LIVER METASTASES**

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**Introduction:** Induction chemotherapy against unresectable colorectal liver metastases (CRLM) has been widely conducted. However, the role of preoperative
chemotherapy for initially resectable CRLM is still controversial. We retrospectively examined the utility of preoperative chemotherapy for CRLM in our hospital.

**Method:** Sixty-three consecutive cases of initially resectable liver only colorectal metastases from 2000 to 2013 were evaluated. Twenty cases received preoperative doublet chemotherapy which consisted of oxaliplatin or irinotecan and fluorouracil (N group) and 43 cases underwent hepatectomy without preoperative oxaliplatin or irinotecan (S group). The demographic of the two groups were similar, and most of the patients received fluorouracil based postoperative chemotherapy. We compared progression free survival after hepatectomy (PFS) and overall survival between the two groups.

**Results:** PFS curves of the N and S group completely overlapped. The overall survival curve of N group showed tendency to be longer than that of S group with no statistical significance. For further investigation, according to age, synchronous metastases or metachronous, lymph node involvement of the primary, the number of the metastases, the size of the largest tumor, surgical margin, we divided 63 cases into two subpopulations, and compared between PFS of N group and that of S group within each subpopulations. Among those subpopulations, PFS of N group was shorter in the patients with <3 metastases or maximum tumor size <3 cm, as compared to that of S group. On the contrary, N group showed better PFS than S group when the number of the tumor was three or more and the maximum size not <3 cm. Other factors did not show significant difference in relation to the preoperative chemotherapy.

**Conclusions:** We propose “maximal diameter not <3 cm” and “three or more metastases” as a new indication of preoperative chemotherapy for resectable liver metastases.

**PPL24-069**

**13 YEARS’ EXPERIENCE OF SURGICAL MANAGEMENT AFTER EXTENDED HEPATECTOMY IN A SOUTHERN ITALIAN REFERRAL CENTER**

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**Introduction:** Extended liver resection implies a radical procedure invariably carrying high rates of postoperative morbidity and mortality. The aim of this study is to perform a full revision of 45 patients submitted to extended hepatectomy (EH), trisectionectomy according to Birsbane 2000 classification.

**Method:** We examined demographics, preoperative portal vein embolization (PVE), operative factors, and early post-operative complications for procedures, focusing on the results of patients who underwent EH from 1999 to 2005 (P1) and from 2006 to 2013 (P2).

**Results:** The most common cause for EH was colorectal liver metastasis (CRLM). Forty-one right and 4 left EH were performed. From these, 17 underwent previous PVE with a mean of 44 ± 29 days-to-surgery time and a 24 ± 8% degree of hypertrophy. Surgery length was 486 ± 122 minutes with a median of 300 (0–3900) mL of blood transfusion. Histological findings: 39(87%) malignant etiologies, size of largest tumor 7.4 ± 4.2 cm, 15 (42%) positive margins (10 CRLM), 20 (56%) vascular invasions and 9 (25%) perineural. Ninety days’ morbidity and mortality was seen in 32 (72%) and 3 (7%) patients, respectively. Most common complications were: 16 right pleural effusions (35%), 11 intra-abdominal collections (24%) and 11 biliary leakages (24%). Mean hospital stay was 18 (5–107) days, depending on Clavien’s grade of complications [≥IIIa 25 ± 24.6 vs <IIIa 10.4 ± 5.6, p = 0.01]. Comparing periods (P1 vs P2) we found an important increase in the number of PVE (p = 0.056), negative margins (p = 0.007), and hospital stay (p = 0.008), and a decrease in the need for blood transfusion (p = 0.04). These variables analyzed in terms of complications showed that not having PVE was significantly associated with having any complication (p = 0.003).

**Conclusions:** The increase in performing PVE in selected patients and the lack of association between short-term complications and positive margins especially on colorectal liver metastasis, suggest to strongly consider this surgical option to expand selection criteria and clinical management in these groups of patients.

**PPL24-070**

**ISOLATED HEPATIC TUBERCULOSIS MIMICKING METASTATIC DISEASE**

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**Introduction:** Liver metastasis from carcinoma breast currently represents a relative contraindication for liver resection. We present the case of a patient who presented with liver lesions consistent with metastasis, 7 years following treatment of carcinoma breast and report the pathologic surprise encountered after resection of liver tumour.

**Method:** We have reviewed the case record of this patient to present the pertinent facts.

**Results:** A 4-year-old woman presented to us with diagnosis of liver tumour with high standard uptake value (SUV) on PET-CT, 5 years following modified
radical mastectomy and postoperative adjuvant chemo radiotherapy for carcinoma of left breast (T2N0M0). She was asymptomatic. Past history was remarkable for total hip replacement for fibrous dysplasia of right hip 5 years ago and right upper pole nephrectomy for cystic disease 7 years ago. Clinical examination was unremarkable. CT scan abdomen showed hypodense lesions in segment 6 and segment 8 of liver of size 1.5 cm. Whole body PET-CT did not show any other evidence of disease. Diagnosis of isolated liver metastasis from carcinoma breast was made in view of history and PET-CT findings. Biopsy was not considered as there would be risk of tumour spillage and diagnosis was considered fairly straightforward, given the clinical situation. Diagnostic laparoscopy followed by right hepatectomy was performed uneventfully. Cut surface of the specimen showed multiple subcentimeter, pearly white lesions which were firm to hard in consistency. Biopsy of the lesion was reported as multiple caseating granulomas, diagnostic of tuberculosis. She has been started on antituberculous therapy.

**Conclusions:** Tuberculosis of liver is known to be PET avid. Offering liver resection in this clinical scenario seemed appropriate as opposed to preoperative fine needle aspiration cytology of the lesion. Latter would risk dissemination, in case these lesions were breast carcinoma metastasis.

**PPL24-071**

**LIVER PARTITION AND PORTAL VEIN LIGATION (ALPPS) FOR THE TREATMENT OF A LARGE PERIPHERAL CHOLANGIOCARCINOMA. A GOOD INDICATION FOR AN INNOVATIVE PROCEDURE**

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**Introduction:** In the last year there has been a huge debate between liver surgeons about an innovative procedure proposed in Germany by Lange et al and popularized by Santibanes and colleagues: in situ liver partition associated to selective portal vein ligation (ALPPS) that was proposed for the treatment of patients with large amount of liver tumors and an expected small liver remnant, allowing its feasibility and avoiding postoperative liver failure.

**Method:** We present a case of a 58 year-old male with an 11 cm peripheric cholangiocarcinoma on segments 4, 7 and 8 invading the right and middle hepatic veins and very close to the left hepatic vein. An extended right hepatectomy was indicated however, liver volumetry showed that segments 1, 2 and 3 represented 22% of the entire liver volume.

**Results:** Preoperative portal vein embolization was necessary however, authors feared that during waiting time for liver hypertrophy, the lesion could grow and become unressectable; decision was made for an ALPPS. During the procedure the right branch of the portal vein and segment 4 pedicle were ligated; the liver was sectioned at the level of the falciform ligament. After 6 days a CT volumetry showed a 49% increase. At the 7th postoperative day, the second step of the operation was performed (extended right hepatectomy). Patient outcome was uneventful with hospital discharge at the 12th postoperative day.

**Conclusions:** Our group has performed 7 cases of ALPPS: 6 for colorectal cancer liver metastasis and the present case; All procedures were indicated for fit young patients (<60 years) and the second step was always performed within 8 days from the first one. Mean liver growth was 48%. Postoperative morbidity was 42% and all patients had a good outcome with no mortality. Despite a subject of debate, ALPPS is a useful tool for selected patients with liver tumors.

**PPL24-072**

**MACROSCOPIC CLASSIFICATION OF PVTT AND BACK FLOW THROMBECTOMY FOR THE TREATMENT OF ADVANCED HCC WITH VP4 PVTT**

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**Introduction:** To improve the prognosis of HCC patients with PVTT, development of less invasive, simple and effective thrombectomy technique for deeply sitting PVTT is imperative. To this purpose, we have proposed new macroscopic classification of PVTT which has a high degree of availability for thrombectomy and have developed the new thrombectomy technique based on this classification. The objective of this study was to evaluate the efficacy of the new thrombectomy technique which is referred as the “Back flow thrombectomy (BFT) technique,” and show the treatment results of liver resection for HCC with contralateral deeply sitting PVTT.

**Method:** Until the end of 2011, 43 multiple bilobular HCC patients with VP4 were performed reductive hepatectomy with tumor thrombectomy. In 22 of 43 patients, BFT were used. Sixteen of 23 patients had PVTT in the contralateral second portal branch. Seventeen of 43 patients were not performed. Percutaneous Isolated Hepatic Perfusion (PIHP) as adjuvant chemotherapy because of either economical reason, extrahepatic metastases, tumor progression, hepatic dysfunction or infectious complications.

**Results:** Patency rates of portal vein at thrombectomy site of all (43)/BFT (22) 3 and 6 months after hepatectomy were 92%/90% and 87%/86%, respectively. The median OS of all 43 patients was 14 months and the 1 and 3-year OS rate was 55.5% and 19.1% respectively. In 26 patients who could undergo PIHP as second treatment, the median OS was 17 months and the 1 and 3-year OS rate was 69.2% and 23.1% respectively.

**Conclusions:** Tumor thrombectomy by BFT achieved high patency rate of portal vein 6 months after hepatectomy and expands therapeutic window for adjuvant chemotherapy for patients with multiple bilobular HCC.
and Vp4 PVTT who were previously untreated. An impressively increased survival rate achieved by additional PIHP in this setting advocates surgical multidisciplinary approach for multiple bilobular HCC with Vp4 PVTT.

PPL24-073

LAPAROSCOPIC LIVER RESECTION FOR COLORECTAL LIVER METASTASES: A SINGLE CENTER ANALYSIS OF 101 CONSECUTIVE CASES

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Introduction: Laparoscopic liver resection for colorectal liver metastases (CRLM) remains limited to a relatively small number of institutions. Recently, the operative results have been reported to be comparable with open laparotomy, however its long term outcomes have been reported in few series. The aim of this study was to assess the operative results and the long term outcomes of laparoscopic hepatectomy (LH) for CRLM in a single institution.

Method: At Iwate Medical University Hospital first LH for CRLM was performed in 1998, and consecutive 101 patients underwent LH for CRLM. The operative results, the oncological factor, the overall survival rate, and the recurrence free survival rate were analyzed.

Results: The median (range) operative time was 228 (70–591) minutes, the blood loss was 116 (3–1567) mL, the hospital stay was 9 (4–256) days, the morbidity (Clavien-Dindo classification ≥II) was 13.9%, and the mortality was 1%. Overall survival and the disease free survival rate were 93.8 and 68.1% at 1 year, 66.7 and 32 months, respectively.

Conclusions: Laparoscopic hepatectomy for CRLM was feasible in terms of not only the operative results but also the oncological outcomes.

PPL24-074

CRYOABLATION IN PATIENTS WITH UNRESECTABLE LIVER AND PANCREATIC TUMORS

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Introduction: Results of the treatment of patients with locally advanced liver and pancreatic tumors are poor. We analysed results of cryoablation in patients with unresectable colorectal liver metastases (CLM) and pancreatic head cancer.

Method: Since 2007, cryoablation was performed in 60 pts. (24 pts – for colorectal liver metastases and 36 – for pancreatic head cancer). Mean age was 54 ± 3 years. Size of lesions in the liver ranged from 1.5 to 9 cm, the number of lesions – from 1 to 10 (4 ± 3). Size of lesions in the pancreas ranged from 2.5 to 10 cm in length. Time of cryoablation ranged from 2 to 5 minutes at T° from −175 to −186°C. All of patients had adjuvant chemotherapy, 5 pts with CLM (20.8%) postoperatively have got transarterial chemoembolization.

Results: There was no postoperative mortality and postoperative morbidity was low. Long-term results of cryoablation were studied in 20 patients with CLM and 28 patients with cancer of pancreatic head.


Conclusions: Cryoablation in patients with unresectable colorectal liver metastases and pancreatic cancer in combination with chemotherapy increases survival rate to some extent. The perspectives of further improvement in the treatment of unresectable pancreatic cancer and metastatic liver tumors connected with multidisciplinary approach including systemic and regional chemotherapy, target and biology therapy in combination with one of the method of locoregional therapy.

PPL24-075

CLINICOPATHOLOGICAL STUDY OF INTRADUCTAL PAPILLARY NEOPLASMS OF THE BILE DUCT (IPNB) – REPORT OF FOUR CASES-

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Introduction: Intraductal papillary neoplasms of the bile duct (IPNB) was introduced as a precancerous and early neoplastic lesion by WHO 2010 tumor classification of digestive system. We clinicopathologically studied four resected cases of IPNB.

Method: Among 320 patients of primary liver cancer who underwent liver resection at Hyogo College of Medicine between 2008 and 2012, four patients were diagnosed as IPNB on the basis of pathological histology. We immunohistochemically evaluated the expression of Cytolelatin (CK)7, CK19, CK20, Ki-67, P53, PAS-Alcian blue. Mucin immunohistochemistry was also performed for mucin core protein MUC1, MUC2, MUC5AC and MUC6. Epithelial types such as intestinal, gastric, pancreatobiliary, and oncocytic type were determined by morphology and mucin core protein staining.

Results: In four patients (two males and two females), all cases were diagnosed as biliary cancer (intrahepatic cholangiocarcinoma or bile duct cancer) before operation. All cases were negative both HCV-Ab and HBs-Ag. Serum levels of CA19-9 elevated in two cases. Median tumor diameter was 3 cm (range 2.2–17.0 cm). Three patients were undertaken left hemihepatectomy.
and one of three was undertaken bile duct reconstruction, and one was undertaken right hemihepatectomy. Histologically, tumor showed an intraluminal, growing papillary tumor covered by neoplastic biliary epithelial cells, three of four were pancreaticobiliary type and one was intestinal type. Immunohistochemically, all cases were positive for CK7, PAS-Alician blue. Invasive IPNB cases were based on MUC1 expression, and MUC2 expression was detected in intestinal type tumor. MUC5AC was expressed by all cases.

**Conclusions:** IPNB have been proposed as the biliary counterpart of intraductal papillary mucinous neoplasms of the pancreas. More detailed morphologic and molecular studies are necessary to clarify the clinico-pathological features of IPNB.

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**PPL24-076**

**ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY-OUR INITIAL EXPERIENCE**

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**Introduction:** Associating liver partition and portal vein ligation for staged hepatectomy (ALPPS) has been proposed recently as one of the techniques to prevent liver failure in patients undergoing major hepatectomy with small future liver remnant (FLR). It has been proposed that it is more effective & quicker than portal vein embolisation (PVE) to induce hypertrophy of FLR. We review our experience with this new procedure in our first 3 patients.

**Method:** Our first three consecutive patients undergoing ALPPS between January 2013 and June 2013 were reviewed. Due to insufficient FLR all the three patients were deemed inoperable. All of them had either primary or secondary tumours of liver.

**Results:** Three patients (2 male and 1 Female) with age 33, 36 and 66 years respectively were operated during this period. Indications were hepatocellular carcinoma in two and metastasis secondary to GIST in one. Extended hepatectomy was required in all 3 patients but their FLR was under 20%. They all had normal liver function tests before the surgery except one who had high bilirubin for which he had percutaneous transhepatic biliary drainage of the contralateral liver. Time interval between the two stages was 16, 18 and 34 days respectively. There was an increase of 74%, 64% and 60% in the FLR 2 weeks from the time of first stage of ALPPS. One patient died due to liver failure and sep-
sis, 3 weeks after the second stage of ALPPS despite having adequate liver volume. One patient had encephalopathy and bile leak but recovered well. The patient who waited for 34 days did not have any complications at all.

**Conclusions:** ALPPS is a feasible option in patients with small future liver remnant. But caution is required in selecting patients for the same as it carries high complication rate.

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**PPL24-077**

**APPROPRIATE TREATMENT STRATEGIES IMPROVE SURVIVAL FOR PATIENTS WITH HEPATOCELLULAR CARCINOMA NO LARGER THAN 10 CM AND PORTAL VEIN TUMOR THROMBUS**

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**Introduction:** Portal vein tumor thrombus appears to be the terminal stage of HCC. PVTT was considered as a contraindication to hepatic resection. However, hepatic resection, TACE, and hepatic resection associated with postoperative TACE have been reported to achieve longer survival periods. Our study aims at comparing the survival periods after different treatment strategies.

**Method:** Three hundred and thirty-eight patients were divided into four groups and underwent different treatments: (1) conservative treatment group (75); immunotherapy combined with nutritional therapy was prescribed, (2) chemotherapy group (86); (3) hepatic resection group (90): tumors and PVTT were resected; and (4) hepatic resection combined with postoperative TACE group (57). All patients were followed until death or June 30, 2012, or until death. Survival rate and differences among groups were analyzed.

**Results:** The survival rates at 1-, 2-, and 3-year in the group IV were 49%, 37% and 19%, which were significantly higher than the other three groups. The 1-, 2-, and 3-year in the group III were 28%, 20%, 15% and 17.5%, 0%, 0% in the group II, which were significant higher after surgical resection than TACE. The 1-, 2-, and 3-year survival rates in the group I were all 0%. Mean postoperative survival period in the first branch or above was significantly longer than that of the other two groups. The survival period of patients received postoperative TACE > 3 (21.6 ± 4.1 months) was longer than those who didn’t receive postoperative TACE (15.1 ± 2.4 months) and just 1–2 cycles (8.2 ± 1.3 months) (p < 0.0001).

**Conclusions:** Surgical resection is the most effective therapeutic strategy. Postoperative TACE is necessary in preventing recurrence and prolonging survival period. TACE should be recommended for unresectable HCC.
PPL24-078

GROWING RATE OF PORTAL VEIN TUMOR THROMBUS IN PATIENTS WITH HEPATOCELLULAR CARCINOMA AND ITS CLINICAL IMPLICATIONS

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Introduction: Portal vein tumor thrombus (PVTT) represents the most significant factors for a dismal prognosis in patients with hepatocellular carcinoma (HCC). When the portal trunk is completely obstructed with PVTT, a life-threatening sequence of events such as massive ascites, variceal hemorrhage, and hepatic failure ensues and frequently precludes surgical intervention. This study was undertaken to elucidate the growing rate of PVTT to determine the timing of surgical intervention for patients with PVTT.

Method: This study included 64 HCC patients with PVTT (56 males, 8 females). Hepatitis B virus was positive in 22, hepatitis C virus positive in 37. The extent of PVTT was serially determined in each patient by image studies including computed tomography, magnetic resonance imaging, ultrasonography, and digital subtraction angiography. Based on these data, the growth rate of PVTT was estimated according to the site of PVTT.

Results: When the tip was in the second order branch, PVTT reached the first order branch of the ipsilateral portal branch with a mean time period of 60 ± 12 days (mean ± SE). In contrast, once PVTT reached the contralateral portal vein, its growth rate from the first to second order branch significantly increased to 20 ± 4 days compared with the ipsilateral side (p < 0.05). The growth rate of PVTT from the first order branch to the portal trunk and from the portal trunk to the opposite first order branch were 38 ± 8 and 11 ± 4 days, respectively, showing a significant increase after reaching the contralateral portal vein (p < 0.05).

Conclusions: These data indicates that PVTT rapidly obstructs the bilateral portal veins once it reaches the portal trunk. Thus we recommend a semi-emergent surgical resection for those patients with PVTT in the portal trunk when liver function allows a planned hepatectomy.

PPL24-079

A COMPARING OF SIMULTANEOUS VERSUS STAGED MAJOR LIVER RESECTION FOR COLORECTAL CANCER LIVER METASTASES

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Introduction: The optimal surgical strategy in colorectal cancer liver metastases (CRLM) remains still controversial. Several centers are recommend staged operation because high rate of complications, longer operation time and delayed hospitalization in simultaneous major liver resection (MLR) group. The aim of this study was to compare of outcomes between simultaneous and staged MLR to CRLM.

Method: From June 2003 to September 2012, 80 patients underwent MLR for CRLM. 44 patients underwent simultaneous hepectomy and colorectal surgery, and 36 patients underwent staged hepectomy. Clinicopathologic, operative, and perioperative data and complications were evaluated.

Results: All patient and tumor characteristics are similar in both group. The simultaneous group had a longer rate of operation time (437 ± 136 minutes vs 336 ± 111 minutes, p = 0.001). Estimated blood loss (836.3 ± 836.5 mL vs 739.4 ± 520.7 mL, p = 0.547), transfusion rate (34% vs 27%, p = 0.631) and hospitalization (15.7 ± 10.2 days vs 13.9 ± 5.7 days, p = 0.692) were not significant difference in both group. Mortality (one patient in simultaneous group), morbidity (30% vs 25%, p = 0.802), and colonic movement normalization rates were similar in the two groups. Considering both surgical procedures (colorectal, p = 0.529 + liver resection, p = 0.626), there was no significant difference between two group.

Conclusions: MLR can be feasibly and safely performed in selected patients at CRLM with similar perioperative outcomes and morbidities.

PPL24-080

LIVER ABSCESS INFILTRATE THORACIC CAVITY WITH THROMBUS INFERIOR VENA CAVA

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Introduction: Liver abscesses infiltrate thoracic cavity caused by amebiasis, in 13–15% of cases. A few cases, lung abscesses was caused by penetration of the liver abscess. In such cases, treated by surgical or percutaneous transpleural drainage at the first. However, in the present case, surgical or percutaneous drainage had high risks because of thrombus in the Inferior vena cava. Ameoba liver abscess merges a vascular complication of hepatic veins and inferior vena cava thrombosis. We administered antibiotics and heparization for thrombus, not surgical or percutaneous drainage, at the first.

Method: A 59-year-old man was admitted to our hospital because of bloody phlegm and cough. Chest and abdominal computed tomography scan revealed abscess infiltrated at the right diagram between the liver and lung, and thrombus in the Inferior vena cava. Endamoeba histolytica antibody was positive. These findings diagnosed liver abscess infiltrate thoracic cavity with thrombus Inferior vena cava.

Results: As a result, inflammation was improved in laboratory examination, and liver and lung abscesses were reduced on CT images. Antibiotics were obtained the similar percutaneous drainage.

Conclusions: This is a first report of the liver abscess infiltrate thoracic cavity with thrombus Inferior vena cava.
PPL24-081

FAVORABLE OUTCOMES OF COMPLETE SURGICAL RESECTION FOR HEPATOCELLULAR CARCINOMA WITH MAJOR PORTAL VEIN OR HEPATIC VEIN TUMOR THROMBUS

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Introduction: The presence of tumor thrombus in portal vein or hepatic vein in patient with hepatocellular carcinoma (HCC), is one of the most poor prognostic factor. The role of complete liver resection is still controversial for this advanced stage tumor.

Method: Medical records of 268 patients who underwent liver resection for HCC between January 2005 and December 2012 were retrospectively reviewed. Thirteen (4.8%) of these patients had pathological confirmed tumor thrombus of major portal vein or hepatic vein. The perioperative and long-term outcomes were evaluated.

Results: Among 13 patients, preoperative transarterial chemoembolization (TACE) was performed in 10 patients. None of them had tumor progression. All patients underwent major hepatectomy with tumor thrombectomy. Ten patients had complete microscopic surgical resection. Perioperative morbidity was 23%, but without mortality. Median survival was 30 months (mean follow-up 38 months). The 1- and 3-year overall survival rate were 92% and 76%. The 1- and 3-year disease free survival rate were 56% and 39%. Eight patients had recurrent tumor either intrahepatic or extrahepatic recurrence, 7 patients underwent early treatment of the recurrence by TACE, radiofrequency ablation or surgical resection.

Conclusions: Complete surgical resection of HCC with tumor thrombus, in combination of careful patient selection, closed postoperative follow up and early treatment of the recurrent tumor are associated with favorable survival rate.

PPL24-082

PRIMARY HEPATIC NEUROENDOCRINE TUMOR: A CASE SERIES

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Introduction: Primary neuroendocrine tumor (NET) of the liver is a very rare neoplasm. Hence it is difficult to make a proper diagnosis, which requires strict exclusion of possible extrahepatic primary sites. Meticulous work up is necessary to rule out an occult extrahepatic malignancy with hepatic metastasis to confirm the primary nature of hepatic carcinoids. Besides it is important to distinguish it from other liver neoplasm’s. The mainstay of treatment is curative liver resection. We present a case series of three patient of primary neuroendocrine tumor of liver.

Method: Of the three patients, two were operated and one treated conservatively.

Results: Of the two operated both are alive after 3 years, with one having recurrence. The patient who was conserved died at the end of 2 years.

Conclusions: Though Neuroendocrine tumors involving the liver are common, primary hepatic neuroendocrine tumours are rare. To qualify it as a primary hepatic tumour, it requires extensive work up. It has an inherent malignant potential that must be recognized. Management remains surgical resection, with several alternative options available for non-resectable tumours and severe symptoms.

PPL24-083

CHOLEDACHAL CYSTS IN ADULTS AND THEIR COMPLICATIONS

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Introduction: Despite choledochal cysts being common in children, an increasing number of patients present with ongoing symptoms in adult life. The aim of this study was to review the management of adult patients with choledochal cysts in a tertiary referral centre.

Method: The records of 31 patients with choledochal cysts presented to us between 2009 and November 2012 maintained as a prospective database were analyzed for demography, clinical presentation, radiological investigation, management, and outcome.

Results: There were 9 males. Based on preoperative cholangiogram and operative findings 19 (61.2%) patients had Type I and 8 (25.8%) Type IV A cysts. 3 patients had Type III and 1 patient had Type II cyst. The presenting complaints was cystolithiasis in 16 (51.6%) patients followed by cholangitis 9 (29.03%), acute pancreatitis 2 (6.45%), hepatolithiasis, malignancy, portal hypertension and chronic pancreatitis 1 patient each. One patient had H/O having undergone surgery for cyst in childhood, with recurrence again with cystolithiasis. Acute pancreatitis and cholangitis were managed conservatively. Endoscopic stenting was performed in patients with cholangitis and those requiring staged treatment as a result of portal hypertension. Overall 30 patients underwent cyst excision with Roux-en-Y hepaticojejunostomy and 1 patient of malignancy subjected to Whipple surgery. The overall morbidity was 16.12 per cent, wound infection 12.9% (4 patients) and bilio-enteric anastomotic leak 1 patient.

Conclusions: Choledochal cysts in adults are not uncommon. Acute pancreatitis, cholangitis and portal hypertension are managed conservatively and then followed up by definitive surgery. Cyst excision with Roux-en-Y hepaticojejunostomy is necessary to prevent the recurrence of complications. Patients with previous inadequate cyst excisional procedures should undergo
and adjust the oncological therapy.

PPL24-084
ALPPS: PROLONGATION OF “SPLIT TO RESECTION INTERVAL” ALLOWED FOR ADJUSTMENT OF TREATMENT STRATEGY IN 30% OF CASES
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Introduction: Right portal vein occlusion plus «in situ split» is a new method to induce hypertrophy of the functional remnant volume (FRV) for two-stage liver resection in 7–9 days. However, a simultaneous growth induction of preexisting hepatic micrometastases has been reported. For this reason a certain percentage of patients might not have an oncological benefit from this procedure. Though, the optimal interval between split and resection remains unclear. Therefore, in the current trial the split to resection interval was prolonged and the effect on the therapeutic strategy analyzed.

Method: Nine patients (4 male 5 female, age 40–76 years) underwent split liver resection for metastatic bilateral liver tumors. The number of metastases varied between 4 and 13. The mean interval from split and to second step liver resection was 48 days.

Results: After the prolonged interval right or extended right hemi-hepatectomy was carried out as planned initially during split resection in 66% of patients. In one case a new metastases was diagnosed in segment 1 and a right hemi-hepatectomy plus additional segment 1 resection was performed. The patient is free of metastatic recurrence 24 months after liver resection. In two patients diffuse metastatic liver disease occurred in the FRV during the prolonged interval. In those the oncological strategy was changed and patients transferred to palliative chemotherapy. Neither the split-resection-plane nor adhesions posed a major intraoperative problem. The postoperative morbidity after the prolonged interval was not increased.

Conclusions: Prolongation of the split-to-resection interval changed the therapeutic strategy significantly in 30% of patients. However, it was not associated with a higher surgical morbidity. We suggest that a longer split-to-resection interval can be used as a diagnostic tool to identify preexisting yet undiagnosed metastasis and adjust the oncological therapy.

PPL24-085
LAPAROSCOPIC SURGERY FOR TREATING RECURRENT HEPATOCELLULAR CARCINOMA
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Introduction: Repeat hepatectomy has been demonstrated to be effective in treating recurrent hepatocellular carcinoma (HCC). However, because the indications for repeat hepatectomy depend on the type of recurrence and residual hepatic functional reserve, the procedure is only suitable for a limited number of patients, and other treatments are often selected. We discuss our clinical experience with laparoscopic surgery for recurrent HCC and report our analysis of its effectiveness.

Method: Seventy-four of 178 HCC patients underwent laparoscopic surgery in 2002–2012; 25 were treated for recurrent HCC. The characteristics and postoperative outcomes of these 25 patients were retrospectively investigated.

Results: The mean interval from first-line treatment to laparoscopic surgery for recurrent HCC was 53.3 months. Fifteen patients underwent laparoscopic hepatectomy, 1 underwent laparoscopic radiofrequency ablation, 8 underwent resection of an extrahepatic metastatic tumor, and 1 patient received diagnostic assessment. Fourteen of the 24 patients who underwent laparoscopic surgery had a repeat recurrence after surgery; however, none of these were stump or port-site recurrences. The survival rates at 1 and 2 years were 75.6% and 44.0%, respectively. The average of overall survival month was significantly higher in patients with intrahepatic recurrence than in those with extrahepatic recurrence (38.2 months vs 19.1 months; p = 0.046). In addition, the average of disease-free survival month was longer in patients with intrahepatic recurrence, although not significantly so (19.0 months vs 10.6 months, p = 0.19).

Conclusions: Laparoscopic surgery appears to be an effective, minimally invasive option for the diagnosis and treatment of both intrahepatic recurrence and extrahepatic recurrent HCC.

PPL24-086
LIVER TRANSPLANTATION IN ALCOHOLIC LIVER DISEASE
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Introduction: The primary effective strategy for patients with alcoholic liver disease (ALD) is total alcohol abstinence. When total alcohol abstinence does not result in nence. Although the mean of disease-free survival month was longer in patients with intrahepatic recurrence, although not significantly so (19.0 months vs 16.0 months, p = 0.19).

Conclusions: Laparoscopic surgery appears to be an effective, minimally invasive option for the diagnosis and treatment of both intrahepatic recurrence and extrahepatic recurrent HCC.

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and duration, history of psychiatric consultation, and type of LT (LDLT vs DDLT) also showed no statistical significance. The role of 6 months abstinence was not clear in patients survivals (p = 0.064).

**Conclusions:** Liver transplantation for acute alcoholic hepatitis has good prognosis and should not be banned for LTLDLT can be applied for alcoholic liver disease with similar survival as DDLT. A flexible approach to “6 months rule” should be applied. A multidisciplinary support for alcoholic patients is warranted.

**PPL24-087**

RIGHT HEPATECTOMY AND CAVOPLasty USING THE GREATER SAPHENOUS VEIN WITH THORACOABDOMINAL AND ANTERIOR APPROACH FOR HUGE HEPATOCELluLAR CARCINOMA WITH IVC TUMOR THROMBUS

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**Introduction:** Conventional hepatic resection for large hepatocellular carcinoma (HCC) is associated with various complications including excessive bleeding, tumor rupture, and spread of tumor cells, curtailing both the short-term and long-term survival outcome. To surmount these problems, many experts employed the anterior approach for major hepatic resections and fashioned the liver hanging maneuver technique, or combined it.

**Results:** The 49 year-old male as a known HBV carrier was referred to our center for surgical treatment. On the laboratory findings, child A compensated liver cirrhosis was noted. Preoperative imaging study showed no distant metastasis, but huge infiltrative HCC in right posterior segment with tumor invasion in the portal vein and RHV extended into the IVC. TACE was done 7 weeks before surgery. He underwent the right lobectomy and IVC tumor thrombectomy by excision including the IVC partial wall with anterior approach and thoracoabdominal incision, and then cavoplasty was performed by using the GSV patch. Without complications during the operation and postoperative days he made a well recovery, and discharged postoperative 2 weeks. Until now, there is no evidence of disease recurrence.

**PPL24-088**

MAJOR LIVER RESECTION FOR LARGE, LOCALLy ADVANCED HEPATOCELluLAR CARCINOMA IN PATIENTS WITH CHRONIC LIVER DISEASE

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**Introduction:** Liver resection for large (≥5 cm) hepatocellular carcinoma (HCC) remains a clinical challenge in patients with chronic liver disease (CLD).

**Method:** Prospectively collected data of patients with large HCC and CLD who underwent major liver resection (≥3 segments) between March 2011 and August 2013.

**Results:** Twelve patients (10 men) with median age of 52 years (20–72) with good performance status and no extra hepatic disease underwent surgery. Eight patients were in Child Pugh Class A and four patients were in Class B. Etiology-(HBV: 7, HCV: 2, Ethanol: 1, NASH: 2). BCLC staging was stage B: 8 and stage C: 4. Median AFP was 6.9 (1.4–62561). On CT scan, three patients had segmental portal vein involvement, one patient had bilobar disease and one had biliary obstruction. Seven patients had extended resection (≥5 segments), four had right hepatectomy; one had modified right hepatectomy (3 segments). On histopathology, all twelve patients had R0 resection, median tumor diameter was 10.7 cm (5–18 cm), liver parenchyma showed cirrhosis in 6, fibrosis in 3 and chronic inflammation in three. All tumors were moderately differentiated (Edmonson Grade 2); six vascular invasion (3 macrovascular); one biliary invasion. Four had multifocal disease. Posthepatectomy liver failure according to ISGLS grading; Grade A: 10 and Grade C: 2. Fifth postoperative day median serum bilirubin was 2.8 mg % (0.9–11.1); median INR 1.3 (1.1–1.8). Morbidity according to Clavien-Dindo classification was Grade 1–8, Grade 2-2, Grade 3B-1 and Grade 5-1. Antiviral treatment was given to all seven patients with HBV related CLD. Overall survival was 83%, with disease free survival of 82% (9/11) at a median follow up of 14 months (1 to 30).

**Conclusions:** Major liver resection for large, locally advanced HCC in CLD has shown excellent outcome in our series.

**PPL24-089**

10-YEAR EXPERIENCE OF LAPAROSCOPIC LIVER RESECTION FOR SEVERAL LIVER DISEASES

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**Introduction:** The aim of this study is to describe a 10-year experience of laparoscopic liver resection for several liver diseases.

**Method:** Between November 2004 and August 2013, 126 cases of 122 patients underwent laparoscopic liver resection at Department of Surgery at Konyang University Hospital, Daejeon, Korea. The following characteristics and results were evaluated retrospectively through the medical records.

**Results:** Forty-two laparoscopic hepatectomies (33.3%) were for benign disease and 84 (66.7%) for malignant tumors. The malignant tumor included hepatocellular carcinoma (HCC) in 34 cases, colorectal cancer metastasis in 35, gallbladder cancer in 8, intrahepatic cholangiocarcinoma in 4, breast cancer metastasis in 2 and gastric cancer metastasis in 1. Benign tumor included...
intrahepatic stone in 30 cases and biliary cystadenoma in 5. According to type of hepatocellular carcinoma, left hepatectomy was performed in 21 cases; bisegmentectomy was performed in 19 and wedge resection in 26. Also, radical cholecystectomy (including segmentectomy 4a, 5 and lymph node dissection) was performed 8 cases. Of thirty intrahepatic duct stone cases, 15 cases was performed common bile duct exploration and stone removal. Conversion to laparotomy was necessary in 9 patients (7.1%). And 19 cases (15.1%) required intra-operative blood transfusion. One patient with alcoholic liver cirrhosis who underwent left lateral sectionectomy for HCC with conversion to open surgery died 67 days after surgery.

**Conclusions:** According to our experiences, laparoscopic liver resection is considered feasible and safe method to use in the cases of several liver diseases.

**PPL24-090**

**LIVER STIFFNESS MEASUREMENT BY FIBROSCAN: A USEFUL TOOL FOR THE ASSESSMENT OF COMPLICATIONS OF PORTAL HYPERTENSION IN PATIENTS WITH CIRRHOSIS**

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**Introduction:** Transient elastography (FibroScan) is a new, non-invasive, rapid, and reproducible method allowing evaluation of liver fibrosis by measurement of liver stiffness. The aim of this study was to evaluate the sensitivity of liver stiffness measurement (LSM) for the detection of complications of cirrhosis.

**Method:** All consecutive patients with cirrhosis were studied. Cirrhosis was diagnosed either on liver biopsy or on clinical, biochemical and radiological basis. Patient’s Child–Pugh score (CTP), model for end stage liver disease (MELD) and complications due to portal hypertension were recorded. Liver stiffness measurement (LSM) by Fibroscan was done at the time of admission.

**Results:** Patients (n = 210) (age 51 ± 12 years, M:F 164:46) were enrolled. Their baseline CTP score (8.8 ± 2.2), MELD score (17.1 ± 7.8) and LSM was 54.9 ± 18.9 kPa. Etiology of cirrhosis was due to alcohol, n = 63, cryptogenic, n = 89, HBV, n = 25, HCV, n = 20, autoimmune, n = 10 and Wilson, n = 3. LSM was significantly correlated with CTP score (0.415, p = 0.001), MELD score (0.28, p = 0.001), total bilirubin (0.169, p = 0.01), albumin (−0.213, p = 0.002) and platelet count (−0.156, p = 0.02). The cut off values for the presence of oesophageal varices (49.3 kPa sensitivity 74%, specificity 77%), cirrhosis Child–Pugh B or C (54.1 kPa, sensitivity 76%, specificity 66%), past history of ascites (52.6 kPa, sensitivity 84%, specificity 70%), hepatocellular carcinoma (62.9 kPa, sensitivity 75%, specificity 63%) and hepatic encephalopathy (57 kPa, sensitivity 75%, specificity 63%).

**Conclusions:** Transient elastography is a promising non-invasive method for detection of complications portal hypertension in patients of cirrhosis. Its use for the follow up and management of these complications could be of great interest and should be evaluated further.

**PPL24-091**

**A CASE OF SIMPLE LARGE LIVER CYST WITH HIGH LEVEL OF CA19-9 IN THE SERUM**

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**Introduction:** Carbohydrate antigen 19-9 (CA19-9) is used as a biomarker to differentiate benign from malignant gastrointestinal disorders. In spite of various diagnostic modalities, biliary cystic neoplasms (biliary cystadenoma and cystadenocarcinoma) remain to be difficult to diagnose preoperatively. We report a case of simple large liver cyst with high level of CA19-9 in the serum.

**Method:** The patient was 63-year-old woman. The CA19-9 showed high level in serum in the regular health checkup. The abdominal CT scans revealed a large simple liver cyst in the right lobe of the liver which was 12.7 × 11.6 cm in diameter. The liver cyst was checked up by outpatient, however it was increased and elevated CA19-9 level as 340 U/mL. Abdominal ultrasonogram showed a large cystic lesion without any nodule inside of the cyst. MR image demonstrated a hyperintense lesion. We believe that the high serum level of CA19-9 was due to the large liver cyst. She was underwent Laparoscopic deloofing procedure. There were no findings suggestive of malignant lesion intraoperatively.

**Results:** There were no complications after surgery. Intraoperative cystic fluid aspiration showed serous fluid with extremely high levels of CA19-9 as 364070 U/mL. The result of pathological examination of the cyst proved benign. The serum CA19-9 level was decreased rapidly after operation. The postoperative course was uneventful and there is no recurrence for 10 months follow up.

**Conclusions:** The elevated level of CA19-9 in serum may not be helpful in the preoperative diagnosis of biliary cystic neoplasm in our case. This case showed quite a rare large liver cyst with abnormally high levels of CA19-9 in serum and cystic fluid.

**PPL24-092**

**TREATMENT STRATEGY FOR HCC PATIENTS WITH ADVANCED AGE 80 OR MORE YEARS-OLD**

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**Introduction:** In this study, results following several interventions in HCC patients with 80 or more years-old were compared with those with 65 or less years-old.
Method: Retrospective comparison was made between 62 patients equal to or more than 80 years-old (Elderly group) and 851 patients equal to or <65 years-old (Youth group). Between 1990 and 2005, total of 1797 patients with primary HCC underwent to initial treatment such as hepatic resection (HR), ablation therapy, or transarterial chemoembolization (TACE) in the Kagoshima carcinoma-of-liver study group.

Results: Total of 225 patients (Elderly n = 10; Youth n = 215) were treated by HR, 198 patients (Elderly n = 8; Youth n = 190) by ablation, and 469 patients (Elderly n = 42; Youth n = 427) by TACE. In terms of the frequency of each therapy, no differences were seen between the 2 groups. Although patients treated by TACE showed poorer survival than those received HR or ablation in Youth group, no clear difference during the 3 treatment was seen in Elderly group. When comparing both groups according to the therapy, the elderly patients showed poorer survival than the youth in HR and ablation, however, no significant difference was seen in TACE. Multivariate comparisons about disease-free survival (DFS) and overall survival in each group. In DFS, size and the number of tumor were prognostic factors for Youth group; liver damage for Elderly group. HR was a good prognostic factor in both groups. On the other hand, in overall survival, size and the number of tumor, liver damage, were prognostic factors for Youth group; none for Elderly group. HR was necessarily not a good prognostic factor in Elderly group.

Conclusions: In HCC patients in Elderly group, Taken together with complication and performance status, it should be respected to employ treatment with lower invasiveness.

PPL24-093
COX-2 EXPRESSION AND THE PREVALENCE OF REGULATORY T CELLS IN TUMOR AND NON-TUMOR SITES OF HEPATOCELLULAR CARCINOMA

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Introduction: The expression of cyclooxygenase-2 (COX-2) plays a role in the differentiation and guidance of regulatory T cells (FOXP3+ Tregs), and this has also been studied extensively in hepatocellular carcinoma (HCC). In this study, we investigated the expression of COX-2 and the prevalence of FOXP3+ Tregs in tumor and non-tumor sites to elucidate the relationship between the two molecules and their association with the clinicopathological features of HCC and disease outcome.

Method: This study involved 44 patients with HCC who had undergone hepatectomy without any preoperative treatment. Paraffin-embedded nodules (n = 44) were sectioned for immunostaining with COX-2 and FOXP3 monoclonal antibodies, and the degree of COX-2 expression and the prevalence of FOXP3+ Tregs were measured.

Results: COX-2 expression in non-tumor site showed a positive correlation with the number of FOXP3+ Tregs (p < 0.001). In addition, in non-tumor site, the high FOXP3+ Tregs prevalence group was significantly associated with TNM stages (p = 0.003) and AFP (p = 0.027). The expression of COX-2 in non-tumor site was also significantly associated with disease-free survival (p = 0.005).

Conclusions: The present findings suggest the association of COX-2 expression in non-tumor site with a disease-free survival and thus the recurrence of HCC. In addition, COX-2 expression and the prevalence of FOXP3+ Tregs are positively correlated in non-tumor site, indicating that their interaction influences the outcome of HCC. To prevent the recurrence of HCC, it may be necessary to inhibit the expression of COX-2.

PPL24-094
SINGLE-INCISION LAPAROSCOPIC LEFT LATERAL SEGMENTECTOMY: “DRUM STICK” AND “BAG-IN-BAG” TECHNIQUE

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Introduction: We recently have created a multitask needle device named “drumstick” that can be assembled inside the abdominal cavity. We also invented the novel concept of “nested surgery” and introduced the “bag-in-bag” technique to minimize the destruction of the abdominal wall. We will present our new technique of single-incision laparoscopic left lateral segmentectomy.

Method: An intraumbilical, 2.5 cm incision was made and multi-access port was introduced. The pneumoperitoneum was established at 13 mmHg. A 5 mm flexible fiberscope was used in all operations. "<Drumstick” device> Liver parenchymal transection was accomplished with the ultrasonic scalpel and CUSA. Our original needle device, Drumstick, was punctured through the upper abdominal wall. This device was assembled inside the abdominal cavity and played multiple roles including retraction to control the transection plane, aspiration of hemorrhage, and a water dripper for hemostasis with bipolar coagulation. "<Bag-in-bag” technique> The resected lobe of the liver was placed in a large tissue retrieval bag within the abdominal cavity. Then, only the opening of the bag was pulled through the umbilicus. Multi-access port was re-inserted in the opening and pneumoperitoneum was established inside the bag. The resected liver was re-incised into pieces so that each of them could be contained to a smaller bag, by carefully avoiding injury to the tumor. The small bags were removed one by one from the umbilicus and finally the large bag came out without extending the incision.

Results: We have performed five cases of left-lateral segmentectomy in the patients with hepatic tumors. There were no significant complications and all patients discharged with a short hospital stay after operation.
Conclusions: Our new technique significantly improved the exposure of the surgical field, and minimized the umbilical incision in single-incision laparoscopic hepatectomy.

PPL24-095
MIDDLE HEPATIC VEIN RECONSTRUCTION BY USING PARIETAL PERITONEUM DURING HEPATECTOMY FOR RECURRED HCC
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Introduction: We report the case of a 32-year-old female patient with recurred HBV-related HCC. Initial operation was done for the 8.7 cm HCC in the left lateral lobe 3 years ago.

Method: Recurred 1.8 cm HCC very closed to middle hepatic vein in S8 was removed by partial hepatectomy. Main middle hepatic vein was removed partially, then parietal peritoneal patch was used for reconstruction for middle hepatic vein.

Results: The patency of middle hepatic vein was intact and there was no tumor recurrence after 6 months.

Conclusions: By using the parietal peritoneal patch graft, tumor resection margin and preservation of main hepatic vein could be achieved easily.

PPL24-096
BISSEGMENTECTOMY 7–8: A SAFE AND EFFECTIVE ALTERNATIVE TO RIGHT HEPATECTOMY
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Introduction: A lesion localized in segment 7–8 and infiltrating the RHV is usually an indication for a right hepatectomy. However, if there is the presence of a small remnant liver, steatotic or cirrhotic liver, parenchymal sparing liver resection should be considered in order to prevent postoperative liver failure. Recent studies have been introduced usefulness of bi-segmentectomy 7–8 to leave an adequate remnant liver and reduced postoperative morbidity and mortality. This report described S7, 8 bisegmentectomy as an safe alternative to right hepatectomy without postoperative morbidity and to obtain the long-term tumor recurrence.

Method: A 57-year-old woman with known hepatitis B related liver cirrhosis was referred for surgical treatment to hepatocellular carcinoma. CT scan demonstrated large HCC infiltrating right hepatic vein at S7, 8. We planned to perform a bisegmentectomy 7–8 instead to right hepatectomy because of small remnant left liver volume and the presence of large inferior right hepatic vein. The operation began with mobilization of the right liver with complete dissection of retrohepatic vena cava. Inferior right hepatic vein was identified. Right hepatic vein was dissected and encircled. Parenchymal transection was performed based on tumor vessel relationship at intraoperative ultrasonography and on anatomical findings at color-doppler ultrasonogra-

Conclusions: Bi-segmentectomy 7–8 should be a safe alternative to right hepatectomy in the selected patients. Moreover, it can provide the curative resection without unnecessary sacrifice of functional parenchyma with minimal morbidity.

PPL24-097
THORACOABDOMINAL APPROACH FOR RIGHT SIDED HEPATIC RESECTION
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Introduction: Resection of a large malignancy in the right liver or a small tumor located at the superior and posterior part of the right liver requires extensive hepatic mobilization. A thoracoabdominal approach might facilitate hepatic resection in such situations, but the safety and benefits of this approach remain unclear. We have employed the thoracoabdominal approach in selected patients with a difficult right-sided hepatic resection.

Method: We reviewed the medical records of the patients who underwent the hepatectomy for hepatic malignancy under the thoracoabdominal approach from Apr. 1998 to Jun 2012 at Asan Medical Center retrospectively. Five patients were included. Perioperative outcomes were evaluated.

Results: Sex ratio (M:F) was 4:1, median age was 67 (range 36–74). The range of the follow up was 2–60 months. Diagnoses were 4 hepatocellular carcinoma, 1 intrahepatic cholangiocarcinoma. Median maximal tumor size was 15.5 cm, and median operative time was 502 minutes. The amount of the pRBC transfusion was 2–5 pints (except one case; 45 pints). Postoperative complications were 2 cases of the pleural effusion, 1 pneumonia, and 1 hepatic failure. Hospital stay was 23 days (range 20–37). Hospital mortality was one case caused by the pneumonia. There were two cases of the disease recurrence.

Conclusions: The thoracoabdominal approach is a safe operative approach that can facilitate resection of massive tumors in the right liver or tumors involving segments 7 and 8 without increased morbidity.
PPL24-099
USEFULNESS OF CONVERTED ICGR15 CALCULATED FROM 99mTc-GSA SCINTIGRAPHY BEFORE RIGHT HEPATECTOMY IN A PATIENT WITH ICG EXCRETORY PERFECTLY DEFECT
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Introduction: In Japan, ICGR15 value is important to decide the tolerable excision quantity of the liver. We experienced a case of ICG excretory perfectly defect patient and performed major heptectomy safely referring to the value of converted ICGR15 calculated from 99mTc-GSA scintigraphy LHL15 value.

Method: A 59-year-old woman was diagnosed as RS rectal cancer with multiple liver metastasis. TNM classification of malignant tumors, 7th edition staging was T3N1bM1a(liver) StageIVA. After six courses chemotherapy using FOLFOX + Panitumumab, primary lesion was resected. At that point, liver metastasis reduced to 66% and was judged PR with RECIST criteria. Liver right lobectomy + S4 partial resection of 57% liver resection was necessary for the all liver metastasis excision. Though, liver dysfunction was not admitted in laboratory data, only ICGR15 showed abnormally high level of 97.1%. The ICGR15 value suggested that necessary liver excision be impossible. 99mTc-GSA scintigraphy was another criterion of liver preliminary function. Conversion of data from 99mTc-GSA scintigraphy to ICGR15 is an easy and convenient method and we have reported 119-115xLHL15 of this patient was 12.74%. So we judged the operation was safe and liver right lobectomy + S4 partial resection of 57% liver resection was necessary for the all liver metastasis excision.

Results: According to this calculating formula, converted ICGR15 of this patient was 12.74%. So we judged the operation was safe and liver right lobectomy + S4 partial resection of 57% liver resection was necessary for the all liver metastasis excision. Though, liver dysfunction was not admitted in laboratory data, only ICGR15 showed abnormally high level of 97.1%. The ICGR15 value suggested that necessary liver excision be impossible. 99mTc-GSA scintigraphy was another criterion of liver preliminary function. Conversion of data from 99mTc-GSA scintigraphy to ICGR15 is an easy and convenient method and we have reported 119-115xLHL15 converts 99mTc-GSA scintigraphy LHL15 value into ICGR15.

Conclusions: In ICG excretory perfectly defect patient, converted ICGR calculated from 99mTc-GSA scintigraphy is effective to know true liver preliminary function.

PPL24-100
EVALUATION OF PREOPERATIVE PROGNOSTIC FACTORS PREDICTIVE OF TUMOR RECURRENT AND SURVIVAL IN PATIENTS WITH HEPATOCELLULAR CARCINOMA
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Introduction: Tumor recurrence after surgical resection for hepatocellular carcinoma (HCC) is an obstacle to long-term survival. Thus, selection of appropriate patients is important, especially those with advanced tumors.

Method: From January 2000 to June 2012, we retrospectively analyzed 298 patients who had undergone surgical resections for HCC with curative intent and evaluated preoperative prognostic factors.

Results: The 5 years disease free survival and overall survival were 47.0% and 58.7% respectively. In multivariate analysis, an alpha-fetoprotein (AFP) level of >100 ng/mL and a standardized uptake value (SUV) of positron emission tomography–computed tomography of >3.5 were predictive factors for tumor biology, recurrence, and survival. Tumor size of >5 cm and a relative enhancement ratio (RER) calculated from magnetic resonance imaging were also significantly associated with prognosis in univariate analysis. We established a scoring system to predict prognosis using AFP, SUV, and RER. In those with tumors of >5 cm, it showed predicted both recurrence (p = 0.005) and survival (p = 0.001).

Conclusions: The serum AFP, tumor size, SUV and RER are useful for prognosis preoperatively. Based on these data, it is possible to predict a good prognosis after surgical resection using our scoring system even in large size tumors.

PPL24-101
COMPARISON OF LAPAROSCOPIC VERSUS OPEN HEPATECTOMY ON THE BASIS OF SERUM PROCALCITONIN LEVEL
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Introduction: Procalcitonin (PCT) is produced in the systemic organs such as lung, liver, kidney, fat and muscle, but is not secreted from the blood components such as leukocytes. Therefore, serum PCT level is not affected by drugs that induce leukocyte reaction such as anticancer agents or steroids. In addition, PCT is useful in the differential diagnosis of infection in cirrhotic patients. It is considered that PCT level reflects surgical stress even in heptectomy patients with cirrhosis and received preoperative chemotherapy.

Method: To evaluate the degree of surgical stress, we compared of (OH) Open Hepatectomy and (LH) Laparoscopic Hepatectomy in patients with liver tumors by measuring the PCT. Patients who had no significant postoperative complications were analysed.

Results: LH was 8 cases: 5 of HCC, 3 of metastatic liver tumor. OH was also 8 cases: 4 of HCC, 4 of metastatic liver tumor. Operation method was, LH: Five cases of partial resection, 3 cases of segmental resection, OH: seven cases of partial resection, one case of segmental resection. The mean operative time was 284 minutes (LH), and 334 minutes (OH) (p = 0.48). The average of bleeding were 290.6 mL (LH), 723.6 mL (OH) (p = 0.03). The average of PCT on the first day after surgery was 0.369 in the LH, and 0.619 in the OH. It was lower in the LH significantly more
than OH on the first day after surgery (p = 0.02). There was no significant difference in the WBC, CRP. There was no correlation between the PCT value and amount of bleeding.

**Conclusions:** Based on the serum PCT level, it was suggested that the laparoscopic hepatectomy is less invasive compared to open surgery.

**PPL24-102**

**INTRAHEPATIC SPLENOSIS MIMICKING HEPATOCELLULAR CARCINOMA IN A CHRONIC HEPATITIS C PATIENT WITH NO HISTORY OF SPLENIC TRAUMA**

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**Introduction:** Intrahepatic splenosis (IS) was defined as auto-transplantation of splenic tissue. The case reports about IS, which might develop in the patients with splenic injury or surgery, are still rare and is difficult to make differential diagnosis of IS from hepatic neoplasms. We had an opportunity to treat an extremely rare case of IS patient without history of splenic injury or surgery.

**Method:** Case report. A 58-year-old man with chronic hepatitis C was referred to our hospital for further examination of liver dysfunction. Serum AFP was elevated (24.9 ng/mL). Abdominal ultrasonography (US) revealed the low echoic mass in the posterior segment of liver. Based on the characteristic image findings by enhanced CT and EOB-MRI exam, the tumor was diagnosed as hepatocellular carcinoma (HCC). He underwent right lateral segmentectomy of the liver. Histopathological findings revealed as IS which consisted of sinusoidal structure, lymphoid follicular aggregates and fibrous bands from its capsule continuing into the inner portion of the lesion, described as a trabeculae which is specific for splenic architecture. His postoperative course was uneventful and he discharged our hospital on sixteenth postoperative days.

**Results:** The overall 4-year survival rates were 79.2% and 96.6% and median survival times were estimated to be 1144 days in group 1 and 1427 days (p = 0.043) in group 1 and group 2, respectively. Moreover, the perioperative mortality rate was 20.8% versus 0% (p = 0.010) and the postoperative repeat bleeding rates were 29.2% versus 0% (p = 0.002) between the two groups. Preoperative prognostic indicators for death were emergency patients with Child–Pugh score ≥ 10.

**Conclusions:** Modified Hassab’s procedure is a simple, safe and effective therapy to control gastroesophageal variceal bleeding not only in the elective situation but also in the emergencies in cirrhotic patients with portal hypertension.

**PPL24-103**

**PORTAL HYPERTENTION WITH SEVERE ESOPHAGEAL AND GASTRIC VARICEAL HAEMORRHAGE TREATED BY MODIFIED HASSAB’S PROCEDURE**

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**Introduction:** Hassab’s operation, which involves gastroesophageal decongestion and splenectomy, is the primary surgical procedure used for devascularization. Although the devascularization of all the vessels of the upper half of the stomach and distal esophagus are performed, it can lead to a high risk of repeat bleeding and prolonged operation time, which increasing the risk of intraoperative.

To cope with these obstacles, the modified Hassab’s procedure was developed to be used. This study evaluated the effectiveness of modified Hassab’s procedure in patients with esophageal and gastric variceal bleeding. We detected the surgical security and reliability of modified Hassab’s procedure by observing the postoperative repeat bleeding situation and long-term survival rate of the patients to support our hypothesis.

**Method:** Between 2004.01 and 2008.01, sixty patients with liver cirrhosis and portal hypertension underwent the modified Hassab’s operation. In group 1, 27 of them had acute esophageal and gastric variceal bleeding and the other 33 patients had a history of variceal bleeding in group 2 in this retrospective study (including three and four patients were lost in follow up, respectively).

**Results:** The overall 4-year survival rates were 79.2% and 96.6% and median survival times were estimated to be 1144 days in group 1 and 1427 days (p = 0.043) in group 1 and group 2, respectively. Moreover, the perioperative mortality rate was 20.8% versus 0% (p = 0.010) and the postoperative repeat bleeding rates were 29.2% versus 0% (p = 0.002) between the two groups. Preoperative prognostic indicators for death were emergency patients with Child–Pugh score ≥ 10.

**Conclusions:** Modified Hassab’s procedure is a simple, safe and effective therapy to control gastroesophageal variceal bleeding not only in the elective situation but also in the emergencies in cirrhotic patients with portal hypertension.
**Method:** Different percutaneous approaches, either well established or newly developed, were analyzed on the base of 192 PVE performed in our department.

**Results:** PVE first described by Kinoshita was produced by contralateral approach. Done from the future liver remnant (FLR), currently mostly via Sg3 portal branch (PB), has an advantage of easier catheterization of PB to be embolized. This approach is infrequent (18 (9.4%) PVE) in our clinic due to theoretical possibility of FLR damage and was used to avoid transtumoral puncture. Most popular approach in our clinic is ipsilateral approach (164 (85.4%) PVE) via Sg5PB (112 (58.3%) PVE) due to easy access and fact that possible complications related to puncture site located within the liver to be removed. However in case of awkwardly located tumor that course deformation of portal vein confluence catheterization of distally located Sg4PB can become challenging procedure. Debates for Sg4PB embolization are still active, background for which are technical difficulties for stable catherization of the latter and possibility of non targeted embolization. For patients who have to underwent right hepatic trisectionectomy with significant deformation of hepatic hilum in presence of remarkable Sg4PB in our clinic was developed ipsilateral approach via Sg4PB (7 (3.6%) PVE). Most difficult for catheterization Sg4PB are punctured under US guidance that gives us stable catheter position and possibility for embolization the latter at time of access tract embolization. For embolization of right lobe PB there is no need for superselective catheterization as embolic material could be delivered with blood flow via proximaly located catheter within right PB. In absence of safe transhepatic approach transplenic approach (3 (1.6%) PVE) could be feasible alternative.

**Conclusions:** Selection of the appropriate percutaneous approach for PVE is a key point enabling effective liver regeneration without complication that could preclude major liver resection.

**PPL24-105**

**TELANGIECTATIC FOCAL NODULAR HYPERPLASIA OF THE LIVER COMPROMISED WITH HEMORRHAGE AND NECROSIS**

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**Introduction:** Telangiectatic focal nodular hyperplasia (FNH) is the non-classical form of the FNH. Although these may have risks of rupture or malignant degeneration, this remains unclear. Here, we demonstrate a case of telangiectatic FNH complicated with hemorrhage and necrosis during follow up.

**Results:** A-33-year-old man visited to emergency room for abrupt onset epigastric pain. From 2 years ago, he was diagnosed to have multiple hepatic mass, compatible with focal nodular hyperplasia, in the regular medical check-up. In the CT scan, 6.2 cm sized well-marginated mass, located in the left lateral section of the liver, showing arterial enhancement in the arterial phase, and faint enhancement of the portal and delayed phase scan.

At this time, laboratory result shows slightly increase AST and ALT. He shows severe tenderness on epigastric area. In the follow-up CT scan, the mass located in the left lateral segment became larger, with containing slightly enhancing lesion on the precontrast scan suggesting that intratumoral hemorrhage occurred. We decided to perform left lateral sectionectomy of the liver.

On section of the specimen, the cut surface showed vaguely nodular lesion, measuring 7.6 cm in size, with hemorrhage and necrosis. Most part of the mass consisted of necrosis due to hemorrhage. However, some portion consisted with dilated sinusoids with increased number of thickened vessels, and also showed CD34 positivity in sinusoidal epithelium. Therefore pathological result was telangiectatic focal nodular hyperplasia although definite diagnosis is limited due to massive necrosis around the hematoma.

**Conclusions:** Bleeding is not a common complication of the FNH. Usually FNH was not necessary to resect when diagnosis was made. However, as shown in our case, a possibility that hemorrhage or necrosis may be induced during its progress and follow-up period should be taken into consideration.

**PPL24-106**

**ANALYSIS OF SURVIVORS MORE THAN 15 YEARS AFTER CURATIVE HEPATIC RESECTION OF HEPATOCELLULAR CARCINOMA**

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**Introduction:** The purpose of the study is to clarify the clinicopathologic features of patients with survival period longer than 15 years after curative resection for hepatocellular carcinoma.

**Method:** Between January 1987 and June 1998, 361 patients underwent hepatic resection for HCC in our hospital. Thirty-four (9.4%) patients survived more than 15 years, and 327 (90.6%) patients survived <15 years. The clinical outcome of the patients surviving longer than 15 years was followed until June 2013. The clinicopathologic features of the two groups longer and <15 years was compared and analyzed.

**Results:** Among the 34 patients surviving longer than 15 years after curative resection of hepatocellular carcinoma, 22 (64.7%) patients were attributed to TNM stage I, 6 (17.6%) were stage II and 6 (17.6%) were stage III. By the time of July 2013, 28 (82.4%) were still disease free and alive. Two patients had tumor recurrence but still alive, two patients died of tumor recurrence. One patient died of cardiovascular accident and one died of prostate cancer. Four patients (11.8%) underwent re-resection of recurrent tumors. The longest period of survival was 23 years and 2 months. In comparison with patients surviving <15 years, patients with survival period longer than 15 years had a significant higher percentage of stage I (64.7% vs 29.1%) and small tumors (<3 cm, 41.2% vs 23.5%), and significant
lower percentage of micro-vascular invasion (14.7% vs 37.3%).

Conclusions: The patients surviving longer than 15 years after curative hepatic resection of hepatocellular carcinoma have favorable pathological features of early TNM staging, small tumor and low micro-vascular invasion. The life-long follow-up is still mandatory for long-term survival.

PPL24-107

A PROPENSITY CASE-MATCHED ANALYSIS FOR ENDOSCOPIC VERSUS OPEN HEPATIC RESECTION FOR PATIENTS WITH HEPATOCELLULAR CARCINOMA MEETING THE MILAN CRITERIA

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Introduction: Recent studies have demonstrated that endoscopic hepatectomy for hepatocellular carcinoma (HCC) is less invasive and can provide similar disease-free and overall survival compared with conventional open hepatectomy. The aim of this study is to compare endoscopic and open hepatectomy for HCC patients meeting the Milan criteria using propensity case-matched analysis. The aim of this propensity case-matched analysis is to compare endoscopic hepatectomy and open hepatic resection for hepatocellular carcinoma (HCC) patients meeting the Milan criteria.

Method: Between 1999 and October 2012, a total of 269 HCC patients who met the Milan criteria performed endoscopic hepatectomy (n = 89) or open hepatectomy (n = 180). A one-to-one propensity case-matched analysis was applied to equalize the background bias in the two groups.

Results: The overall morbidity was 6.7% and no mortality was observed in the endoscopic hepatectomy group. With propensity matching, 57 endoscopic hepatectomy and 57 open hepatectomy patients showed equivalent preoperative clinical characteristics. The median operative time (p = 0.020) and median blood loss (p < 0.001) were significantly lower in the endoscopic hepatectomy group than open hepatectomy, and the median postoperative hospital stay was significantly shorter in the endoscopic hepatectomy group (p < 0.001). The cumulative 5- and 10-year disease-free survival rates were 35.2% and 15.6% in the endoscopic hepatectomy group, and 34.9% and 14.6% in the open hepatectomy. The cumulative 5- and 10-year overall survival rates were 74.3% and 44.4% in the endoscopic hepatectomy group, and 67.6% and 60.8% in the open hepatectomy.

Conclusions: For HCC patients meeting the Milan criteria, this propensity study demonstrated that endoscopic hepatectomy is a safe and less invasive treatment modality with equivalent disease-free and overall survival when compared with open hepatectomy.

PPL24-108

SAFE AND FEASIBLE EXTRAHEPATIC GLISSONEAN ACCESS IN LAPAROSCOPIC ANATOMICAL LIVER RESECTION

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Introduction: Recent rapid developments in technological innovations, improved surgical techniques and the accumulation of extensive experience by surgeons have improved the feasibility and safety of laparoscopic liver surgery. However, laparoscopic anatomical liver resection remains a highly specialized field, as major technical difficulties remain, such as hilar dissection and pedicle control.

Method: During open anatomical liver resections, each Glissonean pedicle is often ligated and divided en bloc extrahepatically before parenchymal dissection. We describe herein a novel technique by which each Glissonean pedicle can be easily and safely encircled and divided en bloc extrahepatically during laparoscopic anatomical liver resection.

Results: Glissonean pedicles could be encircled en bloc extrahepatically, as planned. No serious complications, including major bleeding or injury of the portal triad, were encountered during procedures.

Conclusions: Extrahepatic Glissonean access appears feasible and safe for laparoscopic anatomical resection of the liver.

PPL24-109

IMPACT OF PREOPERATIVE COMPUTER ASSISTED THREEDIMENSIONAL RECONSTRUCTION AND VIRTUAL RESECTION BASED ON MRI FOR HEPATECTOMY

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Introduction: Hepatectomy is a complicated operation because surgeons should consider the anatomical structure, vascular variability and the remnant/remainsider volumes. In the past decade, the computer assisted three-dimensional (3D) reconstruction based on CT became ordinary, which maked the preoperative precise liver volume measurement easily. But nowadays, the using of MRI is more and more popular, because that can provide more information in diagnosis. There is infrequent report about MRI-3D reconstruction, so the aim of this study was to assess the feasibility and accuracy of a 3D reconstruction and virtual hepatectomy based on MRI in hepatectomy.

Method: There were 125 patients (88 primary hepatocellular carcinoma, 12 cholangiocarcinoma, 15 liver metastatic carcinoma, 10 hepatic hemangioma) underwent.
preoperative 3D reconstruction/virtual hepatectomy with MRI (using EDDA system, USA) by the same surgeon. To each case, the anatomical structure, especially the artery anomaly, was marked particularly. And the volumes of occupied lesion, total liver, resecting/remnant were calculated and the resected volume was compared with the actual specimen weight.

**Results:** In 125 patients, each case was planned individually. The average time for one case was about 30 minutes. The predicted liver resection volume showed a significant correlation with the actual value (r = 0.94, p < 0.05). Also there were some anomaly cases: 4 cases with right hepatic artery comes from superior mesenteric artery, 2 cases with left hepatic artery comes from celiac trunk and 10 cases with “middle hepatic artery.”

To these vascular variability cases, the surgeons became more self-confident and reduced lots of time in the operation.

**Conclusions:** Preoperative 3D reconstruction and virtual hepatectomy based on MRI is feasible and accurate. The process can help the surgeon learn the anatomical structure, excising scope and the remnant/remainder volume. Three-dimensional reconstruction leads to an increased precision of operation planning and to a significant improvement of safety of liver surgery.

PPL24-I11

INITIAL EXPERIENCE OF TOTALLY LAPAROSCOPIC COLORECTAL AND MINOR LIVER RESECTIONS IN COLORECTAL CANCER WITH SYNCHRONOUS LIVER METASTASIS

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**Introduction:** Combined resection of colorectal cancer (CRC) with synchronous liver metastases (SLM) is controversial due to the difficulty of the abdominal approach for both resections, the possible increased morbidity and the impact on oncologic results. The aim of the present study is to establish the feasibility of laparoscopic colon and liver combined resection for primary CRC with SLM.

**Method:** We retrospectively analyzed all patients who underwent simultaneous colon and liver laparoscopic resection due to CRC with SLM from August 2008 to March 2013. We excluded major hepatectomies or metastasized located next to main vessels, doubts to achieve an R0 resection or contraindication for laparoscopic surgery.

**Results:** Ten patients underwent totally laparoscopic approach for CRC and SLM. The mean age was 59 (36–73). The numbers of liver lesions in the preoperative images were 1 or 2, located in segment II to VIII, with a mean size of 25 mm (10–50 mm). Surgical procedure for CRC included 2 low anterior resections, 3 right colectomy and 5 left colectomy. The livers resections were: 7 segmentectomy (segments III, V, VI and VII), 2 right anterior sections, 2 bisegmentectomy (V-VI and IVb-III) and 1 left lateral sectionectomy. Five patients were converted to open surgery. The mean operative time was 414 minutes (260–560 minutes). The mean hospital stay was 12 days (5–49). There were no mortality and the morbidity rate was 60% (STROC I–IV). The overall survival up to 1–4 years was 89% and 61% respectively and the disease-free survival 54% and 13% respectively.

**Conclusions:** In this initial experience, totally laparoscopic approach seems to be a feasible and safe option to treat primary CRC with SLM in highly selected patients. It has an acceptable rate of morbidity and
satisfactory oncological results. The conversion to open surgery is recommended, every time R0 resections are compromised.

**PPL24-112**

**USEFULNESS OF LAPAROSCOPIC HEPATECTOMY IN THE ELDERLY PATIENTS**

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**Introduction:** Recently, malignant disease cases in the elderly is increased. Elderly patients often various morbidities, so in the treatment, there is a tendency that is required minimally invasiveness. In about 10 years laparoscopic hepatectomy is spreading in our country. It was introduced in our department from 2010. Laparoscopic hepatectomy has emerged as a viable option; however, its usefulness for elderly patients is undefined. We reviewed the validity of the adaptation of this surgical procedure for elderly patients.

**Method:** Thirty patients who have performed laparoscopic hepatectomy were identified between 2010 and 2012 in our hospital. Three patients were over 80 years old, compared to the group of under 80 years old patients. We analyzed retrospectively various clinical factors.

**Results:** Mean of age was 86.3 and 63.4 years old, respectively. Diseases were two cases of hepatocellular carcinoma (HCC) and one case of cholangiocellular carcinoma in over 80 years group, on the other hand in under 80 years group, there are 20 cases of HCC, four cases of liver metastasis, and three of the others. There was no significant difference in liver function and performance status. Partial resection was performed for all of over 80 years old patients. In the group of under 80 years, it was applicable for partial resection in 23, subsegmentectomy in 1, segmentectomy in 3. Operation time, intraoperative blood loss, and postoperative hospital stay were similar between the two groups. In the over 80 group, there were two cases of respiratory dysfunction, were found in all cases of renal dysfunction, however, there were no complication.

**Conclusions:** It was suggested the safety and validity of laparoscopic hepatectomy for the elderly patients, similar to the non-elderly patients.

**PPL24-113**

**CORRELATION BETWEEN LIVER REGENERATION AND OPERATIVE MORBIDITY AFTER RIGHT AND RIGHT EXTENDED HEPATECTOMIES**

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**Introduction:** Surgical resection is usually the only curative treatment of liver tumors. Major liver resection is sometimes necessary but not always feasible due to insufficient remnant liver volume. The objective of this study is to correlate postoperative liver regeneration with biological and clinical outcome after right (RH) and right extended hepatectomy (REH).

**Method:** Fifty-two patients undergoing RH/REH for malignant tumor between 2005 and 2012 in whom complete pre-and postoperative liver imaging was available were reviewed. Liver volumetry has been performed preoperatively and at 1, 3 and 6 months after resection. Postoperative morbidity and biological evolution have been prospectively recorded. The evolution of remnant liver volume (RLV) hypertrophy has been analyzed and compared depending on post-operative Dindo-Clavien morbidity.

**Results:** Operative indication was colorectal liver metastases in 23 (44.2%), hepatocellular carcinoma in 14 (26.9%), biliary tumors in 13 (25%), and other tumors in 2 (3.84%) cases. Preoperative portal vein embolization (PVE) has been performed in 30 (57.69%) patients. Overall morbidity was 61.5%, major complications representing 40.38%. Average preoperative RLV was 596 mL or 40.8% of total liver volume (TLV) and 0.86% of body weight. The average TLV at 1, 3 and 6 months postoperatively was of 899, 1002 and 1076 mL representing a volumetric hypertrophy rate of 55%, 27% and 13% between each control. At 3 months cirrhotic livers had a 40.7% volume increase versus 79% for non-cirrhotic. No difference in volumetric increase between patients with or without major complications.

**Conclusions:** Liver regeneration is mostly obtained at 1 month after major liver resection, no significant hypertrophy occurs after 3rd month. Liver regeneration rate is lower in cirrhotic livers and seems not to be correlated with morbidity after right or right extended hepatectomy.

**PPL24-114**

**PREOPERATIVE AST TO PLATELET RATIO (APRI) IS AN INDEPENDENT PROGNOSTIC FACTOR FOR RESECTED HEPATOCELLULAR CARCINOMA**

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**Introduction:** The objective of this study was to investigate the prognostic value of platelet-based indices including platelet count, platelet-lymphocyte ratio (PLR), and aspartate aminotransferase-platelet ratio index (APRI), in HCC after curative resection, especially in patients with HBV infection.

**Method:** We retrospectively reviewed 332 patients with HCC treated with curative hepatectomy from 2006 to 2009. Preoperative platelet count, as well as demographics, clinical, and pathologic data were analyzed. Low preoperative platelet count, PLR, APRI were defined as <300/mm³, <115/mm³, and <0.62 respectively. Univariate and multivariate regression was performed for predictors of disease-free survival (DFS) and overall survival (OS).
Results: Both DFS and OS of patients with low platelet count, PLR, and APRI were significantly better than the elevated groups (p < 0.05). On multivariate analysis, APRI, tumor size ≥5 cm, tumor without capsulation, multiple tumors were associated with both poor DFS and OS. In addition, macrovascular invasion was an independent prognostic factor for poor DFS. The 1, 3, 5 years DFS rate were 52%, 36%, 32% for patients with APRI <0.62 and 35%, 22%, 19% for patients with APRI ≥0.62. Correspondingly, the 1, 3, 5 years OS rate were 77%, 51%, 42% and 63%, 35%, 29% for both groups. Both DFS and OS of APRI <0.62 group were significantly better than the elevated group (p = 0.009 and 0.002, respectively). Patients with elevated APRI tended to have cirrhosis, HBV infection, surgical margin <1 cm, and more capsulated.

Conclusions: Elevated platelets based inflammatory indices, especially APRI was associated with adverse characteristic features and poor prognosis in HCC, especially for patients with HBV infection or cirrhosis. Anti-platelet treatment might represent an promising therapy against HCC recurrence.

PPL24-115
HEPATIC RESECTION OF COLORECTAL LIVER METASTASES: RISK FACTORS FOR EARLY TUMOR RECURRENTNESS
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Introduction: Hepatic resection remains the mainstay for curative treatment of colorectal liver metastases (CRLM). Many prognostic scores have been implemented to select patients to undergo surgery but none is accurate enough to identify patients who will not benefit from hepatectomy. The aim of our study is to detect preoperative clinical features that may predict early cancer recurrence (ER), which might reflect the aggressiveness of cancer, in a consecutive series of patients undergoing first hepatectomy for CRLM and evaluated the impact of ER on overall survival (OS).

Method: Two hundred and fifteen patients undergoing a first hepatectomy for CRLM between 2005 and 2012 were analyzed. Patients with ER, as defined by cancer recurrence in the first year after hepatectomy, were identified and compared with patients with delayed recurrence (DR) and without recurrence (NR). OS and disease free survival (DFS) were compared in the different groups to determine the influence of the types of recurrences. Different clinical risk factors were compared between patients with ER and patients with DR and NR.

Results: Overall, 5 year OS and DFS were 45.3 and 35.7%, respectively. After a mean follow-up of 33 months, ER was diagnosed in 86 patients (40%) and DR in 40 (18.6%). In patients with ER, 5-year OS was significantly reduced as compared with the group DR + NR, representing respectively 40.4% versus 57.3% (p < 0.001). Predictive factors significantly associated with ER in multivariate analyses and available before liver surgery were: N+ stage of the primary tumor, synchronous CRLM, initially unresectable CRLM and absence of response to neoadjuvant chemotherapy. Points were attributed to each factor, leading to a score from 0 to 8. In the entire population, OS was significantly correlated with this score.

Conclusions: The association of many preoperative clinical negative predictive factors may permit to select patients that will not benefit from surgery in terms of OS.

PPL24-116
CANCER STEM CELL MARKERS PREDICT EARLY RECURRENTNESS AND PROGNOSIS IN HEPATOCELLULAR CARCINOMA
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Introduction: Surface markers CD133, CD90, and EpCAM have been recognized as putative liver cancer stem cell (LCSCs) markers. The aim of this study was to investigate the recrudescent and prognostic impacts of CD133, CD90, and EpCAM in hepatocellular carcinoma (HCC).

Method: Ninety HCC patients who underwent curative hepatectomy between April 2007 and April 2009, including 38 cases with early recurrence and 52 cases with non-early recurrence, were collected. After propensity score analysis to adjust for baseline differences, 25 pairs of matched patients were selected. Tissue samples from HCC patients and ten normal adult liver tissue samples were collected. The expression of CD133, CD90, and EpCAM were detected by immunohistochemistry. The association of CD133, CD90, and EpCAM expression with early recurrence and survival of the patients were evaluated.

Results: Significant differences between normal adult liver tissue and cancer were observed for all surface markers (p < 0.001). Expression of CD133 was only associated with tumor capsule (p = 0.005). Expression of CD90 were linked to higher histopathologic grade (p = 0.010) and tumor size (p = 0.034). Expression of EpCAM was correlated with elevated serum AFP levels (p = 0.021). The expression of CD90 and EpCAM in the early recurrence group were significantly higher than that in non-early recurrence group (p = 0.001, p = 0.045), but the expression of CD133 were not statistically different (p = 0.440). In multivariate analysis, only positive CD90 expression was significantly associated with early recurrence. Additionally, Positive expression of CD90 and EpCAM, Edmondson grade, tumor size were significantly associated with the prognosis of HCC patients in log-rank test, and COX regression analysis revealed that independent prognostic predictors were tumor size and positive expression of EpCAM.

Conclusions: This research suggests that expression of CD133, CD90, and EpCAM is linked to tumor progression. Additionally, positive EpCAM expression indicates a poor prognosis, and positive CD90 expression can serve as a significant predictor for early recurrence in HCC.
ELEVATED PREOPERATIVE PERIPHERAL BLOOD MONOCYTE COUNT PREDICTS POOR PROGNOSIS FOR HEPATOCELLULAR CARCINOMA AFTER CURATIVE RESECTION

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**Introduction:** The aim of this study was to determine whether monocyte count was prognostic in hepatocellular carcinoma (HCC) following curative resection, especially in hepatitis B virus (HBV) associated HCC.

**Method:** Preoperative absolute number of peripheral monocytes, as well as demographics, clinical, histopathologic, and laboratory data of 351 HCC patients treated with curative surgery were retrospectively reviewed and analyzed.

**Results:** On univariate and multivariate analysis, elevated monocyte count (≥545/mm³), tumor size ≥ 5 cm, non-capsulation, and multiple tumors (more than one tumor) were associated with poor DFS and OS. The 1, 3 and 5-year DFS rate was 58%, 41% and 35% respectively for patients with monocyte counts <545/mm³, and 36%, 23% and 21% for patients with monocyte counts ≥545/mm³ (p < 0.01). Correspondingly, the 1, 3 and 5-year OS rates were 79%, 53% and 46% for monocyte counts <545/mm³, and 64%, 36% and 29% for monocyte counts ≥545/mm³ (p < 0.01). Both DFS and OS of HCC patients with monocyte counts <545/mm³ were significantly better than for patients with monocyte counts ≥545/mm³. Subgroup analysis indicated that DFS after hepatic resection of HBV infected patients was significantly better for the patients with a peripheral blood monocyte count <545/mm³ (p < 0.001), but it didn’t differ between patients without HBV infection (p = 0.858). In addition, DFS was significantly better for the patients with a peripheral blood monocyte count <545/mm³, whether cirrhosis was present or not (p = 0.018 vs p = 0.002). Patients with elevated monocyte counts tended to have a larger tumor (p = 0.019).

**Conclusions:** Elevated preoperative monocyte count is an independent predictor of worse prognosis for patients with HCC after hepatic resection, especially for patients with HBV infection. Postoperative adjuvant treatment might be considered for patients with elevated preoperative monocyte counts.

CORRELATION OF GENE EXPRESSION OF ATP-BINDING CASSETTE PROTEIN AND TYROSINE KINASE SIGNALING PATHWAY IN PATIENTS WITH HEPATOCELLULAR CARCINOMA

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**Introduction:** Recent evidence suggests an involvement of the tyrosine kinase signaling pathway in the development of ATP-binding cassette (ABC) protein-mediated multidrug resistance in cancer. The aim of our study was to determine the relevance of kinase and multidrug-resistance protein expression in human hepatocellular carcinoma (HCC).

**Method:** Paired tissue samples of HCC and corresponding peri-neoplastic tissue were analyzed. The gene expression of ABC proteins and Mitogen-activated protein kinase (MAPK) signaling cascade kinases was evaluated by realtime-PCR and correlated with a series of clinicopathological parameters. In vitro effects of MEK inhibition were evaluated in HepG2 cells.

**Results:** Overexpression of ABC proteins, tyrosine kinases, or both was detectable in 40%, 86% and 33% of HCC samples, respectively. MRPI-, MRP2- and MRP3-mRNA levels were significantly increased in 13%, 20% and 33% of the HCC samples compared to the corresponding peri-neoplastic tissue (p ≤ 0.05). There was an association of ABCC1 and ABCC2 overexpression in HCC tissue (p ≤ 0.05). EGFR-, RAF-, MEK-, ERK- and MAPK-mRNA were overexpressed in 33%, 33%, 40%, 50% and 50%, respectively compared to the peri-neoplastic tissue (p ≤ 0.05).
expression of MRP1, MRP2 and P-Glycoprotein correlated statistically with the MEK gene expression. Patients with tyrosine kinase overexpression had significantly higher angioinvasion (p ≤ 0.05). RAF overexpression correlated statistically with increased tumor size (p = 0.052). In vitro, MEK inhibition led to a reduced ABCCL mRNA and protein expression.

Conclusions: ABC proteins and tyrosine kinases are significantly overexpressed in HCC tissue. The multidrug-resistance phenotype is associated with the MEK expression in HCC. Inhibition of MEK might be a new therapeutic approach to restore chemosensitivity in patients with highly resistant tumors.

PPL24-120
NRF2 DEFICIENCY AUGMENTS THE ACTIVITY OF HEPATIC PROGENITOR CELLS DURING CHOLESTASIS
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Introduction: Transcription factor nuclear factor erythroid 2-related factor 2 (Nrf2) is a central regulator of cellular defense against oxidative stress and inflammation and is also involved in regulating liver regeneration. The aim of the study is to evaluate whether Nrf2 mediates hepatic repair response during cholestasis.

Method: Wild-type and Nrf2-null mice were subjected to bile duct ligation (BDL) or sham operation. Various assessments were performed at 5, 10, 15, 25, and 40 days following surgery.

Results: Significant genotype-dependent differences in liver injury, cell proliferation, and collagen deposition were not seen over the time course of the study. Nrf2-null mice exhibited a more prominent network of septal tissue containing laminin and z fetal protein expressing cells at 15 days after injury, suggesting a stronger repair response, than their wild-type litter mates. In the livers of both genotypes of mice, cytokeratin 19 (CK19), a marker of bipotent liver epithelial progenitors and immature biliary epithelial cells, were expressed in the epithelial cells of newly formed bile ducts and a population of hepatocytic-appearing cells in parenchyma. Notably, Nrf2-null mice showed higher hepatic protein expression of CK19 at 5 days following BDL, indicating earlier onset of the activation of CK19+ progenitor cells, than wild-types. CD133, a marker of liver progenitors, were found to be expressed by newly generated bile duct epithelial cells and a population of hepatocytic-appearing parenchymal cells in the livers of the two genotypes of mice. Hepatic CD133 protein expression was gradually elevated, paralleling continuous increase in the number of CD133+ hepatocytic-appearing cells, as the cholestasis progressed. Remarkably, lack of Nrf2 let to markedly higher magnitudes of the increases in hepatic CD133 protein level and in the number of CD133+ hepatocytic-appearing cells.

Conclusions: Collectively, our data demonstrate that Nrf2 deficiency evokes higher activity of liver progenitor cells and thus stronger liver repair response.

PPL24-121
SURGICAL RESECTION OF HEPATIC CYSTIC ECHINOCOCCOSIS IMPAIRED BY PREOPERATIVE DIAGNOSIS: REPORT OF A CASE
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Introduction: Cystic echinococcosis (CE) is a rare afferent infectious disease in Japan. Echinococcosis is one of the most familiar zoonosis and mainly infects the human liver.

Method: This article reports a case of a hepatic cyst being diagnosed after surgical resection. A 40-year-old Syrian male was admitted for evaluation of a hepatic cyst.

Results: Enhanced CT of the abdomen revealed a large cystic lesion, in the left lateral sector of the liver, which had many septa like a honeycomb. We preoperatively diagnosed this lesion as cystadenocarcinoma or CE. We performed a left hepatectomy. Pathological examination revealed the presence of protoscolices in the fluid of the cysts and led to a diagnosis of this lesion as CE.

Conclusions: On seeing patients with huge hepatic cysts who come from an epidemic area, we should consider hepatic CE.

PPL24-122
CONSTRUCTION OF A NEW HCC CLASSIFICATION FOR HEPATOCELLULAR CARCINOMA AND COMPARISON WITH PREVIOUS NINE STAGING SYSTEMS
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Introduction: It has been validated that HCC of different etiologies may belong to different populations which lead to different prognosis. China has the highest mobility of HCC accounts about 55% of the world, but there is still no consensus on which is the best system to predict prognosis in ethnic Chinese population. Reviewing the existing stagings, only the CUPI staging is the only system for HBV infection suitable for ethnic Chinese, but its priority to other stagings remains to be validated and improved, so it is imperative to explore other better staging systems showing significant good predictive value for ethnic Chinese.

Method: From 1999 to 2010, 908 ethnic Chinese patients diagnosed with HCC (mainly hepatitis B-associated) were enrolled into this study. A multivariate analysis on 24 patient characteristics was performed using a Cox regression model. Independent prognostic factors were introduced to construct the new HCC classification. Akaike information criterion (AIC) was
calculated to have an overall assessment of a certain staging system for the comparison across different staging systems. Survival curves were plotted with the Kaplan-Meier method and were compared for all HCC staging systems.

**Results:** Of the previous nine HCC staging systems, TNM staging system showed the best prognostic significance (AIC = 3719.39), but it had discriminatory for patients with advanced disease for not considering liver function. The new HCC classification shows a better stratification ability for late stage candidates than that of TNM and the best prognostic ability (AIC = 3711.41).

**Conclusions:** For patients with mainly hepatitis B-associated HCC, the new HCC classification was more discriminant than all other nine staging systems. It still showed the best ability at predicting survival. Nevertheless, the new HCC classification needs to be validated by different cohorts of patients before it can be recommended for general use.

**PPL24-123**

**PRELIMINARY EXPERIENCE WITH MULTIPLE MICROWAVE ABLATION FACILITATED BY COMPUTER-ASSISTED LIVER NAVIGATION IN ADVANCED NEUROENDOCRINE LIVER METASTASIS**

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**Introduction:** We have previously reported on a novel means to control multiple liver lesions by computer assisted liver surgery (CALS) and demonstrated its benefits in over 100 patients suffering from advanced colorectal metastasis and primary liver tumors. Here we report our preliminary experience with CALS in the setting of advanced foregut neuroendocrine tumors with a multitude of neuroendocrine liver metastasis (NLM).

**Method:** We report on 2 patients with synchronous NLM. In Pat 1 the primary tumor was located in the pancreas (T3N1M1 G2) and the liver was seeded with 37 lesions as assessed by MEVIS reconstruction. Following metabolic therapy with DOTATOC we used Microwave ablation (MWA) with CALS in order to target 16 zones within the liver.

In Pat 2 the primary was located in the jejunum (T2N0M1 G1) and there were 63 NLM as assessed by MEVIS reconstruction. All tumor zones were targeted in combination with a Seg. VI resection. MWA parameters were set between 10 seconds and 2 minutes at 100 Watt in both procedures. Both patients received 4 weeks oral antibiotics.

**Results:** No perioperative complications occurred and both patients were dismissed within 8 and 11 days, respectively. In Pat 1, CALS was followed by SIRT for further treatment of 10 remaining metabolically active lesions. The patient remains asymptomatic, with low Chromogranin A levels and stable lesions for a follow up period of 15 mts. In Pat 2, postoperative CT scan 3/63 remaining lesions. At follow-up of 2 mts the patient remains asymptomatic with normalised Chromogranin levels.

**Conclusions:** Targeting of multiple, even high-numbered NLM can be achieved safely according to this preliminary experience, in particular without infectious complications with CALS directed microwave ablation. This might serve as adjunct to other therapies for the control of advanced NLM.

**PPL24-124**

**RADIOFREQUENCY ABLATION AS EMERGENCY TREATMENT IN A MASSIVE HEMOPERITONEUM FROM A MULTIFOCAL HCC**

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**Introduction:** The hemoperitoneum is one of the possible complications of HCC that may require emergency surgery as an alternative to radiological locoregional therapies.

We present a case report of a 78-year-old patient with an alcoholic related end stage liver disease and a multifocal HCC with massive neoplastic evolution of the cirrhotic liver associated with refractory ascites.

**Method:** Abdominal CT scan, showed multiple and bilateral foci of bleeding from broken liver cancer. He was urgently transferred from the radiology unit in the operating room for massive hemoperitoneum and hemorrhagic shock. The middle line laparotomy detected a massive hemoperitoneum. The cirrhotic liver in an involution phase had reabitation of umbilical vein and collateral vessels.

**Results:** The liver completely subverted by tumor had two spontaneous bleeding lacerations on Segment II and IV uncontrollable with conventional hemostatic techniques. It was decided, therefore, to carry out the coagulation of the multiple vascular afferents of each single mass by means of RF cycles performed circumferentially on both nodules for a total of 40 minutes. The final hemostasis resulted ultimately effective. The patient was transferred to the ICU for postoperative monitoring in terms of hemodynamic stability. In second post-operative day the patient was discharged and reassigned to the medical ward of belonging.

**Conclusions:** The multifocal bleeding HCC still has an extremely high mortality, the angiographic control of multiple bilateral bleeding lesions can be extremely difficult and can be contraindicated by the location of the lesions and by the overall clinical condition of the patient, especially from the hemodynamic point of view.

In this case, treatment with RF has proven to be effective in the control of multiple and bilateral hepatic lesions, only as hemostatic-intent. This particular technique allowed us to attack the lesion at the level of the vascular pedicle in order to control the bleeding.

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PPL24-125

PRECISE ABLATION OF THE SEGMENTAL GLISSONIAN PEDICLE BY ULTRASOUND-GUIDED RADIOFREQUENCY IN ANATOMIC LIVER RESECTION

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Introduction: Anatomic liver resection has been widely accepted as the most optimum surgical option for HCC. However, the current techniques to delineate the segment have certain limitations. This research is to demonstrate the technique of ultrasound guided segmental glissonian pedicle radiofrequency ablation prior to liver resection in a porcine model.

Method: Twelve animals were divided into 2 groups. Coagulative destruction of the segmental vessels was induced by introduction of a “cooled-tip” radiofrequency electrode under ultrasound guidance. In group B, the hepatic artery was clamped temporarily at the time of radiofrequency ablation. Three segments were resected on each pig.

Results: There was no mortality or morbidity in either group following RFA application. Demarcation areas were clearly observed in 92% of all targeted segments (83% vs 100%; p = 0.000) within an average of 124.0 ± 36.2 seconds following application of radiofrequency. The flow rate of the targeted segmental portal branches was 0 cm/s after radiofrequency. There was no difference in the flow rate of the unaffected segmental vessels following RFA. The mean ablated length of segmental portal, arterial and biliary tract branches was 0 cm/s after radiofrequency. The flow rate of the targeted segmental portal/C6 vessels following RFA. The mean ablated length of segmental portal, arterial and biliary tract branches was 0 cm/s after radiofrequency. There was no difference in the flow rate of the unaffected segmental vessels following RFA. The mean ablated length of segmental portal, arterial and biliary tract branches was 0 cm/s after radiofrequency. There was no significant difference between the two groups.

Conclusions: The experiment showed that the technique of ultrasound guided RFA ablation of the segmental glissonian pedicle is expedient, safe and effective. Simultaneous temporary occlusion of the hepatic artery adds further benefit. The probe needs to be at least 1.5 cm away from non targeted structures to avoid unintended thermal injury.

PPL24-126

SUSTAINED METHYLENE BLUE STAINING TO GUIDE ANATOMIC HEPATECTOMY

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Introduction: The boundary of the target hepatic segment within the liver parenchyma cannot be marked using a conventional anatomic hepatectomy approach. This study described a novel methylene blue staining technique for guiding anatomic resection of hepatocellular carcinoma (HCC).

Method: Between February 2009 and December 2010, anatomic hepatectomy was performed in 57 HCC patients using a novel sustained methylene blue staining technique. Sustained staining was achieved by injecting methylene blue into the distal aspect of the portal vein after exposing Glisson’s sheath. The hepatic pedicle was immediately ligated, and the hepatic parenchyma transection was performed along the interface between methylene blue stained tissue and unstained tissue.

Results: Anatomic hepatectomies were subsegmentectomy (n = 8), monosegmentectomy (n = 27), multisectionectomy (n = 16), and hemihepatectomy (n = 6). The portal vein was successfully injected with methylene blue in 100% of cases, and complete staining of the target hepatic segment was achieved in 52/57 (91.2%) cases. Mean intraoperative bleeding was 330 ± 70 mL, and the postoperative complication rate was 22.8% (13/57). All complications were successfully managed via conservative treatment. Surgical margins were all negative on pathologic examination. Mean duration of postoperative follow-up was 34 months (range, 24–46 months). No local recurrence (around the surgical margin) occurred.

Conclusions: This novel technique of achieving sustained staining by injecting methylene blue then immediately ligating the hepatic pedicle is simple and feasible. It can guide the selection of the surgical margin during hepatic parenchyma transection to improve the accuracy of anatomic hepatectomy for the treatment of HCC.

PPL24-127

A SUCCESSFUL RESECTED CASE OF HILAR CHOLANGIOCARCINOMA WITH RIGHT-SIDED ROUND LIGAMENT

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Introduction: A right-sided round ligament is a rare congenital anomaly with a reported frequency of 0.2–1.2%, and is defined when the gallbladder is located to the left of the round ligament without situs inversus. We herein report a resected case of hilar cholangiocarcinoma with right-sided round ligament.

Method: A 63-year-old female consulted a local physician due to icterus. After insertion of endoscopic retrograde biliary drainage tube, she was referred to our hospital. Laboratory findings at admission were as follows: WBC 7100/μL, AST 56 U/L, T-BIL 1.4 U/L, CEA 1.7 ng/mL, CA19-9 903 U/mL, HCV Ab (−), HBs Ag (−), ICGR15 21.8%, LHL15 0.935. MRCP revealed a right-sided hilar cholangiocarcinoma. MDCT showed that the round ligament existed from right portal vein. Branching type of portal vein in cases with right-sided round ligament is generally classified into trifurcation type and bifurcation type, and this case had the trifurcation type, in which the first branch of the portal vein ran to the posterior segment and then the portal vein formed a trunk of the left and right anterior portal veins.
Results: Operative procedure: Right lobectomy with lymphadenectomy and extrahepatic bile duct resection. Operation time was 510 minutes, and blood loss was 324 mL. Pathological diagnosis was as follows: Broci, flat invasive type, S0, hinf2, H0, ginf0, panc0, du0, pv2, a2, n2, T4N2M0, Stage IVb. The patient had an uneventful postoperative course.

Conclusions: We successfully performed right hepatic lobectomy in a case of hilar cholangiocarcinoma with a right-sided round ligament. From the surgical point of view, a precise preoperative identification of right-sided round ligament would be important, because it accompanies several types of abnormal intrahepatic vessel ramification.

PPL24-128
FIVE-YEAR SURVIVAL OF AFP-PRODUCING GASTRIC CANCER WITH SYNCHRONOUS LIVER METASTASIS: REPORT OF A CASE
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Introduction: Alpha-fetoprotein-producing gastric cancer (AFPGC) is a rare subtype of gastric cancer. It is associated with a poor prognosis because it readily metastasized to the liver and lymph nodes. Despite attempts to treat AFPGC using many types of therapies, the prognosis remains poor. We show a case of AFPGC treated using multimodal therapy who survived for 5 years. Here, we focus on the effectiveness of hepatic intra-arterial chemotherapy combined with oral administration of sorafenib tosylate.

Method: No method.

Results: AFPGC is associated with bleak prognosis because of liver and lymph node metastasis. We present a case of AFPGC with synchronous liver metastasis who survived for 5 years. A 69-year-old man with upper abdominal pain was referred to our hospital. Upper gastrointestinal endoscopy showed a Borrmann II-like tumor in the lower part of the stomach. Computed tomography (CT) showed a hypovascular tumor in the left lobe of the liver. Serum AFP levels were increased. We diagnosed AFPGC with synchronous liver metastasis. After administering oral tegafur/gimeracil/oteracil potassium, we perfomed distal gastrectomy and administered hepatic intra-arterial cisplatin injection. Liver metastasis showed partial response on CT. Despite left hepatic lobectomy, further metastases to the liver and mediastinal lymph nodes became difficult to control. After sorafenib tosylate administration, stabilization of the disease was observed for 4 months. We conclude that hepatic intra-arterial chemotherapy and oral administration of sorafenib tosylate may potentially improve the prognosis in such cases.

Conclusions: We present a case of AFPGC with synchronous liver metastasis who survived for 5 year.

PPL24-130
REAPPRAISAL OF ANATOMICAL RESECTION FOR THE PATIENT OF HEPATOCELLULAR CARCINOMA FROM A VIEWPOINT OF THE RECURRANCE SITE
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Introduction: Necessity of segment-oriented anatomical resection (AR) for hepatocellular carcinoma (HCC) is still under debate. We studied this issue from a viewpoint of the site of recurrence.

Method: One hundred and forty-three surgical cases of HCC between 2002 and 2011 at our hospital were retrospectively reviewed. Primary cases of single HCC smaller than 5 cm with R0 resection were enrolled because larger tumor was hardly a candidate of non-anatomical resection (non-AR). As a result, 50 patients of 20 with AR and 30 with non-AR were extracted and a recurrence rate, time to recurrence and intrahepatic recurrence site were analyzed.

Results: Cumulative recurrence rate followed a distinct two-stage locus: Steep increase within 30 months post surgery and moderate increase thereafter. To exclude de novo carcinogenesis, only the recurrence within 30 months was handled hereafter. De novo recurrence was only 3 in AR and 2 in non-AR. Background liver function was significantly poorer in non-AR. Extrahepatic recurrence was comparable between the groups. There was no difference in the intrahepatic recurrence rate between the groups: AR = 6/20 and non-AR= 13/30 (chi square test, p = 0.39), suggesting non-benefit of AR. Then we analyzed whether the intrahepatic recurrence site after non-AR was biased to the segment (or sector) identical to that of the primary tumor or not. Out of 13 patients, the recurrence site after non-AR was within the identical segment (or sector) in 6 patients and beyond the identical segment (or sector) in 7 patients, suggesting non-benefit of AR again.

Conclusions: Although the number of cases is small and factors like a distance of surgical margin etc. are lacking in this study, the benefit of AR was not demonstrated from the viewpoint of the recurrence site in our daily practice. A larger study of the recurrence site after non-AR is warranted to settle the long-lasting debate about clinical value of AR.

PPL25-001
ROBOTIC PANCREATECTOMY AND HEPATECTOMY: INITIAL EXPERIENCE AT SINGAPORE GENERAL HOSPITAL
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Introduction: The most significant advance in laparoscopy in the last 10 years is the advent of robotic laparoscopic surgery using specialised systems. Although robotic surgery has been adopted routinely for various surgical procedures such as prostatectomy, its use in...
liver and pancreatic surgery remains limited. Presently, the application of robotic technology for pancreatectomy and hepatectomy remains controversial and few large series’ have been reported worldwide. This study aims to examine our institution’s preliminary experience with robotic liver and pancreas resections.

Method: This is an IRB-approved prospective study of 5 consecutive patients who underwent robotic pancreatectomy or hepatectomy with the da Vinci-Si Surgical System (Intuitive Surgical Sunnyvale, Calif. USA) over a 6-month period at a single institution.

Results: During the study period there were 3 robotic hepatectomies including 1 left lateral sectionectomy, 1 segment II/III resection (non-anatomical) and 1 segment V resection with cholecystectomy. The hepatectomies were performed for suspected hepatocellular carcinoma in 2 patients and for a large symptomatic haemangioma in 1 patient. Two patients underwent robotic spleen-saving (vessel preserving) distal pancreatectomies for a solid pseudopapillary neoplasm and an indeterminate pancreatic cystic neoplasm. The median age of patients was 53 (range, 38–66) years and there were 4 males. The median total operating time (including docking time) was 350 (range, 155–540) minutes and the median blood loss was 200 (range, 50–300) mL. No conversions were required and there were no mortalities or major morbidities (≥Clavien-Dindo grade 2). The median hospital stay was 5 (range, 3–14) days.

Conclusions: Our initial experience confirms the feasibility and safety of the application of robotic-assisted surgery in pancreatic and liver resections.

PPL25-002

MULTIVARIATE ANALYSIS OF 353 CONSECUTIVE PATIENTS AFTER RESECTION OF HEPATIC METASTASES FROM COLORECTAL CANCER

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Introduction: To report the 5 year overall survival and disease free survival results in patients who have undergone resection of hepatic metastases from colorectal cancer.

Method: Between May, 1990 and December, 2011, 279 patients who underwent hepatectomy for CRLM at our center. They were grouped ED (early death within 1 year after liver resection). We analyzed the risk factors for early cancer recur and death.

Results: The ED Group included 26 patients, The NED group included 253 patients. The ER Group included 72 patients, The NER Group included 207 patients. The cause of death included cancer progression (n = 20, 76.9%), hepatic failure (n = 3, 11.5%), operation-related (n = 2, 7.7%), and other (n = 1, 3.8%). In univariate analysis, surgery alone without perioperative chemotherapy and poor differentiation of colorectal cancer were identified risk factors for early...
death, and metachronous metastasis, surgery alone without perioperative chemotherapy, tumor size ≥5 cm, multilobular metastasis, CEA>50 ng/mL, and poor differentiation of colorectal cancer were identified risk factors for early recur. Multivariate analysis, surgery alone without perioperative chemotherapy and poor differentiation of colorectal cancer were identified risk factors for early death and tumor size ≥5 cm, surgery alone without perioperative chemotherapy and poor differentiation of colorectal cancer were identified risk factors for early recur.

**Conclusions:** More adjunctive perioperative chemotherapy should be considered for patients with these risk factors (tumor size ≥5 cm and poor differentiation of colorectal cancer), because these patients tend to die or recur within 1 year after liver resection.

**PPL25-004**

**THE OUTCOMES OF SURGICAL TREATMENT OF HUGE HCC**

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**Introduction:** Hepatocellular carcinoma (HCC) is the second cause of cancer-related death in Korea. Although, the surgical resection is a gold standard in treatment of HCC, there are some debates for the treatment of huge ≥10 cm) HCC. We have evaluated the outcomes of resection of huge HCC.

**Method:** We reviewed 646 patients who had undergone surgical treatment for HCC between Jan 1987 and Jun 2013. Fifty-four of 646 patients had huge HCC. Clinicopathologic parameters affecting survival were analysed using univariate and multivariate analyses.

**Results:** There were no postoperative mortality in huge HCC group. Postoperative complication rate were 33.8% in small HCC group and 45.3% in Huge HCC group. Postoperative complication rate were 61.9% in small HCC group and 42.3% in huge HCC group. Multivariate analysis, surgery alone without perioperative chemotherapy and poor differentiation of colorectal cancer were identified risk factors for early recur.

**Conclusions:** More adjunctive perioperative chemotherapy should be considered for patients with these risk factors (tumor size ≥5 cm and poor differentiation of colorectal cancer), because these patients tend to die or recur within 1 year after liver resection.

**PPL25-005**

**PRIMARY HEPATIC LEIOMYOMA ARISING IN HEALTHY PATIENT: A CASE REPORT**

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**Introduction:** Leiomyomas are very rare, benign liver tumors developed from the smooth muscles of the vessels or bile ducts. It can be more observed in patients with immunosuppression or organ transplantation. Herein, we report a case of primary hepatic leiomyoma arising in healthy patient.

**Method:** A 42-year-old woman was referred to our hospital for further evaluation of the presence of hepatic mass, detected on ultrasonogram (US) performed for routine screening examination. The patient was asymptomatic. She had no history of liver disease or oral contraceptive usage. Physical examination revealed a mass in epigastic area of abdomen. All the routine laboratory tests including liver function tests and tests for tumor markers yielded normal findings. Abdominal computed tomography (CT) scan demonstrated a 7.4 × 7.1 cm sized well-defined mass in left subhepatic space that showed heterogenous enhancement in arterial phase, homogenous and delayed enhancement in delayed phase. Liver magnetic resonance images (MRI) scan demonstrated a 7.5 × 7 cm sized mass showed low signal intensity on T1 and T2 weighted images. There was displacement of portal triad, but no evidence of hepatic artery or portal vein involvement. The finding suggested hepatic adenoma or neurogenic tumor.

**Results:** The patient underwent laparotomy with excision of mass, caudate lobe wedge resection. At laparotomy, there was a 8 × 8 × 6 cm sized round, whitish smooth mass on caudate lobe and there was no vascular invasion. Microscopically, the tumor is composed of bland-looking spindle cells with whirling pattern and showed negative margin for tumor. Immunohistochemical staining was positive for Actin, Desmin, Vimentin, Caldesmon. Stains for CD34, C-kit, CK, S-100, HMB-45, EMA were negative. Pathologically, the tumor was identified as a primary hepatic leiomyoma.

**Conclusions:** Primary hepatic leiomyoma is a rare neoplasm and it should be considered differential diagnosis of other liver lesions.

**PPL25-006**

**SIMULTANEOUS LAPAROSCOPIC S8 SEGMENTECTOMY OF LIVER AND LADG IN PATIENT WITH SYNCHRONOUS HCC AND EGC**

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**Introduction:** As we encounter patients diagnosed with double primary cancer, we think over a proper way of treatment. Nowadays, preferable treatment on both early gastric cancer (EGC) and hepatocellular carcinoma (HCC) is laparoscopic surgery. Various literatures have reported there are no differences with
oncologic safety and feasibility between open and laparoscopic surgery for each cancer. Hereby, we report simultaneous laparoscopic S8 segmentectomy and laparoscopic-assisted distal gastrectomy (LADG) in patient with synchronous HCC and EGC.

**Method:** A 58-year-old male patient was diagnosed with EGC and HCC (S8) during cancer screening test. He presented with a 3.9 × 4 cm sized HCC confirmed by ultrasound (US)-guided biopsy in segment 8 of the liver and 1 cm sized EGC (signet ring cell carcinoma) that is located at great curvature of antrum, and localized at mucosa without lymphovascular invasion confirmed by Endoscopic US (EUS). Laparoscopic S8 monosegmentectomy was firstly performed with 4 ports method (umbilicus and epigastrum: 11 mm, Rt. mid-abdomen and Lt. upper abdomen: 5 mm), and LADG with D2 lymph node dissection was performed later with additional 2 ports (Rt. lower abdomen: 11 mm, Lt. lower abdomen: 5 mm).

**Results:** An operating time was 215 minutes, and estimated blood loss was 100 cc. Diet was started at post-operative day 3 and discharged at postoperative day 8 without another complications.

**Conclusions:** We suggest that simultaneous laparoscopic treatment for synchronous HCC and EGC would be safe and feasible method.

**PPL25-007**

**THE EFFECT OF VARIOUS IMMUNOSUPPRESSANT ON EPCAM+, CD133+ CELLS**

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**Introduction:** Liver transplantation (LT) for HCC has been increasing. HCC recurrence after LT is an important risk factor affecting survival. Therefore, optimal immunosuppressant to reduce HCC recurrence is important in advanced cases. According to the cancer stem cell (CSC) theory, the effect on CSC is important to select optimal immunosuppressant. In this study, we evaluate the effect on CSC by various immunosuppressant.

**Method:** CSC subpopulation was defined as EpCAM+, CD133+. Double negative subpopulation was defined as non-CSC. Huh7 and 4 kinds of immunosuppressants (Sirolimus, Tacrolimus, Cyclosporine A, MMF) were used. Cell proliferation was measured by MTT assay. Apoptosis was measured Annexin V and 7-AAD kit. Cell cycle was measured by FACS.

**Results:** Total cell proliferation was decreased in Sirolimus or MMF treated group. However, the proportion of CSC was increased in both groups. No significant change was identified in Tacrolimus or Cyclosporine treatment group. Apoptosis was decreased in CSC subpopulation, however, increased in non-CSC sub-population after Sirolimus treatment. Cell cycle arrest was measured in both CSC and non-CSC sub-populations by Sirolimus (G1 arrest) or MMF (S arrest) treatment. No cell cycle change was identified in Tacrolimus or Cyclosporine A treatment group.

**Conclusions:** Cell proliferation of total cells was inhibited by Sirolimus. However, CSC was more resistant to Sirolimus in Huh7. Additional policy to reduce the number of CSC is needed in Huh7.
PPL25-010
HEPATOICOJEJUNOSTOMY: A REAPPRAISAL OF ITS INDICATIONS, RESULTS, AND LONG TERM OUTCOME

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Introduction: HJ though commonly performed, if not properly performed has both immediate and long term complications. The present study evaluates our outcome of HJ performed in a mixed cohort of patients of iatrogenic bile duct injuries, biliary tract, pancreatic malignancies and other benign biliary pathology.

Method: Between 2008 and May 2013, the records and operative notes of all patients of HJ were reviewed with regards to surgical technique, operative mortality, post-operative complications and postoperative liver function tests with respect to biliary function. End-to-side HJ done in majorit, with Hepp-Couinaud approach in high strictures and recurrences. Anastomosis done with 4/0 PDS taking interrupted sutures. The mean follow-up was 19.4 months (range 1.0–44.7 months).

Results: Eight-eight (48 females) hepaticojejunostomies, including three redo anastomoses, were performed. The indications included 28 following Whipples surgery, 17 following choledochal cyst excision, 40 secondary to iatrogenic BDI and 3 for benign primary biliary pathology. End-to-side hepaticojejunostomy was performed in 72 patients and 16 performed by Hepp-Couinaud technique. This was for patients of BDI (E3-11, E4-4, E5-1) including 3 re-do HJ. There was one perioperative death secondary to sepsis following bile leak. Bile leak was in 3. The long-term results of 65 patients were: 56 symptom-free; 7 had brief episodes of cholangitis, 5 of whom treated conservatively, and 2 with PTBD for stricture. 1 reoperation for stricture and one on whom redo anastomosis was done subjected to Left hepatic resection.

Conclusions: Hepaticojejunostomy is a safe and reliable method for biliary reconstruction. Interrupted sutures using PDS 4.0 provides good results. It should be performed in centers capable of dealing with complications.

PPL25-011
A CASE OF PRIMARY HEPATIC NEUROENDOCRINE TUMOR UNDERGOING A REPEAT HEPATECTOMY

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Introduction: The most common site of primary gastroenterological neuroendocrine tumor (NET) is the ileum, followed by the rectum, appendix, and pancreas. The liver is the most common site for NET metastases, but primary hepatic NET is extremely rare, with only about 100 cases having been reported in the English-language literatures. We report a case with the primary hepatic NET undergoing a repeat hepatectomy.

Method: A 65-year-old man without clinical symptoms had presented with a hepatic cystic tumor since 2 years, and was referred to our hospital because the tumor showed the gradual enlargement in size.

Results: Abdominal enhanced computed tomography and magnetic resonance image showed a hypervascular tumor with cystic component of the segment 8 of the liver. The preoperative diagnosis was cystadenocarcinoma of the liver. We performed a partial hepatectomy of the Segment 8, and the tumor was curatively resected with negative margin. Histopathological diagnosis of the tumor was NET-G2 according to WHO classification. Postoperative examinations did not show the possible primary site of gastrointestinal, pancreatic, or other organic NET. The final diagnosis was the primary hepatic NET with stage III (T3N0M0) as the clinical stage of the liver.

Four deposits of the liver were detected 11 months after the surgery, and these tumors due to intrahepatic recurrence were resected by partial hepatectomies 26 months after the first surgery. The patient is still alive without recurrence 31 months after the first surgery.

Conclusions: Reported 5-year survival of the primary hepatic NET was only 10–20%. Therefore, hepatectomy should be always considered for the primary hepatic NET to improve prognosis, and the repeat hepatectomy also seems to be considered for intrahepatic recurrence of this tumor.
PATIENT: A CASE REPORT

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Introduction: Hepatic carcinosarcoma is defined as a malignant tumor containing an intimate mixture of either hepatocellular carcinoma (HCC) or cholangiocellular carcinoma (CCC) and sarcomatous elements. The pathogenesis of the sarcomatous element has not been fully clarified and the prognosis of this neoplasm is extremely poor. We report a case of primary hepatic carcinosarcoma with portal vein tumor thrombi in a 50-year-old Korean man with hepatitis B virus cirrhosis.

Method: Patient was admitted with vague upper abdominal pain for 1 month. His blood tests were significant for elevated aspartate aminotransferase 48 IU/L, alanine aminotransferase 60 IU/L (normal < 40 IU/L), alkaline phosphatase 606 IU/L (normal < 343 IU/L), total bilirubin 1.4 mg/dL (normal < 1.2 mg/dL) and carbohydrate antigen 19-9 level 69.4 U/ml (normal <37 U/mL). CT scan and MRI of the abdomen showed about 6 x 4 cm mass in left lobe of liver and left portal vein thrombosis extended to main trunk and right extrahepatic portal vein. Subsequently underwent needle biopsy revealed an undetermined type of malignant mesenchymal tumor, which was positive for vimentin and smooth muscle actin in immunohistochemical stain. There was no evidence of distant metastasis in positron emission tomography CT scan. Left hepatectomy and portal vein tumor thrombectomy were performed.

Results: Pathology report was hepatic carcinosarcoma containing an intimate mixture of cholangiocellular and spindle cells in the liver as well as portal vein tumor thrombi. The cholangiocellular components of the tumor were positive for CK7 and negative for glypican and hepatocyte. Spindle cell components were positive for vimentin and CD34 with vascular proliferation. Two months later, the patient had intrahepatic recurrence with invasion of anterior branch of right portal vein, which was followed by death 4 months later due to disseminated malignancy.

Conclusions: Because of highly invasive and metastatic characteristics, carcinosarcoma should be included in the differential diagnosis of a large hepatic mass.
PPL25-014
THE ESTABLISHMENT AND OBSERVATION OF CIRRHOSIS MODEL IN NEW ZEALAND RABBITS BY CARBON TETRACHLORIDE
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Introduction: The purpose of this study is to establish a relatively simple yet stable cirrhotic model in New Zealand rabbits with Carbon Tetrachloride (CCl₄) treatment.
Method: Stage-1: Twenty-four male New Zealand white rabbits were randomized into A, B, C and D groups, given placebo, low, medium and high dosages of CCl₄, respectively. The levels of BW (body weight), TP (total protein), Alb (albumin), Glo (globulin), ALT (alanine aminotransferase), AST (aspartate transaminase), G-GT (γ-glutamyltransferase), WBC (white blood cell), RBC (red blood cell), HGB (hemoglobin) and PLT (platelet) in each group were recorded. Liver biopsy were conducted every 2 weeks in a randomly manner. At stage-2, CCl₄ treatment was stopped when liver biopsy revealed pathological cirrhosis. And the above indices were continually recorded for 8 weeks. Meanwhile, biopsy was conducted to monitor the stability of the liver cirrhosis.
Results: Three New Zealand rabbits in Group C died in the 2nd – 3rd week, five rabbits in Group D died in the 10th week. The liver pathology for cirrhosis revealed that all animals in group-A were staged S0, three in group-B were S4 and the other two were S3. At the second stage, biopsy showed that liver fibrosis of 5 New Zealand rabbits in the Group B improved significantly in the third week (p < 0.05).
Conclusions: Pathological cirrhosis appeared in male New Zealand white rabbits receiving subcutaneous injection of 0.3 mL/kg CCl₄ dissolved in olive oil (1:1 ratio) once every 3 days for 10 weeks. The fibrosis improved in <3 weeks after the withdrawal of CCl₄ and both liver function and hemogram indices recovered to normal levels, suggesting that a sustained treatment of CCl₄ is necessary to maintain the cirrhotic model.

PPL25-016
ISOLATED COMPLETE CAUDATE LOBECTOMY FOR HEPATIC TUMOR OF THE ANTERIOR TRANSHEPATIC APPROACH: SURGICAL APPROACHES AND PERIOPERATIVE OUTCOMES
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Introduction: How to resect the caudate lobe safely is a major challenge to current liver surgery which requires further study.
Method: Nine cases (6 hepatic cell carcinoma, 2 cavernous hemangioma and 1 intrahepatic cholangiocarcinoma) were performed using the anterior transhepatic approach in the isolated complete caudate lobe resection. During the operation, we used the following techniques: the intraoperative routine use of Peng’s multifunction operative dissector (PMOD), inflow and outflow of hepatic blood control, low central venous pressure and selective use of liver hanging maneuver.
Results: There were no perioperative deaths observed after the operation. The median operating time was 230 ± 43.6 minutes, the median intraoperative blood loss was 606.6 ± 266.3 mL and the median length of postoperative hospital stay was 12.6 ± 2.9 days. The incidence of complications was 22.22% (2/9).
Conclusions: PMOD and “curettage and aspiration” technique can be of great help of in the dissection of vessels and parenchyma, clearly making caudate lobe resection safer, easier and faster.

PPL25-017
RAPIDLY ENLARGED INFILAMMATORY HEPATOCELLULAR ADENOMA: REPORT OF A CASE
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Introduction: A new classification for hepatocellular adenoma (HCA) was described in 2006 in WHO classification of tumors of the digestive system. According to this classification, HCA is grouped into three subtypes based on genotype and phenotype as follows: hepatocyte nuclear factor (HNF) 1α-inactivated HCA, β-catenin-activated HCA and inflammatory HCA (IHCA). Among these subtypes, IHCA results from a molecular gain-of-function mutation of the interleukin (IL)-6 pathway, and shows characteristic pathological features such as inflammatory cell infiltration, sinusoidal dilatation and increased expression of inflammatory proteins such as serum amyloid A (SAA) and C-reactive protein (CRP). A non-negligible number of IHCA patients have recently been reported in Western countries, but very few in Asian countries. We now report a case of an IHCA Asian male patient, who showed rapid enlargement of tumor and underwent surgical resection after preoperative perfubutane microbubble (Sonazoid) contrast-enhanced ultrasonography and gadolinium ethoxybenzyl diethylenetriaminepentaacetic acid (Primovist) contrast-enhanced magnetic resonance imaging.
Method: No method.
Results: Screening abdominal CT scan for the fatty liver patient (Japasense, middle-aged male) revealed a 1.7-cm liver mass in the anterior segment of the liver. After 19 months, the lesion had rapidly enlarged to 6 cm in diameter and the patient was referred to our hospital. On Sonazoid-US, the tumor showed a characteristic centripetal filling pattern in the vascular phase. We performed hepatic anterior segment resection because we could not rule out malignant tumor. Histopathological
examination showed hyperplasia of mildly atypical hepatocytes and sinusoidal dilatation with marked inflammatory cell infiltration. Immunohistological staining revealed positive staining for serum amyloid A and C-reactive protein. As the result, we diagnosed this tumor as IHCA. The patient remains alive 51 months after operation without evidence of recurrence.

**Conclusions:** We present a rare case of rapidly enlarged IHCA in an asian patient.

**PPL25-018**

**VIRTUAL HEPATECTOMY IS USEFUL FOR SIMULATION OF ANATOMICAL HEPATECTOMY IN PATIENTS WITH HEPATOCELLULAR CARCINOMA AND INTRAHEPATIC PORTAL VEIN ANOMALY**

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**Introduction:** Intrahepatic portal vein anomaly is rare, but it is the most dangerous anomaly in liver surgery.

**Method:** We present two cases of hepatocellular carcinoma (HCC) and intrahepatic portal vein anomaly.

**Results:** A 65-year-old man had alcoholic cirrhosis and HCC, 5.3 cm in diameter. 3D-CT showed HCC in the posterior section, left-sided gallbladder, right-sided ligamentum teres, and an intrahepatic portal anomaly with a ramification of the anterior portal branch from the left portal vein. Anatomical segmentectomy of segment 6 was performed safely on the basis of virtual hepatectomy simulation.

A 76-year-old man had hepatitis C virus-related cirrhosis and HCC, 4 cm in diameter. 3D-CT showed HCC in the anterior section and an intrahepatic portal anomaly with a ramification of the anterior portal branch from the left portal vein. Anatomical anterior sectionectomy was performed safely on the basis of virtual hepatectomy simulation.

**Conclusions:** Anatomical hepatectomy was successfully performed on the basis of virtual hepatectomy simulation in 2 patients with HCC and intrahepatic portal vein anomaly.

**PPL25-019**

**SHORT AND MIDDLE TERM OUTCOMES AFTER LAPAROSCOPIC VERSUS OPEN LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA: A SINGLE INSTITUTION EXPERIENCE**

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**Introduction:** Laparoscopic liver resection (LLR) has been reported as a safe, minimally invasive, and effective approach to the management of hepatocellular carcinoma (HCC). However, outcomes regarding tumor recurrence and patient survival in comparison with the conventional open approach are limited. The aim of this study was to analyze the perioperative results and survival outcomes of LLR versus open liver resection (OLR).

**Method:** Between June 2010 and May 2013, 104 patients underwent pure laparoscopic liver resection (PLLR) for HCC at Kansai Rosai Hospital. Historical control patients (n = 82) who received OLR for HCC between January 2004 and March 2010 were included for comparison.

**Results:** The patient age was elder in the PLLR group than the OLR group (71.6 vs 68.6; p = 0.0081). No significant differences were noted between the PLLR and OLR groups with respect to patient gender or liver damage. The intraoperative blood loss was lower in the PLLR group than the OLR group (143.9 mL vs 1226.6 mL; p < 0.0001). With the PLLR compared with the OLR group, operation time was 295.4 minutes versus 203.0 minutes (p < 0.0001) and hospital stay was 14.4 days versus 15.5 days (p = 0.5992). AST on the POD1 was 467.0 IU/L versus 396.9 IU/L (p = 0.2558), ALT was 336.9 IU/L versus 304.4 IU/L (p = 0.5223), total bilirubin was 0.89 mg/dL versus 1.18 mg/dL (p = 0.0002), WBC was 9151/μL versus 11585/μL (p < 0.0001), and CRP was 0.97 mg/dL versus 2.80 (p < 0.0001). The surgical margins were similar in the two groups. The 1 year disease-free survival at 1 year of stage I, II, III HCC were 83.1% versus 78.9% (p = 0.6899), 73.7% versus 79.2% (p = 0.6114), and 67.9% versus 43.5% (p = 0.2181) for PLLR and OLR, respectively.

**Conclusions:** Compared with open liver resection, laparoscopic liver resection for HCC is associated with less blood loss and lower systemic influence with no compromise in survival.

**PPL25-020**

**CLINICAL TREATMENT OF MULTIPLE HEPATOCELLULAR CARCINOMA: A RETROSPECTIVE ANALYSIS ON 113 CASES**

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**Introduction:** Multiple hepatocellular carcinoma (multiple HCC) refers to that the number of tumor is more than or equal to two. Previous studies showed that the 5-year survival rate of multiple hepatocellular carcinoma cases is <30%, far lower than that of patients who just have only one single lesion. This study researched and analysed 113 cases of multiple hepatocellular carcinoma, clinicopathological features, the choice of treatment and prognosis. Regarded giving the patients a better and suitable treatment choose as a starting point.

**Method:** Data for 113 multiple hepatocellular carcinoma patients were collected between January and December 2009 in Tianjin Medical University cancer Hospital. All these patients were assigned to three different groups according to different treatments included underwent radical hepatic resection, transarterial...
CHEONGKANG

DEPARTMENT OF PATHOLOGY, POSCO CENTER FOR LIVER FOUNDATION, GUNGOON UNIVERSITY CHOSUNG UNIVERSITY, CHOSUNG UNIVERSITY, CHOSUNG UNIVERSITY

Method: The 1-, 2-, and 3-year overall survival rates of these patients were 36%, 19%, and 11%, respectively, and the median survival was 11.6 months. The 1-, 2-, and 3-year survival rates of radical hepatic resection group were 64%, 45%, and 27%, significantly higher than that of TACE group (33%, 13%, and 7%) and supportive treatment group (0%, 0%, and 0%). Univariate analysis showed that age, tumor location, hepatitis, tumor size, total tumor number, treatment and ALT were poor prognostic factors for multiple HCC. Multivariate analysis revealed that age, hepatitis, tumor size, tumor number, treatment were independent risk factors related to prognostic survival. Conclusions: The patients with multiple hepatocellular carcinoma who are in class B or class C for BCLC classification can also benefit from hepatic resection, if their liver function can tolerate and operation can achieve R0 resection.

PPL25-021

HEME OXYGENASE-1 EXPRESSION AS PROGNOSTIC FACTOR IN PATIENTS WITH HEPATOCELLULAR CARCINOMA

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Introduction: Heme oxygenase-1 (HO-1) is an important enzyme as Heme degradation. HO-1 degrades heme to carbon monoxide (CO), biliverdin, and ferrous iron. HO-1 is increased in stressful condition and major role of enzyme as antioxydative and antiapoptotic effect. HO-1 potently influences tumor growth and metastasis. Some study suggested that HO-1 may play a role in tumor induction and can potentely improve the growth and spread of tumor, and that HO-1 is related to tumor differentiation, apoptosis, progression, angiogenesis, and metastasis. This study represented that HO-1 expression as prognostic factor in patients with hepatocellular carcinoma (HCC).

Method: In this study, the expression of HO-1 in human HCC tissues (n = 96) was investigated by immunohistochemistry. The correlation of HO-1 with the clinicopathological characteristics was analyzed. That resected tumor tissues was confirmed HCC by pathologic division and stored by Paraffin block. Viable HCC tissues were achieved and immunohistochemical stain for HO-1 was done. We analyzed survival by Kaplan–Meier method and crosstabs by chi-square test.

Results: Results showed that HO-1 was expressed in 40 HCC tissues from 96 cases (41.6%). Overall survival (OS) was not statistical difference in HO-1 positive HCC versus negative HCC, mean value was 53.1 months versus 59.5 months (p = 0.102). But disease free survival (DFS) was statistical difference in HO-1 positive HCC versus negative HCC, mean value was 32.3 (months) versus 45.1 (months) (p = 0.044). A high HO-1 expression rate showed a close association with histological differentiation (Edmondson-Steiner grade 3, 4), positive microvascular invasion and capsule invasion (p < 0.05). These results demonstrate that HO-1 is associated with malignant progression in HCC.

Conclusions: Actually HO-1 stained HCC patients was highly recurrence rate, histologically poor grade (E/S grade 3–4), microvascular invasion, and capsular invasion. Thus HO-1 in HCC can be one of prognostic factor and marker of recurrence.

PPL25-022

TRANSARTERIAL CHEMOEMBOLIZATION IN UNRESECTABLE HEPATOCELULAR CARCINOMA: A STUDY OF PROGNOSIS AND SIDE EFFECTS

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Introduction: Transarterial chemoembolization (TACE) alone or in combination with radiofrequency ablation (RFA) is used as a non curative treatment in hepatocellular carcinoma (HCC) for non resectable tumours or as bridging treatment for patients awaiting surgery. The study retrospectively evaluated a consecutive series of patients who underwent TACE to identify incidence of procedure specific complications and prognosis.

Method: A retrospective descriptive cross sectional study was carried out and 175 TACE sessions were included in the study. Data were gathered by way of referring to the relevant medical records of the patients.

Results: Out of the 175 cases studied 144 (82.28%) were males and 31 (17.71%) were females. Mean age of the participants were 67.8 ± 9.78 years. 46 (26.28%) patients who underwent TACE reported as having immediate (within 24 hours) complications while 8 (4.5%) reported as having early (within 30 days) complications. Out of the complications reported post TACE fever was the commonest complication noted with 48 (27.42%) patients reported as having documented fever post procedure. Other common complications noted were groin haematoma 13 (7.42%), arterial bleed 3 (1.71%), arterial dissection 2 (1.14%), Pleural effusion 3 (1.71%), Liver abscess 2 (1.14%) and hepatic infarction 2 (1.14%). TACE related mortality was 4 (2.28%). Overall response assessment using mRECIST criteria found that 10 (5.7%) had complete response (CR) in follow up imaging studies done up to 1 year. While 62 (35.42%) had progressive disease (PD), 25 (14.28%) had partial response (PR) and 61 (34.85%) had stable disease (SD). The average survival from the date of diagnosis was 25.72 ± 6.72 months.

Conclusions: TACE carries a significant morbidity and post TACE fever which in most instances occurred without a septic focus was the most common complication noted. Tumour response rate for TACE is still minimal suggesting that it should always be used concomitantly with surgery and RFA when possible to achieve curative outcome.
PPL25-023

REAL-TIME ULTRASOUND NAVIGATION SYSTEM FOR SYSTEMIC LIVER RESECTION

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Introduction: Systemic liver resection of tumor-bearing portal region is a basic procedure in the treatment of hepatocellular carcinoma (HCC). However, precise parenchymal transection along intersegmental planes is not always easy and technically demanding, so optimal navigation method is required. We devised a simple new navigation approach to guide hepatic parenchymal transection by continuous ultrasound monitoring with the probe positioned behind the liver (Shindoh J., Seyama Y. et al. Hepato-Gastroenterology 60; 590–594, 2013).

Method: Real-time ultrasound monitoring with a probe applied from behind the liver was tried as means of locating the site where resection was proceeding in the liver and confirming the direction of hepatic parenchymal transection to facilitate systemic resection of the liver.

Results: The real-time ultrasound navigation technique was performed during 11 hepatectomies. Continuous scanning of the liver was clearly helpful in i) confirming the site in the liver where the resection was being proceeded and the direction of the parenchymal transection; ii) predicting blood vessels to be encountered in deeper transection planes; iii) ensuring a safe surgical margin around tumor. The mean speed of parenchymal transection was faster (2.4 cm²/minutes vs 1.2 cm²/minutes, p = 0.009) and the amount of blood loss per transected area was smaller (4.4 mL/cm² vs 7.2 mL/cm², p = 0.05) in patients treated with the current technique.

Conclusions: Continuous ultrasound monitoring of the liver is useful to make the parenchymal transection easy.

PPL25-024

SIGNIFICANCE OF THERAPEUTIC OPTIONS FOR RECURRENT HCC AFTER LIVER RESECTION

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Introduction: High incidence of the recurrence after resection of hepatocellular carcinoma (HCC) needs appropriate management of recurrent HCC. The aim of this study is to evaluate the clinical significance of each therapeutic option for recurrent HCC.

Method: From 1994 to 2010, 1091 patients underwent 1015 first time hepatectomies for HCC at this institution. Among them, recurrence occurred in 727 patients (70.5%). They underwent surgery (SUR; n = 265), radiofrequency ablation or percutaneous ethanol injection therapy (RFA/PEI; n = 155), tranarterial chemoembolization (TACE; n = 429), systemic chemo or local radio therapy (CorRT; n = 133), and liver transplantation (LT; n = 5) including duplication. Survivals of each main treatment for recurrence were investigated.

Results: The 1-, 3-, 5-year overall survival rates of the all patients after first time hepatectomy were 94, 75, 60%. The 1-, 3-, 5-year disease free survivals were 65, 35, 25%. Among 727 patients who had the recurrent HCC, a total of 660 patients underwent some of the treatments. The other 64 patients only underwent best supportive therapy. The 1-, 3-, 5-year overall survival rate and median survival time after recurrence according to the main treatment for recurrence were 96, 76, 61% and 6.7 years in SUR group (n = 249), 93, 70, 46% and 4.6 years in RFA/PEI group (n = 118), 100, 80, 80% and Not ascertained in LT group (n = 5), 77, 36, 15% and 2.1 years in TACE group (n = 251), and 69, 21, 10% and 1.6 years in CorRT group (n = 37) respectively.

Conclusions: Aggressive treatments for recurrent HCC including repeat hepatectomy may improve patient survival.

PPL25-025

CLINICOPATHOLOGIC EVALUATION OF 35 CASES OF HEPATOCELLULAR CARCINOMA WITH BILE DUCT TUMOR THROMBI

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Introduction: Hepatocellular carcinoma (HCC) with bile duct tumor thrombi (BDTT) is a rare type of primary liver cancer, and the aim of this study was to evaluate the clinicopathologic characteristics of patients with this kind of disease.

Method: Thirty-five patients with HCC and BDTT among 594 patients with HCC who underwent hepatic resection were selected in this study. The clinical and pathological characteristics of these 35 patients were analyzed and the Kaplan–Meier method was adopted for evaluating survival. The expression of liver stem cell markers was investigated by immunohistochemistry.

Results: In 17 of 35 patients with BDTT, the diameter of the primary tumor was <5 cm (range: 0–17 cm, mean 6.87 ± 6.5 cm). Most of the primary tumors were poorly differentiated (23/35, 66%), laced an intact tumor capsule (21/35, 60%), and had microvessel invasion (29/35, 83%). None of the patients had evidence of direct tumor invasion into the bile duct wall macroscopically or microscopically. The positive rate of the liver stem cell markers was 82.9%, 77.1%, 71.4%, 85.7% and 80%, respectively. Postoperative overall survival rates at 1, 2, and 3 years were 80%, 57.1%, and 25.7%, respectively. The log-rank test showed that the survival rates of HCC patients with BDTT were significantly worse than HCC patients without BDTT (p = 0.000).
Conclusions: HCC with BDTT has aggressive characteristics and the long-term prognosis is extremely dismal.

PPL25-026
ASSESSMENT OF ROLE OF SURGERY IN PORTAL HYPERTENSION
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Introduction: Surgery for portal hypertension is associated with high mortality, rebleeding rates and portosystemic encephalopathy. Though other effective therapeutic options are available for bleeding from portal hypertension, surgery has a definite role. The present study evaluates the mortality and morbidity, and factors affecting outcome of patients undergoing surgery.

Method: Records of 29 patients operated between 2007 and 2010 who underwent surgery were analyzed with particular attention to operative mortality, rebleeding, and encephalopathy and factors affecting their outcome. Survival was calculated according to the Kaplan–Meier method. Devascularization surgery included devascularisation of the greater curvature with splenectomy and stapled esophageal transection. Follow up period ranged from 12 to 36 months.

Results: Of 29 patients subjected to surgery, 5 were Cirrhotic, 5 NCPF, 16 EHPVO and 3 BCS. 19 patients were of Child A (3-Cirrhotic, 4 NCPF and 12 EHPVO). 10 patients were Child B (2 Cirrhotic, 1 NCPF, 4 EHPVO and 3 BCS). DSRS was performed for 3 patients (Child A Cirrhotic). PSRS was performed for 12 patients (5 NCPF, 7 EHPVO). Mesocaval Shunt was performed for 3 patients (All patients of BCS). 11 patients underwent Devascularization (2 Cirrhotic, 9 EHPVO), of which 1 was an emergency surgery (cirrhotic). 2 patients had rebleed (cirrhotic). 2 had ascites (1 each of Cirrhotic and BCS). No patient had post operative encephalopathy. Mortality was in three patients (2 Cirrhotic and 1 BCS). 26 patients are surviving.

Conclusions: Surgery is a one-time procedure with a low mortality rate and good long-term results. The two most important factors in predicting the results of surgery are the Childs score and the timing of the operation, with good results obtained in patients with good liver function and who had an elective operation.

PPL25-027
PURE LAPAROSCOPIC ANATOMICAL LIVER RESECTION FOR HCC AND OTHER LIVER TUMORS
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Introduction: It is thought that anatomical liver resection is the better surgical option for HCC to secure the complete resection of the cancer bearing portal area. Anatomical liver resection is also useful for the resection of deep small tumors with difficult localization. We evaluate our experience for pure laparoscopic anatomical liver resection.

Method: Out of 69 (41 HCC, 28 others; 1–6 tumors/8–107 mm) pure laparoscopic hepatectomies, 26 underwent anatomical liver resection (3 of hemihepatectomy or extended, 14 of sectorectomy or extended, 9 of small anatomical resection). In the resection of 1 or more sector, Glissonian pedicle of the sector is encircled and clamped extrahepatically and divided afterward during the transection. We employed caudal approach, one direction transaction without the mobilization of the liver, for the oncological equality to open anterior approach. For many of the patients with poor liver function, we employed small anatomical resection under the control of intrahepatic small Glissonian pedicles during the transaction.

Results: The operating time of more than 1 sector (excl. LLS) is 336–848 minutes and intraoperative blood loss is 100–3569 mL (<500 mL in recent 5 cases). Those of LLS are 217–403 minutes, 0–181 mL. Those of small anatomical resection are 278–498 minutes, 0–181 mL. There is no operative mortality and complications were observed in 5 patients. In the resection, the exposure of the main hepatic veins on the border of the sectors is feasible and excellent laparoscopic view around IVC area made it possible to encircle the roots of major hepatic vein from caudal/dorsal direction behind the liver. For patients with poor liver function undergone small resection, 3D simulation from preoperative CT is useful to locate the root of Glissonian pedicle and tumor.

Conclusions: Pure laparoscopic anatomical liver resection is feasible with accumulation of experience, using laparoscopic specific views/techniques, and preoperative 3D-CT simulation.

PPL25-028
LOCO-REGIONAL MANAGEMENT OF COLORECTAL LIVER METASTASIS
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Introduction: Liver metastases develop in approximately 60 percent of patients with CRC at some point during the course of their disease. Left untreated, patients with metastatic liver disease have a poor prognosis. Though Liver Resection is a gold standard for these patients, many times, they are poor candidates for liver resection because of the distribution of tumors within the liver at presentation. They are best treated with Locoregional treatment such as Radiofrequency ablation, and Trans Arterial Chemo-embolization. The present study assesses the outcome of patients of Colorectal Liver Metastasis treated with locoregional management.

Method: Of a total of 178 patients operated for colorectal malignancy from 2007 to 2012, a total of 31 patients (20 M: 11 F, age range: 45–78 years) presented...
with colorectal liver metastasis. Of these 14 patients were subjected to Liver Resection. 17 patients were subjected to Locoregional treatment due to either inability to operate or due to not wanting of second surgery (3 patients). All the 17 patients were subjected to a combination of TACE followed by RFA. The average follow up was for 72 months and their survival was observed. The Quality of Life was observed for all the patients using modified SF-36 score (Graded as Poor, Fair, Good and excellent).

**Results:** In the resected group survival was seen in 9 of 14 patients with good quality of life in all. In comparison survival in patients with TACE and RFA was 8 of 17 patients with quality of life good to excellent.

**Conclusions:** Loco-regional management of management of Liver tumor has a definite role in the management, with the patient leading a fairly good quality of life.

**PPL25-029**

**PATHOLOGICAL COMPLETE REMISSION WITH LONG TERM SURVIVAL AFTER HEPATIC ARTERIAL CHEMOTHERAPY IN ADVANCED HEPATOCELLULAR CARCINOMA WITH MAIN PORTAL VEIN THROMBOSIS**

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**Introduction:** The prognosis of advanced hepatocellular carcinoma (HCC) patients with portal vein thrombosis is very poor even after surgery.

**Aim:** We report a case of pathologically confirmed complete remission of HCC induced by hepatic arterial infusion chemotherapy (HAIC).

**Method:** A 45-year-old male patient had a massive HCC in the right and main portal veins. He achieved a partial response after two cycles of HAIC with 5-fluorouracil (750 mg/m²) and cisplatin (25 mg/m²).

**Results:** After completion of six cycles he received a curative partial hepatectomy, and histopathology revealed complete necrosis without any viable tumor cell. He has been in good health without recurrence at 40-month follow-up.

**Conclusions:** This result suggests that this regimen is a promising therapeutic modality for the treatment of advanced HCC with portal vein tumor thrombosis.

**PPL25-030**

**RESECTION FOR LARGE ADVANCED HEPATOCELLULAR CARCINOMA FOLLOWING TUMOR DOWNSTAGING BY TRANSCATHETER ARTERIAL CHEMOEMBOLIZATION AND HEPATIC INFUSION CHEMOTHERAPY**

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**Introduction:** Outcome of patients having a large (>5 cm) hepatocellular carcinoma (HCC) with macroscopic vascular tumor thrombus or multiple intrahepatic metastases is dismal generally. The aim of this study is to evaluate the feasibility of sequential liver resection following downstaging of initially unresectable large advanced HCC by transcatheter arterial chemoembolization (TACE) and hepatic arterial infusion chemotherapy (HAI).

**Method:** A retrospective study was conducted. 17 patients with initially unresectable HCC (diameter >5 cm) with major portal vein/IVC/RA tumor thrombus or multiple intrahepatic metastases who underwent resection following successful TACE and HAI were enrolled in this study.

**Results:** An average tumor diameter was 80 mm. 12 cases had the major (1st branch/main) portal vein or IVC/RA tumor thrombus, and 11 had multiple intrahepatic metastases. For downstaging modality, 4 patients underwent TACE, 11 underwent HAI and 2 underwent TACE + HAI. An average interval between downstaging treatment and resection was 6.4 months. The values of AFP and PIVKA-II were 42,614 and 18,874 before downstaging therapy, 3525 and 1590 after downstaging, and 97 and 23 after resection, respectively. 1-, 3- and 5-year OS were 94.1, 76.0 and 57.0%, respectively. Five-year disease-free rate was 39.4%. Multivariate analysis of preoperative characteristics showed that IVC/RA tumor thrombus was a significant poor prognostic factor, because of a high incidence of postoperative pulmonary metastasis.

**Conclusions:** Resection following tumor downstaging by TACE and HAI gives good long term results and possibility of a cure for patients having a large HCC with major vascular tumor thrombus or multiple intrahepatic metastases. This strategy should be investigated further by prospective randomized controlled trials.

**PPL25-031**

**A NOVEL LAPAROSCOPIC HEPATECTOMY WITH GLISSONIAN PRECOAGULATION AND MONITORING ISCHEMIC AREA**

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**Introduction:** Laparoscopic hepatectomy has spread rapidly as a curative and less invasive therapeutic modality for primary and second liver tumors. Pure laparoscopic hepatectomy for small tumor locating at deeper-site of the liver is relatively difficult instead of superficial tumor. Therefore we developed a new “laparoscopic hepatectomy following Glissonian precoagulation.”

**Method:** (1) Ultrasound-guided Glissonian blood flow occlusion of a planned resected liver using radio-frequency ablation (RFA). Percutaneous RFA was performed using a cooled-tip electrode with a 2 cm metallic tip and the power application was increased to
100 W in the impedance control mode and the electrode was left in the liver for 6–10 minutes. (2) Understanding of the extent of ischemic area using laparoscopic contrast-enhanced intraoperative ultrasound (CE-IOUS) with Sonazoid™ and laparoscopic Photo Dynamic Eye (PDE) camera with indocyanine green (ICG) administration. (3) Completion of laparoscopic hepatectomy with surgical aspirator and energy devices. We applied this method for three patients (2 hepatocellular carcinoma and one colorectal liver metastasis) treated with laparoscopic hepatectomy.

**Results:** (1) A sufficient ischemic area can be obtained by 1–3 RFA procedures. (2) An ischemic area was well visible both on liver surface by PDE camera and in deeper-site of the liver by CE-IOUS during whole time of the operation in all patients. (3) A total amount of intraoperative blood loss was minimal because of ischemia of cutting line of the liver. (4) The tumor was completely removed with adequate surgical margin, and no complication was observed.

**Conclusions:** A new laparoscopic hepatectomy was feasible and quite beneficial. It is because of secure stoppage of regional blood flow with RFA and monitoring visualized ischemic area by PDE camera and laparoscopic CE-IOUS.

**PPL25-032**

**TECHNICAL ADVANCEMENT AND CURRENT ROLE OF LAPAROSCOPIC LIVER RESECTION IN THE TREATMENT OF HEPATOCELLULAR CARCINOMA**

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**Introduction:** Liver resection has been demonstrated as the preferable initial treatment for patients with resectable Hepatocellular carcinoma (HCC). Laparoscopic liver resection (LLR) has been technically progressing as a new ideal surgical option offers minimal invasiveness, as well as effectiveness in patients suffering primary and metastatic liver diseases. The aim of this study is to discuss the ability and current role of LLR for HCC.

**Method:** We retrospectively reviewed 97 consecutive patients who underwent LLR for HCC in our institution.

**Results:** Among the 97 cases, 84 (86.5%) had histologically confirmed chronic liver disease including liver cirrhosis. Tumor location in the liver was infero-lateral segments in 74 cases (76.3%), and the postero-superior segments in 23 cases (23.7%). Anatomical resection of the liver other than left lateral sectionectomy was 25 (25.8%), and major liver resection (resection more than 3 Couinaud’s segments) was 9 (9.3%). Eleven cases (11.3%) had 2 or more liver resection, or resection with tumor ablation therapy for multiple HCCs. Repeat resection for recurrent HCC was performed in 8 patients (8.6%). Postoperative complications were seen in 16 cases (16.5%), otherwise, no severe complication above Clavien-Dindo classification grade IIIb was encountered, except a case of accidental cerebral infarction. No postoperative liver failure, gas embolism or operative death was observed. As a consequence of accumulation of our experience with expansion of surgical indication for LLR, the candidacy of LLR in HCC patients had remained 20% of all liver resections including open liver resection in the early period, however, it has been increasing up to 60% lately in our series.

**Conclusions:** LLR is effective surgical treatment for HCC. Technical refinement of LLR with accumulation of experience enables to perform difficult surgery with safety. Therefore, LLR could be applied more frequently, and is expected further development as important option for treatment of HCC.

**PPL25-033**

**MINIMALLY INVASIVE LIVER RESECTION FOR COLORECTAL LIVER METASTASIS**

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**Introduction:** Since 1993, we have performed minimally invasive laparoscopic liver resection (LLR) to treat malignant liver cancer, including colorectal liver metastases (CLM). However, further studies are needed to accumulate sufficient evidence on the oncological outcome of LLR for CLM.

**Method:** To elucidate the efficacy of LLR for CLM, this study comparatively analyzed the invasiveness and short-term prognosis of LLR (n = 41 cases) and open liver resection (OR) (n = 54 cases) performed for CLM after 2006 and also investigated the safety of LLR following chemotherapy.

**Results:** Compared with the OR group, the LLR group had significantly less blood loss (p < 0.001) and a shorter hospital stay (p < 0.001). The E-PASS scoring system was used to compare surgical invasiveness, and although the preoperative risk score did not differ between the groups, the surgical stress score and comprehensive risk score were significantly lower in the LLR group (p < 0.001). Concerning the survival rate and disease-free survival rate, there were no significant differences between procedures. However, more clinical cases and longer follow-up periods are needed to reach a definitive conclusion. Preoperative hemanalysis, intraoperative bleeding, complications, and postoperative length of stay did not differ significantly between LLR patients with preoperative chemotherapy and those with surgery alone, indicating no adverse effects of chemotherapy.

**Conclusions:** LLR can be an effective minimally invasive surgery in CLM patients receiving both perioperative chemotherapy and surgery. Because LLR is comparable with OR with regard to short-term oncological outcome, LLR may be a valuable option for CLM.
PPL25-034

STUDY OF THE CLINICORADIOLOGICAL CORRELATION IN THE PATIENTS OF PORTAL HYPERTENSIVE BILIOPATHY

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Introduction: Patients with portal biliopathy (PB) usually are asymptomatic, rarely experiencing jaundice, cholangitis and choledocholithiasis. This study analyses clinical and radiological co-relation and outcome of intervention in PB patients.

Method: This is prospective analysis of 2 years, March 2010–2012. Patients of EHPVO were assessed for etiology of PVT, Symptoms, serum alkaline phosphatase and total bilirubin. Doppler USG of abdomen and MRCP were done in all. Patients were grouped into Clinically Symptomatic and Asymptomatic group. ERCP and CT-Angiography to assess for shunt able vessels done in symptomatic patients. F/U of serum alkaline phosphatase and total bilirubin done at end of 30, 90 and 180 days and thereafter 6 monthly. MRCP done at end of 1 year in whom intervention was done. Statistical analysis done using SPSS v11.5.

Results: Thirty-nine patients (20 females, age range 13–69 years) were studied. 34 had radiological evidence of PB (87.17%). 9 (23.07%) were clinically symptomatic, 5 had Jaundice with cholangitis and 4 only jaundice. The radiological abnormality in 34 was: Varicoid: 23, Fibrotic: 7 Mixed: 4. Their distribution in symptomatic patients was: Varicoid: 6 and 3 Fibrotic. Five of nine symptomatic patients were subjected to ERCP stenting. PSRS shunt done in two, Cholecodo Jejunostomy in 1, and cholecystectomy with T-Tube insertion in 1.

Conclusions:
1. There is a definite Clinico-Radiological-Biochemical co-relation in patients with Symptomatic Portal Biliopathy.
2. Biochemical parameters are more realistic as compared to radiological parameters alone to investigate clinical condition of Portal Biliopathy.
3. Of Radiological parameters; Epicholedochal venous plexus, Stricture with dilatation, Delayed enhancement were found to be statistically significant.
4. Biochemical and Radiological parameters were statistically significant with the p < 0.0001 in the clinically symptomatic group.

PPL25-035

EN BLOC RESECTION RIGHT HEMILIVER, CAUDATE LOBE OF LIVER AND IVC FOR LOCALLY ADVANCED MALIGNANT ADRENAL TUMOR

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Introduction: Locally advanced tumor such as adrenal and renal malignant tumors invaded to IVC and liver was regarded as unresectable state or recommended palliative treatment till now. But advance of surgical technique and intensive treatment make the surgeon perform more radical surgery.

Method: We report a case of en bloc resection of right hemiliver, caudate lobe and intrahepatic IVC and prosthetic graft reconstruction in adrenal tumor with liver, diaphragm crux and IVC invasion.

Results: A 46-year-old man visit for right frank pain began 2 months ago. Vital signs were within normal range, too. Screening abdomen CT scan reveal 8.5 cm sized adrenal mass with IVC and liver invasion. In 24 hours urine test, metanephrine was 1.8 mg/day, epinephrine, VMA, cortisol, norepinephrine were within normal range. There was no metastatic foci and lymph node involvement in preoperative MRI and PET CT scan. In preoperative CT scan left side liver volume was about 30% of total liver volume but ICG R15 was 37.6%, so preoperative right portal vein embolization was done. Three weeks later, right hepatectomy and caudate lobectomy and IVC resection was performed by en bloc resection. During IVC resection and graft reconstruction, extracorporeal circulation was performed. Dacron prosthetic graft was used for IVC graft. 3 pint PRC were transfused during surgery. Adrenal gland tumor was revealed malignant pheochromocytoma with direct invasion to IVC and liver by pathologic examination.

Conclusions: Combined liver and IVC resection is difficult but feasible in selected patients and can be adopted to locally advanced adrenal gland tumor.

PPL25-036

SURGICAL TREATMENT FOR HEPATOCELLULAR CARCINOMA WITH BILE DUCT THROMBOSIS: EVALUATION OF BILE DUCT THROMBECTOMY

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Introduction: HCC with bile duct tumor thrombosis (BDT) is a rare event and the standard surgical procedure is unclear. We are on the basis of hepatic resection with removal of the BDT without bile duct resection. The aim of this study was to evaluate the feasibility of bile duct thrombectomy without bile duct resection.

Method: Fifteen patients who underwent liver resection for HCC with BDT in our department from 1980 to 2011 were reviewed retrospectively.

Results: Thirteen patients underwent hepatic resection with thrombectomy without bile duct resection. 2 patients underwent a bile duct resection combined with hepatic resection. The postoperative recurrence was 12 cases (thrombectomy: 11/13, bile duct resection: 1/2). In the thrombectomy group (TG), recurrence were
single intrahepatic recurrence: 2 cases, multiple intrahepatic recurrence: 4, multiple lung metastasis: 3, and bile duct metastasis: 1, which located in the remnant intrapancreatic bile duct. In the bile duct resection group (RG), recurrence form was multiple liver metastasis: 1 case. Recurrence-free survival was 399 days in TG and 189 days in RG. Recurrence treatments in TG were TACE: 2 cases, RFA: 2, TAI: 2, reoperation: 1 and non treatment: 2. Recurrence treatment in RG was TAI + molecular target drug: 1 case. The 5-year OS was 38%, and 3 patients survived over 10 years in TG.

Conclusions: Three patients survived over 10 years in the thrombectomy group. The majority of recurrence form was intrahepatic recurrence, and needed interventional therapy. Recurrence in the remnant bile duct was observed only 1 of 13 cases, which occurred in the intrapancreatic bile duct. Prophylactic bile duct resection should be done with pancreatoduodenectomy, however, this is not realistic in cases with chronic liver disease. Further, hepaticojejunostomy increases the risk of cholangitis and liver abscess during interventional therapy for intrahepatic recurrence. Our conclusion is that thrombectomy without bile duct resection is feasible for HCC with BDT.

PPL25-037
SMALL REMNANT LIVER VOLUME CASE EXPERIENCE AFTER MAJOR LIVER RESECTION
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Introduction: Generally, Major hepatectomy can be performed safely at RLV (remnant liver volume)/TLV (total liver volume) ≥30% or RLV/BWR (body weight ratio) ≥0.6.

Recent reports have shown that this limit can be decreased to 20–25% without a high death rate. In this retrospective study, we investigate 42 patients under RLV/TLV <30% or RLV/BWR <0.6 about post operative hepatic dysfunction, morbidity, hospital days and so on after major hepatectomy.

Method: Records were reviewed of 42 consecutive patients who falls under RLV/BWR <0.6 or RLV/TLV <30% in which underwent major hepatectomy between 2008 and 2012. RLV (cubic centimeter) was measured preoperatively with three-dimensional helical computed tomography; TLV (total liver volume; cubic centimeter) was calculated from the patients BSA. The relation between RLV/TLV and RLV/BWR was examined using linear regression analysis. Post hepatectomy liver failure (PHLF) was defined as both a prothrombin time<50% and total serum bilirubin level >50 mol/L after postoperative day 5. Continuous variables were expressed as median and compared using the Mann–Whitney U-test. Hepatic dysfunction and morbidity were compared using Fisher’s exact test.

Results: PHLF patience along 50/50 criteria was 7 (16.67%) during 42 patients, and 1 patient expired due to PHLF. Five patients out of 7 patients were recovered until normal laboratory value. There is a jaundice patience for 2 months during progress observation. At cirrhosis, preoperative chemotherapy, fatty change, and DM; there was no affect of occurrence as PHLF. Cholestasis and caudate lobectomy revealed risk factor of PHLF (p = 0.002). In morbidity, only caudate lobectomy was significant risk factor.

Conclusions: As follows from our research, acceptable rate of PHLF has been reported for small remnant liver operation with no cholestasis and even with PHLF, every patient was recovered their liver function except two cases. Though, a comparative study with non-small remnant liver group will be necessary, major hepatectomy can perform under RLV/BWR <0.6 or RLV/TLV <30% in non-cholestatic patients. And major hepatectomy can be done with enough preoperative decompression for cholestatic patient.

PPL25-038
A LONG TERM SURVIVAL CASE OF INTRAHEPATIC SARCOMATOID CHOLANGIOCARCINOMA
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Introduction: Intrahepatic sarcomatoid cholangiocarcinoma is a rare disease which is sarcomatous changes in cholangiocarcinomas. Many of characteristics of this tumor are still unknown but prognosis is worse than for a ordinary intrahepatic cholangiocarcinoma. We experienced a patient with intrahepatic sarcomatoid cholangiocarcinoma who survived for 10 years from initial diagnosis and we present our case.

Method: Case report.

Results: A 71-year-old man was admitted to our hospital suffering from persistent fever and right pleuritic pain for 2 months. Imaging studies showed a huge hepatic mass which was revealed to be a sarcoma-like mass of the right hemiliver. Hepatotomy was performed and gross finding was 18 × 16 × 15 cm in size with a yellowish-fanning, diffusely soft, friable and clearly demarcated mass on cross section. Microscopically the tumor cells were contained in the sarcomatous component (63%), tumor necrosis (36%) and adenocarcinoma component (0.6%) on histological mapping. Histologically, the tumor was composed of malignant osteoid tumor cells. Immunohistochemical staining for cytokeratin was positive in the sarcomatous components. After curative surgery, early peritoneal and intrahepatic recurrence occurred in 2 months. He received transcatheter arterial chemoembolization (TACE) using cisplatin and adriamycin regimens and systemic chemotherapy with epirubicin and ifosfamide 6 times over 8 months. He took annual CT scans for 5 years and there was no evidence of tumor recurrence. He is still alive without tumor recurrence for 10 years from initial diagnosis of this tumor.

Conclusions: Intrahepatic sarcomatoid cholangiocarcinoma is a rare disease and there are just a little knowledges about its characteristics. Many papers reported short term survival even after aggressive treatment. We
experienced early recurrence after surgery for sarcomatoid cholangiocarcinoma but TACE and systemic chemotherapy worked effectively and complete cancer remission was achieved. Further studies should be necessary to find out what factors contribute good prognosis of this aggressive disease.

PPL25-039
SIMULTANEOUS LAPAROSCOPIC RESECTION OF PRIMARY COLORECTAL CANCER AND LIVER METASTASIS

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Introduction: Liver metastasis of colorectal cancer (CRC) is common. Resection of solitary tumors of primary and metastasis CRC can have a favorable outcome. Open resection of primary CRC and liver metastasis in one operation or in separate operations is currently common practice. Synchronous resection of primary CRC and liver metastasis by laparoscopy have recently been reported. The efficacy and safety of synchronous laparoscopic resection are in debate. The aims of the present study was to report our initial experience with simultaneous laparoscopic resection and evaluate oncologic results.

Method: From Jan 2009 to Aug 2013, 12 cases of laparoscopic hepatectomy on liver metastasis of CRC were performed. In simultaneous resection, additional trocars were inserted at upper abdomen by surgeon’s preference after colorectal procedures were completed. Liver parenchymal resection was performed using the ultrasonic shears, Ligasure, ultrasonic dissector, clip, endoscopic linea stapler. For major hepatectomy, hilar approach was firstly performed. Pringle’s maneuver was not routinely performed during wedge resection due to the harmful effect on colorectal anastomosis. The margin from the lesion is ideally 1 cm and is marked by intraoperative ultrasound.

Results: Type of procedure were 2 right hepatectomy, 1 left hepatectomy, 3 left lateral sectionectomy, 1 caudate lobectomy, and 9 wedge resection. All procedures were completed via a totally laparoscopic approach with no conversion. Simultaneous resections were performed on six cases. In 4 cases, over two lesions were resection.

Conclusions: In conclusion, within the limits of a retrospective, noncomparative study analyzing a small sample, this study shows that simultaneous laparoscopic resection of primary CRC and metastatic liver tumors can be performed safely and is technically feasible in selective patients. Large scale randomized controlled trials are needed to demonstrate the effectiveness of this minimally invasive approach.

PPL25-040
RATIONALE AND SURGICAL TECHNIQUE OF LAPAROSCOPIC LEFT LATERAL SECTIONECTOMY WITH ENDOSCOPIC STAPLE

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Introduction: Laparoscopic left lateral sectionectomy (LLLS) has been accepted with popularity in its benefits related to minimally invasive surgery. Some surgeons like to isolate glisssonian pedicles to segment 2 and 3 and control individual pedicles with surgical clips. But others like to control glisssonian pedicles to segment 2 and 3 at once with endoscopic stapling device without isolating each pedicles. The aim of this study is to find rationale (safety, outcomes, learning curve) of LLLS with endoscopic staples.

Method: We retrospectively analyzed and compared the clinical outcomes(operation time, blood loss, hospital stay, learning curve, complication rate, etc.) in 33 patients who underwent LLLS between April 2004 and December, 2011 depending on surgical technique whether isolate each glisssonian pedicles (individual group, n = 20) or not (batch group, n = 13). To see the learning curve, we arbitrarily divided first and second half period (before and after December, 2009) depending on case number 17.

Results: There was one open conversion in individual group. Mean operative time was 265.3 ± 21.3 minutes (mean ± SE) in the individual group and 170.0 ± 22.9 minutes in batch group. Operation time in batch group was significantly shorter than individual group (p = 0.007). There was no blood transfusion in batch group, but 4 out of 20 patients in individual group needed blood transfusion during surgery. Mean post-operative hospital stay were 10.7 ± 1.1 and 9.4 ± 0.8 days in individual and batch group (p = 0.46). Mean operative time in the first and second half of individual and batch group were 271.9 ± 28.9/254.3 ± 32.2 minutes and 209.0 ± 29.1/142.1 ± 30.7 minutes (first half/second half). In batch group, we could save operation time significantly (p = 0.027) in second half period without morbidity and mortality.

Conclusions: The LLLS with endoscopic staple (batch group) was easy and safe technique with short learning curve and better outcomes without mortality and morbidity. We will show schematic pictures and video to support rationale for LLLS with endoscopic staples.

PPL25-041
MISTAKING PRIMARY LIVER TUBERCULOSIS FOR A MALIGNANCY. COULD SURGERY BEEN AVOIDED?

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Introduction: Primary liver tuberculosis is a rare entity within healthy immuno-competent individuals. Conversely, most of cases are secondary and are associated with miliary tuberculosis (TB). We report a case of primary hepatic TB which was misdiagnosed and treated initially as a primary liver tumour.

Method: Case report.

Results: A 56-year-old lady presented with epigastric pain, loss of weight and appetite of 3 weeks duration. Clinical examination revealed jaundiced patient with upper quadrant tenderness. Initial blood work-up revealed anaemia, a deranged liver profile and an elevated CA-19-9 (562 U/mL). Computed tomography (CT) demonstrated an ill-defined 3.5 x 4.0 cm heterogeneously enhancing mass at the liver hilum with periporal lymphadenopathy. She was diagnosed with cholangiocarcinoma. Biliary decompression via ERCP was performed and she was then subjected for a central hepatectomy. Intra-operatively, we noted yellowish nodules over the entire liver with mesenteric and ommental lymphadenopathy dissimilar to the CT findings. A frozen section biopsy revealed predominantly lymphoplasmacytic inflammatory infiltrates, multiple granuloma with central necrosis and multinucleated Langhan’s-type giant cells suggestive for tuberculosis. In subsequent testing the patient was nonreactive for HIV, HBV, HCV and sputum AFB. Chest X-ray also showed no suspicion of pulmonary TB. She was started on anti-tuberculous therapy and her condition has improved since.

Conclusions: Although hepatic involvement can be seen in up to 80% of the disseminated cases of TB, isolated primary liver TB is rare because of the low oxygen tension within the liver, making it unfavourable for mycobacterium growth. A preoperative diagnosis of hepatic TB was not immediately made in this case as the history, the elevated tumour marker and imaging results inclined towards diagnosis of malignancy. It was only via frozen section biopsy was diagnosis confirmed. Despite the rarity of this condition, liver tuberculosis should be considered a differential diagnosis for liver lesions to avoid unnecessary surgery.

PPL25-042
COMPARISON OF HEPATIC RESSECTION AND RADIOFREQUENCY ABLATION FOR SOLITARY HEPATOCELLULAR CARCINOMA SMALLER THAN 4 CM
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Introduction: Hepatic resection (HR) is considered the modality of choice for the patients with early hepatocellular carcinoma (HCC). Radiofrequency ablation (RFA) is generally recognized as an alternative treatment to HR for early HCC, especially for patients with impaired liver function. However, there is controversy to choose first line treatment modality for the early HCC between HR and RFA. The aim of this study is to compare the oncological outcomes of two therapeutic modalities for early HCC including HR and RFA.

Method: Between January 2002 and February 2009, 118 patients with a single HCC smaller than 4 cm who underwent HR (n = 75), or who completely ablated by RFA (n = 43) were enrolled in this study. The outcomes after treatments of the two groups were analyzed and compared each other to evaluate efficacy of the treatment modalities.

Results: In HR group, tumor size was larger than in RFA group (2.54 ± 0.90 cm vs 2.20 ± 0.74 cm, respectively, p = 0.035). Platelet count in HR group was higher than in RFA group (1.43 x 10^5 vs 1.19 x 10^5, p = 0.031). All patients in HR group (n = 75) was Child–Pugh class A, but RFA group showed 37 Child–Pugh class A and 6 Child–Pugh class B (p = 0.003). Median recurrence free survival times were 79 months in HR group, 45 months in RFA group. And overall 5 years survival rate in HR group and RFA group were 80.8% and 87.9%, respectively. There was no significant difference in recurrence free or overall survival between the HR group and RFA group (p = 0.076 and p = 0.475, respectively). A multivariate analysis revealed that lower serum albumin level and decreased platelet count were independent risk factors for recurrence.

Conclusions: RFA exhibited similar therapeutic effects with HR in terms of patients survival for early HCC, if RFA could exhibit complete ablation.

PPL25-043
LAPAROSCOPIC VERSUS OPEN ABLATION THERAPY FOR TREATMENT TO PRIMARY UNRESECTABLE AND SMALL HEPATOCELLULAR CARCINOMA
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Introduction: This study aimed to retrospectively evaluate the relative perioperative safety and postoperative outcome of the laparoscopic/thoracoscopic approach versus the open approach to RFA for primary unresectable and small HCC.

Method: We retrospectively analyzed 55 patients who underwent open (n = 32) or laparoscopic/thoracoscopic RFA (n = 23) for primary unresectable and small HCC between January 2005 and December 2010.

Results: There was a trend showing that laparoscopic/thoracoscopic RFA was performed for tumors located in the anterior segment (e.g., segments III, V, VIII). The laparoscopic/thoracoscopic RFA group had a significantly lower intraoperative blood loss, shorter operative time, and shorter postoperative hospital stay, compared with the open RFA group. No major postoperative complications occurred in patients who underwent laparoscopic/thoracoscopic RFA. No significant differences in overall survival, recurrence-free
survival and local recurrence rates were observed between the two groups.

Conclusions: In consideration of operative invasiveness and postoperative recovery, laparoscopic/thoracosscopic RFA is superior to the open approach in patients with unresectable and small HCC. The surgical outcome did not differ between the two approaches. Laparoscopic/thoracososcopic RFA can be considered to be a useful procedure for ablation therapy.

PPL25-044

LINE-1 HYPMETHYLATION AS A POOR PROGNOSTIC INDICATOR AFTER CURATIVE HEPATECTOMY FOR PATIENTS WITH HEPATOCELLULAR CARCINOMA

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Introduction: Global DNA hypomethylation is associated with increased chromosomal instability, leading to carcinogenesis. Long interspersed nuclear element-1 (LINE-1) sequences are highly repeated human retrotransponso sequences and constitute a substantial portion (approximately 17%) of human genome. DNA methylation in LINE-1 repetitive element is a surrogate marker of global DNA methylation level. We herein examined the clinicopathological significance of LINE-1 methylation status in surgical patients with hepatocellular carcinoma (HCC).

Method: Fifty-two patients with HCC, who underwent a curative hepatectomy were enrolled in this study. Bisulfite-specific PCR and DNA pyrosequencing were performed to quantify the methylation levels of three Cpg sites of LINE-1 using the PyroMark Q24 Advanced system. The average of the relative amounts of C in the 3 Cpg sites was used as the overall LINE-1 methylation level. The patients were divided into two groups; hypermethylation group (n = 28) and hypomethylation group (n = 24) according to the average value of LINE-1 methylation level in the tumor tissues. LINE-1 methylation level was compared with clinicopathological variables.

Results: Pyrosequencing analysis showed the significant hypomethylation of LINE-1 in tumor tissues compared with non-tumor tissues (48.0 ± 12.3 vs 68.6 ± 2.4, p < 0.001). LINE-1 hypomethylation significantly contributed to greater tumor size, more tumor numbers, and higher incidence of intrahepatic metastasis (p < 0.05). Tumor stage in the hypomethylation group was significantly more advanced than that in the hypermethylation group (p < 0.05). The patients in the hypomethylation group had a significantly poorer disease-free survival (DFS) and overall survival (OS) compared with those in the hypermethylation group. Multivariate analysis showed that LINE-1 hypomethylation in the tumor tissues was independently associated with both DFS and OS after hepatectomy for the HCC patients.

Conclusions: LINE-1 hypomethylation in the patients with HCC was associated with more advanced tumor and poorer prognosis after hepatectomy, suggesting that it has potential for use as a prognostic biomarker.

PPL25-045

LIVER RESECTION WITH HYPOThERMIC IN SITU LIVER PERFUSION FOR MALIGNANT AND BENIGN LESIONS

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Introduction: The aim of the study is to demonstrate the benefit of in situ hypothermic perfusion during liver resection (LR) with total vascular exclusion (TVE) for malignant and benign lesions localized near or invading the hepatocaval confluence and/or inferior vena cava.

Method: Vascular occlusion techniques were used in 108 out of 215 LR performed in a period from 2008 to July 2013 years. They included Pringle maneuver (34 cases), selective vascular isolation (62 cases), TVE – 6 cases and TVE with hypothermic liver perfusion (6 cases). Major LR was defined as a resection of 4 and more Couinaud segments. Biliary complications, post-hepatectomy liver failure were defined according to ISGLS criteria.

Results: The average time of surgical procedure was longer in cases of LR with TVE and hypothermic liver perfusion, 712 ± 155 minutes, than in standard major LR, 280 ± 154 minutes (Mann–Whitney, p = 0.00001). The average blood loss in LR with TVE and hypothermic perfusion was 2880 ± 1948 and 588 ± 478 mL in standard major LR (Mann–Whitney, p = 0.00003). Grade B–C posthepatectomy liver failure developed in 2 of 6 LR with TVE and TVE with hypothermic liver perfusion each (33.3%) and in 8 of 48 standard major LR (16.6%; p = 0.6). Grade B–C biliary complications developed in 3 of 12 cases (25%) of LR with TVE and hypothermic liver perfusion and in 9 of 48 cases (18.7%) of standard major LR, but the difference was not statistically significant. There was one hospital mortality after all 12 LR with TVE and hypothermic perfusion (16.6%). Mortality after standard major LR comprised 8.3% (4 of 48; Fisher test, p = 0.6).

Conclusions: TVE with hypothermic liver perfusion expands the resectability not only of malignant but also benign liver lesions and permits to avoid the liver transplantation in hardly accessible benign liver tumors with the acceptable rate of complications.

PPL25-046

HEPATIC RESECTION FOR LARGE HEPATOCELLULAR CARCINOMA

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**Introduction:** Hepatocellular carcinoma is the fifth most common cancer worldwide with 1 million new cases a year. The role of hepatic resection for HCC larger than 10 cm is less clear. Several studies presented a gloomy picture of high morbidity and mortality following resection of large HCC. Nevertheless we have followed an aggressive policy of surgical resection as it provides significant local control with good quality of life. The aim of this study is to evaluate the perioperative and short term outcomes along with the clinicopathologic factors influencing overall survival after resection of large HCC.

**Method:** Between August 2009 and December 2011, 42 consecutive patients underwent hepatic resection for hepatocellular carcinoma. Thirty patients had HCC with maximum diameter greater than 10 cm. These 30 patients were included in study prospectively.

**Results:** Patients were analyzed with respect to the 18 prognostic factors affecting their overall survival. Univariate analysis revealed blood loss more than 1000 mL, the need for blood transfusion, unencapsulated tumours, high grade tumours and microscopic vascular invasion were associated with worse overall survival. Other variables were not significant for overall survival on univariate analysis. None of the above factors were found to be significant by multivariate analysis.

**Conclusions:** Even in the presence of associated cirrhosis, resection of large HCC which offers the only prospect for cure is justified, provided that patients are carefully selected in terms of liver function reserve and liver remnant volume.

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**PPL25-047**

**THE FEASIBILITY OF THIRD OR MORE REPEAT HEPATECTOMY FOR RECURRENT HEPATOCELLULAR CARCINOMA**

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**Introduction:** The 2nd hepatectomy has been accepted as an effective treatment for recurrent hepatocellular carcinoma (HCC), providing comparable long-term survivals with those of initial hepatectomy. However, the feasibility and prognostic benefits of multiple repeat resection (more than 3 times) have not been adequately assessed. The aim of this study is to investigate the feasibility of multiple repeat hepatectomy for recurrent HCC.

**Method:** From 1994 to 2011, a total of 1341 patients underwent curative hepatectomy for HCC. Among them, 941 underwent the 1st hepatectomy for the primary HCC and 289 underwent the 2nd hepatectomy for the 1st recurrence of HCC. The remaining 110 patients underwent multiple repeat hepatectomy (3rd: 74, 4th: 28, and 5th: 8). Patient demographics, tumor characteristics, and surgical outcomes were compared among those who underwent initial hepatectomy (1stHx), 2nd hepatectomy (2ndHx), and 3 or more hepatectomies (multiHx).

**Results:** No significant differences were found in patient demographics among the 3 groups. Surgical duration was significantly longer in multi Hx (median: 6.4 hours, range: 0.7–13.3 hours) than in 2nd Hx (median: 5.9 hours, range: 1.7–13.9 hours). Postoperative bile leakage and wound infection were more frequently observed in multi Hx (12.5%/2.9%) than in 2nd Hx (6.2% [p = 0.04], 0.4% [p = 0.03]). The 3/5-year disease free survival rates were 36.6%/27.1% in 1st Hx, 24.4%/17.9% in 2nd Hx (p < 0.001 [1st vs 2nd]), and 21.0%/18.5% in multi Hx (p < 0.01 [1st vs multi], p = 0.95 [2nd vs multi]). The 3/5-year overall survival rates were not significantly different among the 3 groups (1st Hx: 79.4%/65.3%, 2nd Hx: 76.7%/60.5%, multi Hx: 81.5%/68.2%).

**Conclusions:** Multiple repeat hepatectomy offers comparable disease-free and overall survivals to the 2nd hepatectomy. However, the technical complexity of multiple repeat hepatectomy is associated with the increased risks of postoperative bile leakage and wound infection.

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**PPL25-048**

**SURGICAL SITE INFECTION AFTER SIMULTANEOUS COLORECTAL AND LIVER RESECTION FOR COLORECTAL CANCER AND LIVER METASTASIS**

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**Introduction:** Although simultaneous colorectal resection and liver resection is a radical treatment for patients with synchronous colorectal cancer and liver metastasis, postoperative complications, including surgical site infection (SSI), are unresolved issues after the operation. In this retrospective study, we investigated risk factors for SSI after simultaneous colorectal and liver resections.

**Method:** The subjects were 17 patients who underwent simultaneous colorectal and liver resection for synchronous colorectal cancer and liver metastasis between April 2006 and March 2013. The T factor of main lesions in most patients were classified into T3 and T4. Thirteen patients had lymph node metastases. The numbers of metastatic liver tumors ranged 1–6, and the maximum diameter of the liver tumor ranged 10–45 mm. The resected liver weight ranged 20–350 g. SSI included intraabdominal infection and wound infection. Risk factors, including operative procedures, for SSI were evaluated.

**Results:** The SSI developed in 7 of 17 patients after the operation. The abscess formation along the liver cut surface developed in 4 patients, intraabdominal infection with leakage of the intestinal anastomosis developed in 2 patients. Wound infection developed in 2 patients. The resected liver weight in the group of SSI
was larger in patients with SSI than in those without SSI ($p < 0.05$). The incidence of SSI tended to be higher in patients who underwent Pringle maneuver during liver resection than in patients who did not do the maneuver ($p = 0.0503$).

**Conclusions:** The increased weight of the resected liver and Pringle maneuver may affect the development of SSI after simultaneous colorectal and liver resection.

**PPL25-049**

**SINGLE HCC $\leq 3$ CM IN LEFT LATERAL SEGMENT: LIVER RESECTION OR RADIOFREQUENCY ABLATION?**

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**Introduction:** Liver resection and radiofrequency ablation (RFA) are accepted as effective treatments for small hepatocellular carcinoma (HCC). The purpose of this study was to evaluate the long-term results of RFA compared to left lateral sectionectomy (LLS) in patients with Child–Pugh class A disease for the treatment of single and small HCC in the left lateral segment.

**Method:** We reviewed the data of 133 patients with single HCC ($\leq 3$ cm) in left lateral segments who underwent curative LLS ($n = 66$) or RFA ($n = 67$) between 2006 and 2010.

**Results:** The median follow-up period was 33.5 months in the LLS group and 29 months in the RFA group ($p = 0.060$). Most patients had hepatitis B virus-related HCC. The hospital stay was longer in the LLS group and 29 months in the RFA group ($p = 0.018$). Increased PIVKA-II levels and small tumor size were associated with HCC recurrence in multivariate analysis.

**Conclusions:** There is no doubt that liver resection is the gold standard for single HCC $\leq 3$ cm in the left lateral segment. However, RFA can be considered as a primary treatment for HCC with preoperative low PIVKA-II levels.

**PPL25-050**

**CAN THE MODEL FOR END-STAGE LIVER DISEASE SCORE REPLACE THE INDOCYANINE GREEN CLEARANCE TEST IN THE SELECTION OF RIGHT HEMIHEPATECTOMY IN CHILD–PUGH CLASS A?**

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**Introduction:** The Model for End-stage Liver Disease (MELD) score was developed to reflect hepatic reserve in patients. The aim of the present study was to identify the correlation of MELD scores with the assessment of the risk of hepatic function after hepatectomy in patients with hepatocellular carcinoma (HCC) related to hepatitis B virus (HBV).

**Method:** A case-control study was performed based on data for 141 consecutive patients who underwent curative right hepatic resection between January 2006 and June 2010.

**Results:** All patients were Child–Pugh class A. The mean age of the patients was 50 years (range, 29–73 years). The group included 114 men (80.9%) and 27 women (19.1%). The distribution of MELD scores (median 7, range 6–14) and indocyanine green retention rate at 15 minutes (ICG-R15) (median 9.2%, range 1.1–19.5%) showed no significant correlation ($p = 0.615$). Only one perioperative death (0.7%) occurred within 30 days, which was the result of liver failure by hepatic artery dissection during the Pringle maneuver. Hepatic dysfunction occurred in 25 patients (17.7%) after liver resection. In multivariate analysis, male gender, increased HBV DNA level, and elevated serum aspartate transaminase (AST) level were significantly related with hepatic dysfunction. Tumor size and satellite nodule were closely associated with tumor recurrence in HBV-related HCC after right hepatectomy and satellite nodule was a predisposing factor for mortality in those patients.

**Conclusions:** MELD score does not accurately predict hepatic function after right hepatectomy in patients with resectable HBV-related HCC. MELD scores were not correlated with the ICG-R15 values in patients with Child–Pugh class A.

**PPL25-051**

**INTRAHEPATIC METASTASIS IS MORE RISKY THAN MULTIPLE OCCURRENCE IN HEPATOCELLULAR CARCINOMA PATIENTS AFTER CURATIVE LIVER RESECTION**

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**Introduction:** The characteristics of multiple nodules in hepatocellular carcinomas (HCCs) after curative liver resection remain obscure. We compare the clinicopathologic characteristics and prognoses between patients with hepatic lesions with multicentric occurrence (MO) and intrahepatic metastasis (IM) at the time of surgical resection.

**Method:** The histopathologic features of multiple tumors from 198 patients of HCC were analyzed and divided into MO group ($n = 51$, 25.8%) for multicentric HCCs and an IM group ($n = 147$, 74.2%) in cases with intrahepatic metastases. Overall survival rate, disease-free survival and clinicopathologic differences were compared between the two groups.
**PPL25-052**

**DIFFERENCES BETWEEN HEPATOCELLULAR CARCINOMA AND HEPATITIS B VIRUS INFECTION IN PATIENTS WITH AND WITHOUT CIRRHOSIS**

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**Introduction:** In patients with hepatitis B virus (HBV) infections, differences in hepatocellular carcinoma (HCC) between those with liver cirrhosis and those without cirrhosis have not been elucidated. The aim of this study was to compare clinicopathological characteristics and survival between non-cirrhotic and cirrhotic patients with HBV. Furthermore, we aimed to determine prognostic factors for tumor recurrence after hepatectomy in patients with HBV and HCC.

**Method:** Between 2005 and 2010, 441 curative hepatectomies for HCC in patients with cirrhosis and 454 for HCC in patients without cirrhosis were performed. The clinicopathologic characteristics and survival between the two groups were compared and prognostic factors for tumor recurrence were identified by univariate and multivariate analysis.

**Results:** Cirrhotic patients had lower platelet counts, PIVKA-II levels, and tumor size than non-cirrhotic patients. Serum ALP, HBV DNA, and ICG levels, as well as the incidence of positive HBeAg in cirrhotic patients, were higher than in non-cirrhotic patients. HCC differentiation in non-cirrhotic patients was poorer than in cirrhotic patients. The 1-year, 3-year and 5-year disease-free survival rates were 72.0%, 61.0% and 55.7% in non-cirrhotic patients, and 68.6%, 51.5% and 45.9% in cirrhotic patients, respectively (p = 0.013). However, The 1-year, 3-year and 5-year overall survival rates were 92.4%, 81.7% and 74.8% in non-cirrhotic patients, and 91.9%, 82.4% and 78.7% in cirrhotic patients, respectively (p = 0.683). Risk factors for tumor recurrence in each group varied in multivariate analyses. Increased age, high platelet counts, microvascular invasion, serosal invasion, and intrahepatic metastasis predisposed to tumor recurrence in non-cirrhotic patients, but elevated PIVKA-II and ALP levels, low serum albumin levels, portal vein invasion, intrahepatic metastasis, and tumor size were predisposing factors for recurrence in cirrhotic patients.

**Conclusions:** Among HCCs, the prognosis of patients with MO is significantly better than that of patients with IM.

**PPL25-053**

**LONG-TERM OUTCOME OF LAPAROSCOPIC VERSUS OPEN LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA: A CASE-CONTROLLED STUDY WITH PROPENSITY SCORE MATCHING**

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**Introduction:** Laparoscopic liver resection (LR) for hepatocellular carcinoma (HCC) is usually applied to superficial and left side small lesions. Therefore, well designed comparative studies about the results of LR versus open liver resection (OR) for HCC are difficult and still uncommon. The aim of this study was to compare the perioperative and long-term oncologic outcomes of LR versus OR for HCC between well-matched patient groups.

**Method:** Between January 2000 and March 2012, 205 patients (43 with intent to treat with LR, 162 OR) underwent primary liver resection of less than three segments for HCC in our center. To select a comparison group, propensity score matching (PSM) was used at 1:1 ratio with covariates of baseline characteristics including tumor characteristics. Outcomes were compared between the matched groups.

**Results:** The two groups were well balanced by PSM and 29 patients were matched respectively. In LR, there were more non-anatomical resection (65.5 vs 34.5%, p = 0.012), less postoperative ascites (0.0 vs 17.2%, p = 0.025), shorter hospital stay (7.69 ± 2.94 vs 13.38 ± 7.37 days, p < 0.001). Except these, there were no significant differences in perioperative and long-term outcomes. The 1-, 3- and 5-year survivals were 100%, 100% and 92.2% in LR, and 96.5%, 92.2% and 87.7% in OR (p = 0.267). The 1-, 3- and 5-year disease-free survivals were 81.7%, 61.7% and 54.0% in LR, and 78.6%, 60.9% and 40.1% in OR, respectively (p = 0.929).

**Conclusions:** The outcome of LR for HCC was technically feasible and safe in selected patients, and LR showed similar perioperative and long-term oncologic outcomes when compared with OR matched with PSM.
PPL25-054
TUMOR LYSIS SYNDROME FOLLOWING 7-DAY SORAFENIB TREATMENT FOR HEPATOCELLULAR CARCINOMA: A CASE REPORT
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Introduction: Sorafenib, an oral multi-targeted tyrosine kinase inhibitor, is indicated for the treatment of advanced hepatocellular carcinoma. Although rare, tumor lysis syndrome can be a fatal adverse event in hepatocellular carcinoma (HCC) patients with large tumor burden.
Method: A 55-year-old hepatitis B carrier visited our clinic with progressive dyspnea for 3 weeks. Chest and abdominal computed tomography revealed a huge HCC in the left lobe of liver with invasion of inferior vena cava, right atrium, and pulmonary arteries as well as multiple lung metastases.
Results: After 8 days sorafenib administration, tumor lysis syndrome was diagnosed based on the characteristic finding of hyperuricemia, hyperkalemia, acute kidney injury with a massive tumor necrosis on the follow-up imaging. Despite discontinuation of sorafenib and supportive care, the patient’s clinical course rapidly deteriorated.
Conclusions: This is a rare, but fatal complication in an early period following sorafenib treatment for HCC. Careful follow-up after sorafenib commencement is required for early diagnosis and management of tumor lysis syndrome especially in HCC patients with preexisting risk factors.

PPL25-055
ASSOCIATION BETWEEN POLYMORPHISMS OF PPM1E GENE AND TUMOR SIZE OF HEPATOCELLULAR CARCINOMA PATIENTS IN KOREAN POPULATION
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Introduction: Hepatocellular carcinoma (HCC) is the most common type of primary liver cancer in Korea. The protein phosphatase, Mg2+/Mn2+ dependent, 1E (PPM1E) inactivates multiple substrates including 5’-AMP activate protein kinases (AMPK) which inhibits the growth and survival of cancer cells. However, no study on the possible genetic association of PPM1E single nucleotide polymorphism (SNP) with HCC has been conducted yet.
Method: HCC patients (153 males and 30 females) and healthy individuals (167 males and 224 females) were enrolled in this study. We selected three exonic SNPs (rs16943333, rs3809724 and rs3809723) in the 3’-UTR of the PPM1E gene.
Results: rs16943333, rs3809724 and rs3809723 of PPM1E were not significant differences between the HCC group and the control group. In the further analysis, we divided HCC patients into two groups according to tumor size, serum AFP level, UICC stage, radiologic morphology and portal vein thrombosis. We found that rs16943333 and rs3809724 in PPM1E were significantly associated with the tumor size. The genotype frequency of rs16943333 was associated with tumor size in the codominant 2 (G/G vs A/A, p = 0.038, Fisher’s exact p = 0.06, OR = 6.27, 95% CI = 1.11–35.41), dominant (G/G/G vs A/A, p = 0.014, OR = 2.27, 95% CI = 1.17–4.41) and log-additive models (p = 0.0058, OR=2.16, 95% CI = 1.23–3.79). In the allele frequency analysis, rs16943333 was associated with tumor size (p = 0.010, OR = 2.07, 95% CI = 1.19–3.59). The genotype frequency of rs3809724 was associated with tumor size in the codominant 2 (C/C vs T/T, p = 0.300, Fisher’s exact p = 0.09, OR = 5.31, 95% CI = 1.17–24.05), dominant (C/C/T vs T/T, p = 0.030, OR = 2.04, 95% CI = 1.07–3.89) and log-additive models (p = 0.011, OR=1.97, 95% CI = 1.16–3.37). In the allele frequency analysis, rs3809724 was associated with tumor size (p = 0.023, OR = 1.84, 95% CI = 1.09–3.12).
Conclusions: In conclusion, we found that PPM1E polymorphisms were significantly associated with tumor size of HCC patients.

PPL25-056
HISTOPATHOLOGIC FACTORS AFFECTING TUMOR RECURRENCE AFTER HEPATIC RESECTION IN COLORECTAL LIVER METASTASES
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Introduction: Hepatic resection is a standard method of treatment for colorectal liver metastases (CRLM). However, the pathologic factors of metastatic liver lesions that affect tumor recurrence are less well defined in CRLM. The aim of this study was to evaluate the risk factors for recurrence of CRLM, focusing on histopathologic factors of metastatic lesions of the liver.
Method: From January 2003 to December 2008, 117 patients underwent curative hepatic resection for colorectal liver metastases were reviewed. Tumor size and number, differentiation, tumor budding, angio-invasion, dedifferentiation and tumor infiltrating inflammation of metastatic lesions were investigated.
Results: The mean number of hepatic tumors was 2 (range 1–8). The mean size of the largest tumor was 2.9 (range 0.3–18.5) cm in diameter. The moderate differentiation of the hepatic tumor was the most common in 86.3% of the patients. Tumor budding, angio-invasion, and dedifferentiation were observed in 81%, 34%, and 12.8% of patients. Inflammation infiltrating tumor was detected in 6.8% of patients. Recurrence after hepatic resection appeared in 69 out of 117 cases (58.9%). Recurrence-free survival at 1-, 2- and 5-year were 62.4%, 43.6% and 34.3%. The multivariate analysis showed the number of metastases ≥3 (p = 0.007),...
the tumor infiltrating inflammation ($p = 0.047$), and presence of dedifferentiation ($p = 0.020$) to be independent risk factors for tumor recurrence.

**Conclusions:** Histopathological factors, i.e., dedifferentiation and tumor infiltrating inflammation of the metastatic lesion, could be one of the risk factors of aggressive behavior as well as the number of metastases even after curative resection for CRLM.

**PPL25-057**

**INTRACTABLE BILE LEAKAGE AFTER LIVER RESECTION**


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**Introduction:** The bile leakage is a major complication after liver resection and sometimes falls in intractable. We investigated risk factors for intractable bile leakage after liver resection.

**Method:** The subjects in this study were 336 patients who underwent liver resection between January 2008 and December 2012. We investigate the characteristics in clinicopathological findings in patients with bile leakage to investigate risk factors for bile leakage. In addition, we also investigate risk factors for intractable bile leakage. We defined “intractable bile leakage” when patients with bile leakage required a period of 1 month or longer in order to cure the bile leakage.

**Results:** The bile leakage developed in 15 of the 336 patients after liver resection. By univariate analysis, large tumor, tumor at the hilar area, a high-risk operation (right anterior sectionectomy, left medial sectionectomy, and right anterior and left medial sectionectomy), a long operation time, and large amount of intraoperative blood loss were risk factors for the bile leakage. By multivariate analysis, hilar area type tumor was an independent risk factor for bile leakage. Of the 15 patients with bile leakage, 7 patients had intractable bile leakage. Three of the 7 patients had the stenosis or the obstruction of proximal bile duct (duodenal side of the leakage point), whereas no patients with bile leakage but not intractable had such stenosis or obstruction. Intraabdominal infection occurred in all 7 patients with intractable bile leakage whereas no patients with bile leakage but not intractable had the infection.

**Conclusions:** The hilar area type tumor was an independent risk factor for bile leakage after liver resection. The stenosis or obstruction of the bile duct (duodenal side of the leakage point) and intraabdominal infection were risk factors for intractable bile leakage.

**PPL25-058**

**METAANALYSIS OF INTERMITTENT PRINGLE MANOEUVRE VERSUS NO PRINGLE MANOEUVRE IN ELECTIVE LIVER SURGERY**

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**Introduction:** Intermittent pringle manoeuvre (IPM) is frequently used during liver surgery. This metaanalysis aimed to review the impact on blood loss, operating time and morbidity and mortality with and without use of IPM.

**Method:** An electronic search was performed of the MEDLINE, EMBASE, PubMed databases using both subject headings (MeSH) and truncated word searches to identify all articles published that related to this topic. Pooled risk ratios were calculated for categorical outcomes, and mean differences for secondary continuous outcomes, using the fixed-effects and random-effects models for meta-analysis.

**Results:** Four randomised controlled trials encompassing 392 patients were analysed to achieve a summated outcome. Pooled data analysis showed the use of IPM resulted in reduced transection time/cm$^2$ (mean difference (MD) $-0.53 \ [-0.88, -0.18]$ minutes/cm$^2$ ($p = 0.003$) but with comparable blood loss (mL/cm$^2$) (MD $-1.67 \ [-4.41, 1.08]$ mL/cm$^2$, $p = 0.23$), overall blood loss (MD $-20.42 \ [-89.42, 48.58]$ mL), blood transfusion requirements (RR 0.78 [0.40, 1.52, $p = 0.47$]) and morbidity and mortality compared to NPM (No Pringle manoeuvre). In addition there was no significant difference in the postoperative hospital stay (MD 0.37 [$-0.60, 1.34$] days).

**Conclusions:** There is no evidence that the routine use of IPM improves perioperative and postoperative outcomes compared to NPM and its routine may not be recommended.
Z-score were +0.4 and +0.6 respectively in the postoperative 1st year after LT or PCS. Then delta Z-score decreased annually. The m-delta Z-scores changed to positive values 2 years later after PCS or LT, relatively to the median Z-score of non-op group.

**Conclusions:** Patients with GSD type I showed a growth spurt after LT or PCS and caught up growth 2 years later.

**PPL25-060**

**GLISSONEAN PEDICLE TRANSECTION FOR ANATOMIC LIVER RESECTION**

Nguyen Thuan, Tran Cong Duy Long, Nguyen Hoang Bac, Le Tien Dat and Dang Quoc Viet

**Introduction:** Hepatocellular carcinoma (HCC) is one of the most common malignant tumors globally. It is an aggressive tumor that usually develops in a cirrhotic liver with limited functional reserve. With advanced surgical techniques and perioperative care, outcome after hepatic resection for HCC has greatly improved with low operative morbidity and mortality. However, the high incidence of postoperative recurrence remains a serious problem. As long as liver function is adequate, anatomic resection is strongly recommended as the best surgical procedure for HCC.

Despite its first description by Takasaki 1986, there has been wide acceptance of the procedure to date. Our aim was to study the clinical effect of anatomic liver resection using Glissonean pedicle transection for HCC.

**Method:** This study included 142 patients who underwent anatomic liver resection using Glissonean pedicle transection between 1/1/2011 and 7/31/2013.

**Results:** Almost types of hepatectomy were performed (except caudate lobectomy). Mean operation time was 163.72 ± 55.61 minutes (90–360). Median blood loss was 200 mL (50–2500, 25th and 75th percentage were 100, 300 respectively). Right portal vein and posterior bile duct injury rate were 2.1% and 2.1% respectively. Posterior biliary leakage rate was 2.8%. There was no reoperation. Mortality rate was 0%. 1-year and 2-year recurrent rate were 18.6% and 44.5% respectively. 1-year and 2-year survival rate were 93.2% and 42.3% respectively.

**Conclusions:** The results of current study suggest that Glissonean pedicle Transection for anatomic liver resection is a simple, feasible, safe, effective procedure and should be widely applied for HCC treatment.

**PPL25-061**

**EFFICACY OF MELOXICAM, COX-2 INHIBITOR, FOR RECURRENT HEPATOCELLULAR CARCINOMA AFTER CURATIVE SURGERY**

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**Introduction:** As hepatocellular carcinoma (HCC) has a high rate of recurrence even after curative treatments, chemopreventive agents for recurrent HCC will likely prove beneficial in improving the prognosis of HCC. Recently, cyclooxygenase-2 (COX-2) has been found to be overexpressed in HCC. This study investigated the effects of meloxicam, a clinically used COX-2 inhibitor, for recurrent HCC after curative treatment.

**Method:** We have treated 114 patients with meloxicam (15 mg/day) for recurrent HCC after curative surgery, hepatic resection or surgical microwave ablation (microwave coagulo-necrotic therapy; MCN), in our institute from January 2004 to December 2009. The median size of recurrent tumor was 10.8 mm (range, 5–23 mm), the median number of recurrent tumor was 1.9 (range, 1–25). Effects of meloxicam were evaluated by MRI according to RECIST version 1.1 criteria 6 months after initiating meloxicam administration and overall survival was retrospectively evaluated and statistically analyzed.

**Results:** Of these 114 cases, 3 cases (2.6%) achieved complete response (CR), 6 cases (5.2%) achieved partial response (PR), 37 cases (32.4%) showed stable disease (SD) and 68 cases (59.6%) showed progressive disease (PD). Between the CR + PR + SD group (46 cases) and the PD group (68 cases), no significant differences in liver function, tumor size, tumor number, tumor markers, operative procedure at first curative surgery or operative times were found. Mean duration from starting meloxicam to retreatment for recurrent HCC was 582 days in the CR + PR + SD group and 322 days in the PD group (p < 0.0001). The 1-, 3-, 5-year overall survivals for the CR + PR + SD group and the PD group were 100%, 95.6%, 83.6% and 100%, 83.1% and 57.4%, respectively. The overall survival was better in the CR + PR + SD group than in the PD group (p = 0.0481).

**Conclusions:** Administration of meloxicam, the COX-2 inhibitor, for recurrent HCC may prolong the time to progression of recurrent HCC and provide a better prognosis.

**PPL25-062**

**CURATIVE TREATMENT OF OLIGOMETASTATIC LIVER AND LUNG DISEASE FROM ANAL SQUAMOUS CELL CARCINOMA: A CASE SERIES**

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**Introduction:** At present there is limited evidence to guide the management of patients with oligometastatic disease in the setting of anal squamous cell carcinoma (SCC). At The Prince of Wales (POW) Hospital in Sydney, by analogy with oligometastatic rectal cancer, we have selectively treated such patients with curative resection. This study aims to assess outcomes in potentially curative oligometastatic anal SCC patients, hypothesising that cure may be achieved with aggressive treatment.

**Method:** A retrospective review of the POW Department of Radiation Oncology anal SCC databases was performed. Eligible patients included those with primary diagnosis of anal SCC and synchronous or subsequent metastases.
oligometastic disease surgically treated with curative intent. Patient, tumour and treatment characteristics were extracted and disease outcomes assessed.

**Results:** Four eligible patients were identified, with metastectomy performed 2011–2013. Three had single metastatic lesions to liver and one had a single metastasis to lung. Two patients were immunosuppressed (one with HIV, the other with SLE on prednisolone). Management of the primary anal lesion was with definitive chemoradiotherapy in three cases and abdominoperineal resection in the patient with SLE. Two patients had synchronous oligometastatic liver disease and one patient presented 30 months post-primary treatment. Surgical management involved central liver resection (n = 1), bisegmental resection (n = 1) and hemi-hepatectomy (n = 1). The fourth patient with oligometastatic lung disease, diagnosed 14 months post-initial treatment, was managed with wedge resection. Post-metastectomy, two patients were treated with adjuvant chemotherapy and one with adjuvant chemo-radiotherapy. Average follow up post-metastectomy was 12.3 months (range 2–24). Two of four patients remain disease-free at 2 and 15 months post resection. The two patients who developed recurrent metastases had a disease free survival of 24 and 25 months. The average overall survival was 23 months.

**Conclusions:** This case series demonstrates that curative treatment of oligometastatic anal SCC is possible in selected cases.

**PPL25-063**

**EPIDEMIOLOGY OF METASTATIC COLON CANCER AMONG SAUDIS**

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**Introduction:** The incidence of colorectal cancer in Saudi Arabia is rising, being the most common cancer in the male population. However, little is known about the epidemiology of metastatic colon cancer. The country has a population of over 26 M people with a median age and life expectancy of 25 and 75 years old respectively. Our study aim is to present the incidence and management patterns of metastatic colorectal cancer in Saudi Arabia.

**Method:** The incidence of colorectal cancer in Saudi Arabia is rising, being the most common cancer in the male population. However, little is known about the epidemiology of metastatic colon cancer. The country has a population of over 26 M people with a median age and life expectancy of 25 and 75 years old respectively. Our study aim is to present the incidence and management patterns of metastatic colorectal cancer in Saudi Arabia.

**Results:** In 2008, SCR reported 904 cases with male predominance. The median age was 59, 29.2% of patients had synchronous disease. At our tertiary center, there were 191 new colon cancer cases with male predominance (57%) and a mean age at diagnosis of 58. Median follow up was 3 years. Rectal cancer was the primary site in 33% of cases. 64 (33%) patients had synchronous disease 39(20%) were hepatic and 23 (12%) were lung metastasis. Total 15 follow up patients had metastatic disease 7% hepatic and 4% was lung. Out of the total liver metastasis 20% were resected.

**Conclusions:** Metastatic colon cancer is a considerable problem occurring in a relatively young population. More effective screening, possibly at an earlier age with population-specific guidelines, and better treatment strategies are needed to improve this important public health burden.

**PPL25-064**

**DEVELOPMENT OF A LAPAROSCOPIC LIVER RESECTION PROGRAM AND STRATEGIES TAKEN TO INCREASE COMPATIBILITY – A LARGE VOLUME CENTER’S 10 YEARS’ EXPERIENCE**

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**Introduction:** The application of laparoscopic liver resection has had little progress since the first laparoscopic liver resection was performed two decades ago. The slow acceptance of laparoscopic approach in liver resection is primarily due to the technical difficulty of the operation, fear of gas embolism, potential massive bleeding, and possible inferior outcome in malignant diseases. In the last 5 years, it has gained much popularity among surgeons and many centers are currently performing laparoscopic liver resection or are planning to start one.

**Method:** A total of 355 patients who underwent laparoscopic hepatectomy of Samsung medical center between January 2003 and April 2013. Clinical chart and operation record was reviewed for preoperative and postoperative patients’ clinical status.

**Results:** As in most centers from 2008 to 2011, laparoscopic liver resection was mainly done for lesions for small tumors at the so called ‘antero-lateral segments’ (segments 2–6) requiring limited resection and most anatomic liver resections were primarily left lateral seconetomies.

Since 2011, major resections such as left or right hepatectomies and liver resections for lesions in difficult locations (segment 1, 7, 8) have been performed increasingly, up to the half of total cases.

**Conclusions:** The main innovations taken between 2011 and 2012 were the application of bipolar electrocautery, the use of increased intra-abdominal pressure during bleeding and the mid-term positive results on the survival on patients receiving laparoscopic liver resection for malignant tumor. We are now in an era where laparoscopic approach for liver resection is being accepted more widely and it has become important for institutions to have a good laparoscopic program.
PPL25-066
EXPERIENCES OF LAPAROSCOPIC LIVER RESECTION IN VARIOUS LIVER DISEASE

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Introduction: To review and investigate the experiences of laparoscopic liver resection in various liver disease

Method: From April 2008 to December 2010 in Chungnam national university, 49 cases of laparoscopic liver resection were performed among 157 liver resections. During formal 1 year, mainly laparoscopy assisted liver resections were performed and during later 2 years totally laparoscopic liver resections were main operative type. Surgery type is decided preoperatively by intension to treatment. Clinical data were collected retrospectively and comparatively analyzed by surgery type.

Results: Mean age was 60.0 (35–85), sex ratio (M:F) was 1:1.3. Preoperatively 28 patients were diagnosed intrahepatic duct stone with recurrent pyogenic cholangitis, 9 patients were hepatocellular carcinoma, 5 patients were colorectal cancer with liver metastasis and 7 patients were benign hepatic tumors. Laparoscopy assisted liver resection was 16 cases (32.7%) and totally laparoscopic liver resection was 33 cases (67.3%). Anatomical major liver resection was 40 cases (81.6%) and 9 cases (18.4%) were nonanatomical resection. Mean operation time was 264.3 minutes (75–570 minutes) and intraoperative transfusion was done in 4 cases, two cases were bile leakage. Pulmonary atelectasis and indigestion were happened in one case each. All of them were solved by conservative managements. Mean malignant tumor size was 2.4 cm (1.8–5.0 cm) and mean tumor free margin was 1.9 cm (0.7–5.0 cm). But tumor recurrence was happened in 5 cases (35.7%). Two cases (22.2%) were hepatocellular carcinoma and three cases (60%) were colorectal cancer liver metastasis.

Conclusions: In this study, we conclude laparoscopic liver resection is feasible operation but it needs to be carefully conducted when it comes to malignant tumors.

PPL25-067
MESENTERICO-LEFT PORTAL BYPASS (REX SHUNT) IN CONGENITAL Cavernomatous Transformation of Portal Vein: TWO CASES REPORT

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Introduction: Extrahepatic portal vein thrombosis or cavernomatous transformation is the frequent cause of extraportal portal hypertension in children. Life-threatening variceal bleeding reoccurs in these patients whose liver parenchyma is functionally normal. Surgical shunt procedures are indicated including portosystemic shunt and mesenterico-left portal shunt (REX shunt). REX shunt, which restores the physiologic hepatopetal portal flow, is preferable according to the limited articles published. The cases we reported highlighted the effectiveness of REX shunt in treating patients with variceal bleeding secondary to extraportal portal hypertension.

Method: Two cases were illustrated. Both presented to clinical attention at age of 7 due to recurrent variceal bleeding despite of repeated endoscopic sclerotherapy or banding. REX shunt procedure was performed with autologous internal jugular vein and expanded polytetrafluoroethylene prosthetic graft as interposition conduit, respectively.

Results: Esophageal variceal bleeding ceased after the REX shunt procedure and the follow-up endoscopy revealed no evidence of varices 3 months postoperatively.

Conclusions: Mesenterico-portal bypass (REX shunt) procedure is effective and curative in treating extraportal portal hypertension for restoration of normal hepatopetal portal flow.

PPL25-068
A CASE OF SYMPTOMATIC SPONTANEOUS INTRAHEPATIC PORTOSYSTEMIC SHUNT MANAGED BY LAPAROSCOPIC HEPATIC VEIN CLOSURE

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Introduction: Intrahepatic portosystemic shunt (IPSS) is uncommon and usually follows trauma or iatrogenic injury, but spontaneous shunts may also occur. The shunts should be treated when they cause symptoms, which may mimic hepatic encephalopathy. Early and accurate diagnosis is crucial to prevent misdiagnosis as a psychiatric or neurologic disorder. Although interventional endovascular management of the shunts is the treatment of choice, a surgical approach can be used when the percutaneous approach fails.

Method: We report here a case of symptomatic spontaneous IPSS between the posteroinferior branch of right portal vein and the accessory right inferior hepatic vein, which was successfully managed with laparoscopic closure of the hepatic vein.

Results: The encephalopathic symptoms resolved promptly after the closure.

Conclusions: We conclude that IPSS can be treated by laparoscopic hepatic venous occlusion in selected cases of patients.
PPL25-069
SIMULTANEOUS LIVER AND PANCREATIC RESECTIONS: A SINGLE CENTER EXPERIENCE
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Introduction: In western countries, Simultaneous Liver and Pancreatic Resections (SLPR) are rarely performed operations because of high postoperative mortality and morbidity. Mortality rates up to 30% were reported for major liver resection associated with pancreaticoduodenectomy. This study evaluates the safety and outcomes of SLPR at a tertiary European center for Hepato-Pancreato-Biliary Surgery.

Method: Between January 1994 and January 2012, 50 consecutive patients with a mean age of 57.3 ± 1.9 years (range, 20–81) underwent SLPR. Indications for surgery were neuroendocrine carcinoma (16), biliary cancer (15), colon cancer (5), duodenal cancer (1) and others (13). Twelve patients (24%) had undergone preoperative biliary drainage, five patients (10%) underwent pre-operative portal vein embolization (PVE) and 9 patients (18%) received preoperative chemotherapy.

Results: The type of pancreatic resections included pancreaticoduodenectomy (30), distal pancreatectomy (17), spleen preserving distal pancreatectomy (2), and total pancreatectomy (1). Twenty-three patients (46%) had associated major hepatectomies, 27 (54%) underwent minor liver resections and 11 (22%) had associated vascular resections. The transfusion rate was 32% and overall mortality and morbidity rates were 4% and 46%. Univariate and Multivariate analysis showed no differences in postoperative morbidity for extent of liver resections (major vs minor) or the type of pancreatic resections and preoperative chemotherapy was the only independent risk factor associated with postoperative morbidity (p = 0.02).

Conclusions: SLPR can be performed with acceptable morbidity and mortality rates. Postoperative outcomes do not vary with the extent of liver resection or the type of pancreatic resection. Major hepatectomy should not be considered a contraindication to SLPR in selected patients. Patients receiving preoperative chemotherapy should be carefully evaluated and selected very cautiously.

PPL25-070
ANESTHESIA WITH REMIFENTANIL IS RECOMMENDED FOR HEPATECTOMY ON HEPATOCELLULAR CARCINOMA

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Introduction: The advantage of remifentanil, a synthetic narcotic drug, is an immediate effect. In current researches, remifentanil has been shown to be able to control intraoperative blood pressure and, therefore, it has been frequently used for general anesthesia.

Method: In 40 cases who underwent heptatectomy in 2006, fentanyl was used (fentanyl group: FG), while in 52 cases undergoing heptatectomy in 2009, remifentanil was employed (remifentanil group: RG). Intraoperative and postoperative volumes of urine, mean blood sugar level, and insulin consumption were compared between the two groups. In order to evaluate intraoperative vital conditions, the 92 patients were divided into stable-condition group (SG: n = 33) and non-stable-condition group (NSG: n = 59). To obtain clinical data, anesthesia charts were reviewed.

Results: There were no significant differences in age, intraoperative bleeding amount, serum albumin level, serum creatinine level and HbA1c level between FG and RG. However, there were statistically significant differences in operation time (332 vs 254 minutes: p < 0.01), anesthesia time (420 vs 330 minutes: p < 0.01), balance of intraoperative hydration (volume of infusion – amount of bleeding – urine volume)/weight/anesthesia time (7.6 vs 9.9 mL/kg/hours: p < 0.01), intraoperative urine volume/opera-time (58 mL vs 72 mL: p < 0.03) and blood sugar level (208 vs 178 g/dL: p < 0.01) between FG and RG. Within 24 hours after surgery, blood sugar level and insulin consumption showed no significant differences.

Comparison between SG and NSG showed significant difference in blood sugar level (158 vs 145 g/dL: p < 0.05), within 24 hours after surgery, blood sugar level (197 vs 186 g/dL: p < 0.03) and insulin consumption (6 U vs 2 U: p < 0.01).

Conclusions: The anesthesia that can maintain stable vital condition during surgery has a strong effect of controlling blood sugar level during a perioperative period in heptatectomy patients with hepatocellular carcinoma. Anesthesia with remifentanil is recommended for heptatectomy patients with hepatocellular carcinoma.

PPL25-071
VENOUS THROMBOEMBOLIC PROPHYLAXIS FOLLOWING HEPATIC RESECTION: PATTERNS OF CARE AMONG LIVER SURGEONS

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Introduction: Broad consensus does not exist around the utilization of venous thromboembolic (VTE) prophylaxis for patients undergoing hepatic resection. We sought to define what clinical factors impact choice of VTE prophylaxis among hepato-pancreato-biliary (HPB) surgeons.

Method: Surgeons who perform liver resections were invited to complete a web-based survey regarding their opinions on VTE prophylaxis. The impact of physician and clinical factors on VTE prophylaxis was analyzed.

Results: Two hundred and four responses were received (response rate-67%). Most respondents were
male (91%), from the United States (80%), and practiced at an academic center (87%). Surgical training varied: HPB (24%), transplantation (25%), surgical oncology (33%), combined HPB/transplantation (13%), or no specialty training (29%). Respondents estimated the risk of a VTE event was higher following a major (8%) versus minor (5%) resection. Although 98% of respondents routinely used VTE prophylaxis, there was considerable variability: sequential compression devices (89%), unfractionated heparin Q12 hours (31%), unfractionated heparin Q8 hours (30%), and low-molecular weight heparin (37%). While 88% of respondents noted their use of VTE prophylaxis was not impacted by operative indication (benign vs malignant), 16% of surgeons stated that a major resection reduced their likelihood of administering prophylaxis. Other factors associated with a decreased likelihood of administering pharmacologic prophylaxis included: elevated INR (75%), thrombocytopenia (63%), liver insufficiency (58%), large operative blood loss (45%) and early complication (7%). Of note, 47% of respondents routinely waited until ≥ POD1 before initiating pharmacologic prophylaxis and 35% hold VTE prophylaxis until there are no signs of coagulopathy. A minority of respondents (14%) said they routinely send patients home on pharmacologic prophylaxis. While 81% of surgeons state that their hospital has institutional guidelines for VTE, a comparable number (80%) believe that consensus guidelines would be helpful.

Conclusions: There is considerable practice variation regarding VTE prophylaxis among liver surgeons. While the vast majority of surgeons routinely employ VTE prophylaxis, the methods, timing and purported contraindications to VTE prophylaxis differ significantly among liver surgeons.

PPL25-072
EXPRESSION OF FATTY ACID BINDING PROTEINS IN A MOUSE MODEL OF OBESITY-ASSOCIATED HCC
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Introduction: Hepatocellular carcinoma (HCC) is the 3rd leading cause of cancer-related mortality. Risk factors for HCC include viral hepatitis infection, aflatoxin exposure and chronic alcohol consumption, with obesity emerging as an increasingly important risk factor. The aim of this study was to investigate expression of fatty acid binding proteins (FABPs) as potential biomarkers and/or mechanistic modulators of obesity-associated HCC.

Method: Male C57BL/6 mice were injected with vehicle (Veh) or diethylnitrosamine (DEN; 5 mg/kg) at 21-24 days. At 5 weeks, mice were placed on control diet (CD; 10% kcal%fat) or high fat diet (HFD; 60% kcal%fat) and maintained. At 42 weeks mice were sacrificed and livers examined for gross tumor incidence. Liver sections were formalin-fixed for histological analysis or snap-frozen. To assess FABP expression, RT-qPCR and immunobLOTS were performed.

Results: Animals on HFD-Veh formed large tumors in 30% of animals, an effect exacerbated by DEN administration (90%), compared to small tumors in 60% in CD-DEN. Expression of FABP1 was upregulated in CD-DEN and HFD-DEN compared to Veh-injected animals. FABP2 was unchanged between CD-Veh and -- DEN and HFD-Veh animals. However; there was a 2-fold down regulation of FABP2 in livers of HFD-DEN non-tumor tissue (NT) compared to HFD-DEN tumor (T) tissue. No significant FABP3 was detected; however, there was ~1000-fold upregulation of FABP4 in HFD animals compared to CD animals, an effect exacerbated in DEN-injected animals. FABP5 expression was downregulated in HFD-Veh and HFD-DEN-NT tissue; however, HFD-DEN-T tissue expressed 3-fold higher levels.

Conclusions: FABPs are dysregulated in obesity-associated HCC. Interestingly, there is a reciprocal relationship between expression of FABPs 1, 2 and 5 in tumor tissue from HFD-DEN mouse livers compared to distant NT liver tissue. These findings suggest FABPs may be biomarkers for obesity-associated HCCs. Further studies should be conducted to determine the mechanistic impact, if any, on FABP dysregulation on the initiation and progression of obesity-associated HCC.

PPL25-073
REDUCTION OF COMPLICATIONS: THE PROGRESSION OF LAPAROSCOPIC LIVER RESECTION
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Introduction: Laparoscopic hepatic resection has been described as safe and efficacious. This study examines the drift in incidence and severity of post-operative complications arising from laparoscopic compared to open liver resection.

Method: Retrospective review of 615 patients managed by a single surgeon from 2000 to 2013. Analysis contrasts the demographics and post-operative outcomes between both groups. Complications were examined and compared using the Clavien-Dindo Classification for severity.

Results: Seven hundred and fifty-three hepatic resections in 615 patients were examined. Open surgery was reserved for smaller lesions (4.5 cm vs 5.1 cm: p = 0.064) and predominately in malignant lesions (44.8% vs 78.2%: p < 0.001). Complications were more frequent in open procedures (40.2% vs 20.2%: p < 0.001) although the severity of complications was not significantly different (p = 0.846). Concordantly an open approach resulted in a higher percentage of patients requiring critical care (89.7% vs 12.9%: p < 0.001) resulting in a longer hospitalization (8.5 days vs 3.4 days: p < 0.001).

Conclusions: This study confirms laparoscopic hepatic resection carries a lower incidence of complication. Notably the severity of the complications is equivalent between the laparoscopic and open groups. The higher utilization of critical care services and prolonged hospitalization may also be attributed to an increased
complexity of open resections not performed laparoscopically.

PPL25-074
SECOND HEPATIC RESECTION FOR RECURRENT PANCREAS LIVER METASTASES
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Introduction: Multiple liver resections have successful outcome in colorectal metastases. However still remains controversial in the literature the treatment of liver metastases of pancreatic adenocarcinoma. The second hepatectomy for metastatic pancreas has been rarely performed in these patients.

Method: Case report based on our files and literature review.

Results: Female patient underwent pancreaticoduodenectomy (PD) for adenocarcinoma pancreas uneventful. Remained asymptomatic until 13th month postoperative when a CT showed hepatic metastases. She underwent non anatomic segment IV and partial resection of transverse colon single metastasis in the liver confirmed by CT PET preoperative and US intra-operative. Pathology confirmed metastasis and showed negative margins. She had so far no complications. Evolves asymptomatic until new CT showed a new metastasis in the 8th month postoperative hepatectomy and 21th month postoperative PD when she underwent segmentectomy IV and V and right colectomy due to recurrence of metastasis, uneventful and with good postoperative outcome. Pathology confirmed metastasis and showed negative margins. Remained asymptomatic for 31 months. Died at 32 months post-operatively.

Conclusions: The improvement in the treatment of pancreatic adenocarcinoma and intensive monitoring of these patients may allow the second hepatectomy in selected cases.

PPL25-075
THE EFFECT OF ALCOHOL ON SIRT1 EXPRESSION AND FUNCTION IN ANIMAL AND HUMAN MODELS OF HEPATOCELLULAR CARCINOMA
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Introduction: Risk factors for hepatocellular carcinoma (HCC) include chronic ethanol (EtOH) consumption and viral hepatitis. Sirt1 is a NAD+ dependent deacetylase implicated in alcohol-induced liver injury and overexpressed in human HCC. The aims of this study were to investigate Sirt1 expression in mouse models of EtOH feeding and HCC, and in human HCC cells with differing alcohol metabolism profiles.

Method: Juvenile (23–25 days) C57BL/6 and B6C3 mice were injected with DEN and randomized to receive drinking water (DW) or EtOH-DW for 8 weeks when 36 weeks old. Livers were analyzed for HCC incidence and size, and Sirt1 expression. In parallel human HepG2 HCC cells or HepG2 cells transfected to express ADH and CYP2E1 (VL-17a cells; Dr. Clemens, Omaha, NE) were treated with alcohol (0–50 mM) and/or CAY10591 (Sirt1 activator; 10 µM, 24 hours).

Results: B6C3 mice exhibited significantly elevated Sirt1 expression versus C57BL/6 mice and Sirt1 expression was elevated in HCC versus non-tumor liver. However, EtOH-feeding did not further alter Sirt1 expression in mice of either background despite EtOH increasing size and incidence of HCC in B6C3 mice. In vitro, VL-17a-cells exhibited significantly greater alcohol metabolizing capacity versus HepG2-cells and EtOH treatment significantly decreased Sirt1 expression in VL-17a-cells, an effect not observed in HepG2. Concomitantly, EtOH-treatment stimulated VL-17a-cell growth but not that of HepG2 cells and these EtOH-dependent changes in VL-17a-cell growth were abrogated by CAY10591 pretreatment.

Conclusions: Sirt1 expression correlates with susceptibility to HCC formation in different mouse strains, but is not further affected by chronic alcohol feeding. Conversely Sirt1 expression and function is directly influenced by capacity to metabolize alcohol in human HCC cells in culture. These apparent discrepancies in Sirt1 expression-function may reflect differences in enzyme expression compared to activity or more complex changes in genes that are targeted for deacetylation during tumor progression in the setting of chronic alcohol feeding-treatment.

PPL25-076
MULTIPLE SURGERIES IN THE TREATMENT OF HEPATIC METASTASES
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Introduction: Exposing the postoperative results and survival in the medium-long term repeat surgery of liver metastases in the Hepato-Biliary-Pancreatic and Liver Transplant Surgery (Hospital Infanta Cristina, Badajoz), from February 2006 to May 2013.

Method: We reviewed the medical history of 259 patients who underwent liver metastases during this period. 54 parameters were collected, including demographic and hospitalization data, characteristics of the primary tumor and metastases, parameters in relation to surgery, postoperative morbidity and survival in the medium-long term.

From these data was performed retrospective statistical analysis used SPSS18.0 for Windows.

Results: Of the 259 cases, 181 (69.9%) was a single intervention for hepatic metastases and in 78 cases were patients who required more than one surgery. 31 (11.9%) was the first of consecutive interventions, 38 (14.6%) was the second intervention, 8 (3.08%) the third and the fourth one (0.38%). Of the 78 cases of multiple surgeries 56 were males (71.8%). The mean age was 3.92 ± 11.7. The origin of the primary tumor...
was colorectum in 82.1%, neuroendocrine in 9% and no colorectal no neuroendocrine in 9%. In 39 cases the metastasis was single (50%). Major hepatectomy was performed in six patients (7.7%) RF was performed in 35 patients (44.9%), as the only procedure in 18 (23.1%). They pointed transpluion 20 patients (25.6%). Overall morbidity was 16.7%. Surgical morbidity 11.5%, the postoperative length of hospital stay was 9.4 ± 9.99 days. The comparison of variables between single/multiple surgeries found no statistically significant differences. The comparison of survival after a single/multiple intervention was 84/92% at 1 year, 57/65% at 3 years and 36/43% at 5 years (no statistically significant differences).

**Conclusions:** The repeated resection of liver metastases is frequently performed -Repeate surgery of metastases in our unit is a safe technique with acceptable morbidity and mortality -In comparison with the first intervention, repeated resections show acceptable results.

**PPL25-077**

**USE OF TRANSARTERIAL CHEMOEMBOLIZATION (TACE) FOR HEPATOCELLULAR CARCINOMA (HCC) TUMOR DOWNSTAGING**

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**Introduction:** Current strategies for HCC management utilize liver-directed therapy as first-line therapy for patients with hepatic confined tumors and Child’s class A or B cirrhosis. We recently performed a 3.5-year prospective assessment of successful downstaging for patients with HCC in the setting of cirrhosis.

**Method:** Between 7/1/2009 and 12/31/2012, 781 TACE procedures were performed on 431 newly diagnosed HCC patients. TACE was performed using a combination of epirubicin, Ethiodol, and Gelfoam particles with selective tumor targeting as the standard approach. Patient demographics, recurrence, and survival results were reviewed.

**Results:** One hundred and seventy-six patients were outside of Milan criteria at time of initial TACE (Stage III-91, Stage IVA1-49, Stage IVA2-36). 23/176 outside Milan cases have been gone on to liver transplantation thus far, with the remainder of downstaged patients either currently listed, unfit for OLT for other reasons, or not interested in OLT. Overall, 101/431 patients undergoing TACE therapy have gone on to OLT. Overall survival after TACE therapy is 91.2%, 85.1%, and 76.4% at 1-, 2-, and 3-year in the 101 undergoing OLT.

**Conclusions:** TACE therapy provides an effective initial strategy for first-line treatment of patients with HCC in the setting of cirrhosis. In patients presenting with hepatically confined non-metastatic disease, this therapy may allow for tumor downstaging and subsequent liver transplantation.

**PPL25-078**

**LIVER RESECTION FOR COLORECTAL LIVER METASTASES (CRLM) IS SAFE IN THE ELDERLY PATIENTS.**

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**Introduction:** Liver resection (LR) is an accepted treatment for patients with CRLM and has been recently proposed also for selected elderly patients. The aim of this study was to clarify the perioperative outcome of LR in patients older than 75 years.

**Method:** From January 2000 to June 2013, 246 LR have been performed for CRLM with curative intent; in 26 a explorative laparotomy or a RFTA were performed and were excluded. 220 patients were enrolled: 99 younger than 65 years (YG), 92 between 65 and 75 years (OG) and 29 older than 75 years (VOG). Patients’ demographics, clinical and histopathological parameters, intra and perioperative results were analyzed. ANOVA and Student’s t tests were used for statistics; significance was defined as p < 0.05.

**Results:** YG included 61 males and 38 females, aged 54.62 ± 8.42 years [25–65]; OG included 68 males and 24 females, aged 68.91 ± 2.86 years [65–75] and VOG included 15 males and 14 females, aged 78.59 ± 2.70 years [75–85]. Unique CRLM were 35.4%, 46.7% and 44.8% in YG, OG and VOG, respectively (p = NS). Mean diameter of the largest tumour was 34.64 ± 23.85 mm [6–130] in YG, 40.89 ± 28.69 mm [8–200] in OG and 33.68 ± 13.79 mm [8–60] in VOG (p = NS). Duration of surgical procedure was 349 ± 141 minutes [150–820], 375 ± 161 minutes [90–800] and 315 ± 153 minutes [115–745] in YG, OG and VOG, respectively (p = NS). Intraoperative blood transfusions were 245 ± 510 mL [0–3300], 262 ± 506 mL [0–2500] and 168 ± 327 mL [0–1200] in YG, OG and VOG, respectively (p = NS). Postoperative hospital stay was 10.38 ± 4.17 days [6–33], 11.21 ± 7.79 days [6–68] and 10.24 ± 6.29 days [4–32] respectively (p = NS). Postoperative complications were 13.13%, 19.56% and 17.24% in YG, OG and VOG respectively (p = NS). Two patients died, one in OG and one in VOOG, respectively (p = NS).

**Conclusions:** Advanced age should not be considered a deterrent for liver resection in patients with CRLM.

**PPL25-079**

**TRANSLATIONAL SCIENCE IN A SURGICAL RCT: GETTING THE MOST OUT OF YOUR INVESTMENT**

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**Introduction:** Laparoscopic liver resection is standard procedure in many specialized centres. However, there is to date no RCT validating the surgical and oncological equivalence of laparoscopic and open liver resection. The Oslo Comet-study is a RCT on laparoscopic and open liver resection for colorectal liver metastases. Primary end point is 30 days morbidity. However, a large RCT is costly and demands great effort from participating patients and medical professionals. This warrants maximum utilization of the data collected.

**Method:** We have initiated several translational studies in addition to evaluating the primary and secondary targets:

2. Establishment of a bio bank for genome analysis of tumour tissue. Linking of genome data to clinical information will facilitate identification of prognostic factors.
3. A health economy evaluation of a) in-hospital costs, b) 1-year cost/quality of life and c) lifetime cost of the two procedures.
4. Development of software for multidisciplinary team meetings. It includes functionality for targeting modern anti cancer treatment based on genome information.
5. Evaluation of novel imaging methods for liver tumours: Liver specific FDG-PET and CT perfusion.
6. Development of software for segmentation and 3d-reconstruction of liver anatomy. This is used interactively during surgery and further prospects include tracing of laparoscopic instruments, and updates as the liver changes position during surgery.

**Results:** The patients give written consent to participation in all translational studies upon entering the randomized trial.

**Conclusions:** A RCT is considered the most valid study design to determine the effect of interventions. However, they are so demanding to perform that research institutions often consider other study designs. In order to maximize output of our RCT we have expanded the trial with several translational studies. This organization importantly provides clinical data for scientists to whom such data is often difficult to obtain, and facilitates hypothesis generation and new discoveries.

**PPL25-080**

RIGHT PORTAL VEIN LIGATION AND IN-SITU SPLITTING BY LAPAROSCOPY FOR TWO-STAGE HEPATECTOMY

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**Introduction:** Objective: To evaluate the interest and describe the technical aspects of laparoscopic right portal vein ligation and in-situ splitting in two stage hepatectomy.

**Background:** Two-stage hepatectomy with portal vein ligation or embolization can be used to treat bilobar liver metastases and to decrease the risk of liver insufficiency. Recently, right portal vein ligation combined with in-situ splitting has been proposed to increase left lobe hypertrophy before an early second stage. The interest of laparoscopy has never been evaluated in this setting.

**Method:** A 63-year-old patient presented with metachronous bilobar liver metastases from colorectal cancer. The laparoscopic first stage included segment-III wedge-resection, segment II and IV radiofrequency ablation, right portal vein ligation and in-situ splitting. The completion of the right hepatectomy was performed 10 days later, with an uneventful outcome.

**Results:** The first step was feasible and safe. Left lobe hypertrophy was measured at 40%. The second step was performed by laparotomy because of major adherences and the need for subcostal extraction. The overall procedure was perfectly tolerated, with no signs of liver failure.

**Conclusions:** Two-stage hepatectomy with right portal vein ligation and in-situ splitting is feasible and safe by laparoscopy. The interest is to improve the post-operative outcome of each step in order to improve tolerance to the overall procedure.

**PPL25-081**

FALLING BARRIERS TO LAPAROSCOPIC LIVER RESECTION

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**Introduction:** Laparoscopic liver resection is an accepted modality for the management of a variety of benign and malignant tumors. Initial efforts were focused on peripheral lesions. We now examine selected patient demographics and extent of operative interventions that might have previously precluded a laparoscopic approach.

**Method:** Retrospective review of 615 patients managed by a single surgeon from 2000 to 2013. Analysis was performed to compare and contrast demographics and operative characteristics between both open and laparoscopic hepatic resections.

**Results:** Seven hundred and fifty three hepatic resections in 615 patients were reviewed. Demographics (age, BMI, incidence of cancer and cirrhosis) were compared between open and laparoscopic approaches and found to be equivalent. In contrast ASA was higher in the open group (3.0 vs 3.1: p < 0.05) as was the extent of resection as indicated by number of segments resected (3.0 vs 2.4: p < 0.001) and percentage of major resections (formal lobe) (23.3 vs 47.0: p < 0.001).

**Conclusions:** This analysis identified few patient demographics as continued barriers to a laparoscopic approach. Initial analysis does confirm open surgical techniques are reserved for patients deemed more critically ill, using ASA as a surrogate marker. The incidence of formal lobar resection was also significantly different indicating large atypical resections are most often reserved for an open approach. This study demonstrates that some barriers to a laparoscopic approach for liver resection are diminishing. Future studies are necessary to delineate the persistent barriers for continued adaptation of the laparoscopic approach.
HEPATIC TUBERCULOMA: DIAGNOSTIC DIFFICULTY

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Introduction: Hepatic tuberculosis is seen in about 14% of abdominal localisation. It’s usually seen as a secondary localisation of pulmonary or peritoneal tuberculosis (80%). Levine described 6 entities of liver involvement from wish tuberculosis poses the problem of differential diagnosis with tumours. We report 2 cases.

Method: Case 1: woman 55 years old, in diabetic diet, treated on 1987 for pulmonary tuberculosis. The patient underwent a thoraco abdominal CT for chronic cough wish found a hepatic incidentaloma of 4 cm in segment V. the patient had cytolysis without cholestasis. Hepatic viral serology and tumour markers were negatives. Percutaneous biopsy found epitheloid granuloma without necrosis. Case 2: man 66 years old, presenting 6 month before it’s admission abdominal pain without vomiting, jaundice or gastrointestinal bleeding. Abdominal ultrasonography showed hypo echogenic mass involving segment VI and VII. Abdominal CT confirmed localisation and hypo density character. Percutaneous biopsy wasn’t contributive. Tumour markers and hepatic viral serology were negative. Gastroduodenoscopy and colposcopy showed no lesion.

Results: Case 1: after multidisciplinary staff with infectious disease doctors, the decision to not start antibacterial treatment was taken. We performed right laparoscopic hepatectomy. Immediate outcomes were uneventful. Histopathology exam showed epitheloid granuloma with caceous necrosis. Case 2: under right subcostal incision, exploration found no gastro intestinal tumour, there was a hepatic mass in segment VI and VII. We performed bi segmentectomy VI and VII. Outcomes were simple. Histopathology showed epitheloid granuloma with caceous necrosis. The two patients underwent antibacterial treatment.

Conclusions: Hepatic tuberculosis is very rare. Diagnostic is difficult mimicking hepatic tumour. Non-invasive treatment is desirable when it’s possible.

INITIAL EXPERIENCE WITH LAPAROSCOPIC LIVER RESECTION IN A DEVELOPING COUNTRY

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Introduction: Over past decades laparoscopic liver resection (LLR) has gained wide acceptance among hepatobiliary surgeons community. To date, few data are available concerning LLR programs in developing countries. This study aimed to assess feasibility and safety of LLR in a Moroccan surgical unit.

Method: From June 2010 to February 2013, patients that received LLR were identified from a prospective “liver resection” database and included in this study. Parenchymal transsection was performed using Harmonic scalpel and bipolar clamp with no Intraoperative ultrasound use or systematic pedicle clamping. LLR difficulty was categorized into 3categories according to Louisville-statement (I–III). Demographic informations, liver lesion informations, operative details, pathological tumor-margin and 1-month postoperative morbidity according to Clavien-Dindo(C-D) classification were analyzed.

Results: Among 104 patients who underwent liver resection 13 (12.5%) had LLR. There were 7 females with mean age of 57.5 ± 17 years. LLR was performed for malignant lesions in 10 (77%) patients: hepatocarcinoma in 7 patients and synchronous rectal-liver metastasis in 3 patients. Lesions were solitary in 12 (92%) patients with median size of 50 mm (15–150 mm). Patients with liver metastasis received combined laparoscopic rectal and liver resection. We used pure laparoscopic approach in 12 (92%) patients and hybrid one in 1 patient. LLR difficulty was category I, II and II in respectively 3 (23%), 6 (46%) and 4 (31%) patients. Conversion rate to open liver resection was 15%. Mean blood loss was 395 ± 270 minutes with no hepatic pedicle clamping or perioperative blood transfusion. All resections were tumor-free margin. Mortality rate was nil and morbidity occurred in 4 (30%) patients: ascites (C-D 2) and pelvic sepsis in combined resections (C-D 3b). Median hospital stay was 6 days.

Conclusions: Laparoscopic liver resection in Morocco is safe in selected patients, since no operative mortality, blood transfusion requirement or palliative resection was recorded and liver related morbidity rate was low. Intraoperative ultrasound liver examination capacities are mandatory to improve laparoscopic liver resection program’s quality and extend indications.

TACE COMBINED WITH SORAFENIB ON POSTOPERATIVE INTRAHEPATIC RECURRENCE OF HEPATOCELLULAR CARCINOMA

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Introduction: To study the clinical effect of transcather arterial chemoembolization (TACE) combined with sorafenib on postoperative intrahepatic recurrence of hepatocellular carcinoma.

Method: Since July 2009, 3 postoperative intrahepatic recurrence of hepatocellular carcinoma patients were treated with TACE and orally sorafenib at a dose of 400 mg twice daily more than 6 months, ECOG score 0–2, Child–Pugh A–B. All patients by imaging evaluation and liver function evaluation had no TACE treatment contraindications. Adjust the dosage according to the occurrence of adverse reactions in the treatment process. The tumor response was evaluated the efficacy...
and adverse reactions according to the modified solid tumor evaluation criteria (mRECIST) every 2 months, and then the clinical efficacy and quality of life would be evaluated.

Results: Three patients were alive since July 2009, mRECIST evaluation in 1 PR, 2 SD. The main treatment-related adverse events were hand-foot syndrome, diarrhea and hypertension, symptomatic treatment and reduction of medication can be alleviated.

Conclusions: Hepatocellular carcinoma in patients with intrahepatic recurrence after TACE combined with sorafenib treatment does not increase the incidence of complications, can significantly improve survival quality of life and longer survival time.

PPL25-085
INFLAMMATORY PSEUDOTUMOR OF THE LIVER DIAGNOSED AS METASTATIC LIVER TUMOR IN PATIENT WITH A GASTROINTESTINAL STROMAL TUMOR OF RECTUM: A CASE REPORT
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Introduction: Inflammatory pseudotumors (IPT) of the liver are rare benign lesions characterized by proliferating fibrovascular tissue mixed with inflammatory cells. A case of IPT of the liver found in association with a malignant GIST of rectum was reported.

Method: A 74-year-old man was admitted to our hospital for examination and surgical treatment of liver tumor. His medical history revealed that he undergone a sacroabdominal rectal amputation for malignant GIST of rectum at the age of 65 years. CT scan revealed a 14 mm low density area in segment 8 of the liver. Contrast CT showed contrasting effect from the peripheral portion. Dynamic contrast-enhanced MRI (EOB-MRI) showed that tumor appears isointensity in the arterial phase and was completely washed out in the delayed phase and hepatobiliary phase. FDG-PET showed strong uptake in the liver. Considering the patient’s history, combined with the radiological findings of the tumors, a diagnosis of liver metastasis from malignant rectal GIST was made and partial hepatectomy was performed.

Results: Microscopic examination of the paraffin section of the liver tumor showed that it was composed of fascicles of spindle fibroblasts and myofibroblasts admixed with chronic inflammatory cells. The overall pathological features were those of an IPT of the liver.

Conclusions: IPT was rarely found in the liver. Moreover, only four cases of the liver IPT in association with GIST were reported. Stomach, duodenum, small intestine, and rectum (our case) are one case each, and metastasis from GIST was pre-diagnosed in all cases. Differential diagnosis between IPT and malignant neoplasms by imaging methods is difficult, because heterogeneity of CT findings is also often observed in malignant tumors. Furthermore, in our case, FDG-PET revealed the strong uptake of the tumor. So all four cases were underwent hepatectomy. Herein, our patient is discussed along with references from the literature.

PPL25-086
SORAFENIB IN ADVANCED HEPATOCELLULAR CARCINOMA WITH HBV INFECTION
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Introduction: To evaluate the effect and safety of molecularly targeted agent sorafenib in advanced hepatocellular carcinoma with HBV infection.

Method: From April 2007 to February 2010, 81 advanced hepatocellular carcinoma patients with HBV infection were treat with sorafenib at a dose of 400 mg twice daily.

Results: The overall incidence of treatment-related adverse events was 84.8%. The most common adverse events were hand-foot skin reaction, diarrhea and hypertension. There was no grade IV adverse events and no discontinuation of the drug due to severe adverse events. The median overall survival time is 72 weeks and the median time to progression is 66 weeks.

Conclusions: Sorafenib prolongs the overall survival and the time to progression of patients with advanced hepatocellular carcinoma, with no severe adverse events. Prevention of adverse events and immunotherapy can improve the effect.

PPL25-087
DIAGNOSIS AND TREATMENT OF HEPATIC CYSTIC ECHINOCOCCOSIS COMPANIED WITH DIGESTIVE TRACT FISTULA
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Introduction: Hepatic cystic echinococcosis (HCE) was common zoonosis in pastoral areas, HCE could invade hepatic surrounding organs and bring about relative complications. When lesion of HCE were close to hollow organs, digestive tract fistula would take place. In clinic, diagnosis and treatment for HCE companied with digestive tract fistula were all very difficult, so, we summed this kind of cases to analyze, hoped can draw some helpful clinical lessons from these cases.

Method: Seventeen cases with hepatic cystic echinococcosis accompanying digestive tract fistula were retrospectively analyzed in our hospital from 2008 to 2012. All cases were examined with abdominal B ultrasound check and CT scan for diagnosis before surgery, and were done operation to confirm diagnosis. Different treatment such as anti-infection therapy, nutrition support therapy and the local drainage for fistula in different organs after surgery.
Results: In total of 17 cases, 9 cases were complicated with fistula of colon, 5 cases were complicated with gastric fistula, 3 cases complicated with fistula of duodenum. 15 cases were cured after surgery, but 2 cases with colonic fistula died after surgery for severe infection. The surgery for hepatic echinococcosis complicated with fistula of hollow organs was very difficult, especially for colonic fistula. It was very important for keeping drainage unobstructed beside fistula. But, local colectomy should be considered if premature preparation of a fully. It was relatively easy for treating gastric and duodenal fistula. Patients usually could be cured after repair for fistula based on gastrointestinal decompensation and postoperative enteral and parenteral nutrition support.

Conclusions: Surgery was ideal that radical incision for fistula was done when cystic echinococcosis was treated. Otherwise, continuous flow fistula mouth drainage after surgery should be keep, with nutrition support, fistula should close as possible as quickly. Only when such comprehensive therapy could be done, the life of patients should be saved.

PPL25-088

THE STUDY OF THE IMMUNOLOGICAL CHANGES OF SPLEEN DURING THE DEVELOPMENT OF SEPSIS

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Introduction: To observe the pathological and immune status change of spleen in septic rats, exploring the role of spleen in the development and progression of sepsis for the pathophysiology research of sepsis.

Method: We used 200 ± 10 g SD male rats to establish normal group, sham operation group, CLP group, meanwhile set 6, 12, 24 hours three time points to observe. Sepsis model was prepared by cecal ligation and puncture (CLP). HE staining was used to observe the histological changes of spleen; TUNEL was used to detect the apoptosis in rat spleen; using flow cytometry to detect percentage changes of T lymphocytes different type in peripheral blood and spleen (CD4⁺ T cells, CD8⁺ T cells and TRC cells).

Results: CLP group compared with the normal group, increased spleen weight, spleen index increased; white pulp and hyperplasia of lymphoid nodules, especially arterial peripheral lymphoid sheath was significant thickened in 24 hours group, there was ill-defined between white pulp and red pulp. Normal group and sham group had no significant difference, and occasionally were few apoptotic cells; CLP group had increasing number of apoptotic cells, and 12 hours group began with a very significant difference (p < 0.01). Comparing with normal group, the CD4⁺ T cell proportion of CLP group at all time points in peripheral blood were highly significant reduction (p < 0.01); and the proportion of TRC cells was increased significantly in 24 hours group (p < 0.05). In the spleen, the ratio of different T lymphocytes types in CLP group were rising, including the difference of CD4⁺ T cells in 24 hours group was significant (p < 0.01) and TRC cells in 12 hours group also has a significant difference in the increase (p < 0.05).

Conclusions: The changes of the immune status in early sepsis may be associated with the increasing ratio of T lymphocytes and increased apoptosis in the spleen.

PPL25-089

CLINICAL OBSERVATION OF SORAFENIB TOGETHER WITH TACE IN ADVANCED HEPATOCELLULAR CARCINOMA WITH NO EXTRAHEPATIC METASTASI

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Introduction: To evaluate the efficacy and safety of molecular targeted agent sorafenib together with TACE in advanced hepatocellular carcinoma without extrahepatic metastasis.

Method: From April 2007 to September 2009, 45 advanced hepatocellular carcinoma patients without extrahepatic metastasis were orally treated with sorafenib at a dose of 400 mg twice daily. Among them, 18 patients were treated with TACE (125 times).

Results: The most common adverse events in both group s were hand foot skin reaction, diarrhea and hypertension. There were no grade 4 adverse events and no discontinuation of the drug due to severe adverse events in both groups. The median overall survival time was 1610 months in sorafenib 2TACE group and 513 months in sofafenib group (p < 0.01). The median time to progression was 1010 months in sorafenib 2TACE group and 413 in sofafenib group (p < 0.01).

Conclusions: TACE does not promote the adverse events in advanced hepatocellular carcinoma without extrahepatic metastasis treated with sorafenib. Sorafenib combined with TACE prolongs the median overall survival time and the time to progression in these patients.

PPL25-090

IMPACT OF VIRAL HEPATITIS ON OUTCOMES AFTER LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA: RESULTS FROM A NORTH AMERICAN CENTER

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Introduction: Hepatitis B (HBV) and hepatitis C (HCV) are well-recognized risk factors for hepatocellular carcinoma (HCC). The characteristics and clinical outcomes of HCC arising from these conditions may differ. This study was conducted to compare the outcomes of HCC associated with HBV and HCV after liver resection.
Method: Of 386 liver resections for HCC performed between July 1992 and April 2011, 181 patients had HBV and 74 patients had HCV. Patients with HBV/HCV co-infections (n = 20), non-HBV/HCV etiology (n = 94) and post-operative death within 3 months (n = 17) were excluded. Patient, tumor characteristics, peri-operative and oncologic outcomes were compared between patients with HBV and HCV.

Results: The patients with HBV had better overall survival than patients with HCV (68 months vs 59 months, p = 0.03); however, there was no difference in recurrence-free survival between the groups (44 months vs 45 months, p = 0.1). The factors predictive of overall survival based on multivariate analyses included: vascular invasion (p < 0.01, HR = 3.4), Child–Pugh score (p < 0.01, HR = 4.8), and underlying liver disease (HCV vs HBV) (p = 0.01, HR = 1.9). Vascular invasion and tumor number (p < 0.01, HR = 2.3 and p < 0.01, HR = 2.1) were independent predictors of recurrence-free survival.

Conclusions: Overall survival but not recurrence-free survival after liver resection for HCC is better in patients with HBV than HCV. This survival advantage for HBV patients may be due to differences in tumor biology and outcomes after disease recurrence.

PPL25-091
ENHANCED EXPRESSION OF TISSUE FACTOR IN PORTAL VEIN OF LIVER CIRRHOTIC PATIENTS WITH PORTAL VEIN THROMBOSIS

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Introduction: Despite coagulation is defective in cirrhotic patients, the occurrence of portal vein thrombosis (PVT) is still high. The mechanism leading to PVT is unclear so far. Thrombosis that occur in the veins commonly result from vascular injury. Recent studies suggest that pathologic expression of tissue factor (TF) within the injured vessel wall may trigger thrombosis. We aimed to determine the expression and mechanism of TF in portal vein of cirrhotic patients with PVT.

Method: We examined the expression of TF in portal vein in cirrhotic patients (n = 34) and splenic rupture patients (control group, n = 12) by immunohistochemical staining and real-time PCR. The cirrhotic patients were classified into PVT group (n = 10) and non-PVT group (n = 24). The expression and activity of NF-κB p65 and c-Rel were examined by immunohistochemical staining.

Results: The result of real-time PCR and immunohistochemical staining showed that expression of TF in portal vein of cirrhosis group were significantly higher than control group (all p < 0.05). In cirrhosis group, the protein level of TF in PVT group was also significantly higher than non-PVT group (p < 0.05). Immunohistochemistry revealed the expression of p65 and c-Rel in portal vein of cirrhosis group were stronger than control group (all p < 0.01). The positive signal for p65 and c-Rel were observed in nucleus of endothelial cells in portal vein of cirrhotic patients, while in cytoplasm of endothelial cells of control group.

Conclusions: The results indicated that up-expression of TF in local portal vein endothelial tissue may increase the risk of PVT in cirrhosis. The translocation of NF-κB p65 and c-Rel from the cytoplasm to the nucleus may activate the expression of TF in portal vein.

PPL25-092
ELIMINATING THE LEARNING CURVE FOR LAPAROSCOPIC HEPATECTOMY

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Introduction: Laparoscopic liver resection (LLR) merges experience and understanding in open liver surgery with minimally invasive technical skills. This study reflects the experience of a single hepatobiliary surgeon with no formal training in laparoscopic liver surgery and examines the possible learning curve associated with LLR.

Method: Patients undergoing LLR by a single surgeon between 2007 and 2013 were reviewed. Laparoscopic procedure volume was compared to concurrent open procedures. Consecutive cases were analyzed by academic year, terciles and quartiles to identify patterns in patient selection, intraoperative characteristics and postoperative complications.

Results: A total of 120 LLR were performed for both benign (14%) and malignant tumors (86%). Resections included sub-segmentectomies or segmentectomies (72), bisegmentectomies (30), caudate resections (1), as well as left (8), right (8) and extended hepatectomies (2). The mean ASA of the cohort was 2.8 (SD: 0.5); 36 patients (30%) had a tumor size > 30 mm. Total liver procedures performed increased throughout the study period; however the annual ratio of LLR to open procedures remained relatively constant around 35%. Only two patients required conversion to open surgery. There was a gradual increase in case complexity; however, operative times still progressively decreased (mean 285 vs 218 vs 209 minutes, by tercile). Even after division of the cohort into annual, tercile and quartile groups, intraoperative blood loss, transfusion requirements, hepatic-related complications, overall morbidity and length of stay were not significantly different.

Conclusions: The introduction and maintenance of LLR into a hepatobiliary practice can be safely accomplished with limited morbidity and low conversion rates. There were no significant outcome differences throughout the study period, even at the onset of the surgeon’s experience. The assumed learning curve associated with the adoption of minimally invasive liver surgery can be overcome with appropriate patient selection and gradual progression of case complexity.
PPL25-093
CTLA-4Ig INCREASES EXPRESSION OF CD4+ CD25+ FOXP3+ TREG CELLS IN THE SPLEEN AND PERIPHERAL BLOOD DURING PREGNANCY IN ABORTED MODEL OF MICE
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Introduction: To investigate the effects after the administration of cytotoxic T lymphocyte-associated antigen-4 immunoglobulin (CTLA-4Ig) for the abortion-prone mice and the change of the Treg cells in them.

Method: Using CBA/J×DBA/2 matings as an abortion-prone model, FACS was used to detect Treg cell in the normal mice and aborted mice duration early-middle pregnancy, and also detected Treg cell after CTLA-4Ig or PBS administration in each of them, western blot and RT-PCR was used to detect the expression of Foxp3 in all the group, pregnancy outcomes were analyzed after the mice are sacrificed at the day 14 of pregnancy.

Results: Treg cells continually increased duration of early-middle pregnancy in the normal mice and aborted model mice, the number of Treg cell, the level of Foxp3 was higher in the normal mice than in the aborted model mice in spleen and peripheral blood, the pregnancy outcome is also better in the normal group than the aborted group, after CTLA-4Ig administration (10 mg/kg), the number of Treg cell, the level of Foxp3 increased in the treatment group than in the control group, the similar changes were also found in spleens of these groups.

Conclusions: CTLA-4Ig administration could increase the Treg cell expression in the aborted model mice and improve the pregnancy outcome, it could be a novel therapy for human RSA.

PPL25-094
EVALUATION OF EIGHT DIFFERENT CLINICAL STAGING SYSTEMS ASSOCIATED WITH OVERALL SURVIVAL OF CHINESE PATIENTS WITH HEPATOCELLULAR CARCINOMA
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Introduction: Hepatocellular carcinoma (HCC) is a common cancer in China, an area of high hepatitis B virus (HBV) infection. Although several staging systems are available, there is no consensus on the best classification to use because multiple factors, such as etiology, clinical treatment and populations could affect the survival of HCC patients.

Method: This study analyzed 743 HBV-related Chinese HCC patients who received surgery first and evaluated the predictive values of eight different commonly used staging systems in clinic.

Results: The overall 1-, 3-, 5-year survival rates and a median survival were 91.5%, 70.3%, 55.3% and 72 months respectively. BCLC staging systems had the best stratification ability and showed the lowest AIC values (2896.577), followed by TNM7th (AIC = 2899.980), TNM6th (AIC = 2902.17), JIS (AIC = 2918.085), Tokyo (AIC = 2938.822), CLIP (AIC = 2941.950), CUPI (AIC = 2962.027), and Okuda (AIC = 2979.389).

Conclusions: BCLC staging system is a better staging model for HBV infection patients with HCC in Chinese population among the eight currently used staging systems. These identifications afford a large group of Chinese HCC patients with HBV infection and could be helpful to design a new staging system for a certain population.

PPL25-095
HEPATIC PERIVASCULAR EPITHELIOID TUMOR (PECOMA): CASE REPORT
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Introduction: Primary perivascular epithelioid cell tumor (PEComa) of the liver has recently been described mainly in children and young adults. It belongs to the family of tumours which comprises angiomylipoma and clear cell “sugar” tumor of lung.

Immunohistochemistry of this tumor is positive for melanoma markers (Mart-1, HMB-45) and those of smooth muscle (actin). We report a case of an unusually large (19 × 11 cm) hepatic PEComa in a 43 year woman.

Method: Case Report: 43-year-old mother, with no known co-morbid, underwent investigation for general weakness. She was found to have a multilobulated heterogeneous lesion almost replacing the right lobe and extending to segment 4. There was enhancement in arterial phase and early washout in venous phase of CT-scan. IVC and Rt. hepatic vein appeared compressed. Left lobe vascular structures were pushed by the expansive growth. Segment 2 and 3 appeared grossly hypertrophied pushing the spleen inferiorly. Hb 9.3 G/dL, T Bil 1.13 mg/dL (direct 0.18), alkaline phosphatase 1324, GGt 89, ALT 15, INR 1.0. Hepatitis serology was negative and normal AFP and CA 19-9. Chest CT and bone scan were negative for metastasis.

Results: She underwent extended right hepatectomy via a right thoracoabdominal approach. Post-operative course was uneventful. Histopathology revealed a well circumscribed, unencapsulated dark brown mass (19 × 11 cm) with extensive areas of hemorrhages. It was composed of nests and sheets of epithelioid cells surrounding the sinusoidal like vascular channels. Occasional mitosis was seen. IHC showed typical phe-
Portal vein embolization (PVE) induces effective liver regeneration in patients with hepatobiliary malignancy. This study confirmed that preoperative embolization of the right or left hepatic vein trunk is safe and comparable to that after PVE alone. In 24 patients, the increase in blood liver enzymes after HVE was limited liver regeneration after PVE awaiting major surgery. In 10 patients, pylorus-preserving pancreatectomy and extended bile duct resection with excavation of the transpancreatic bile duct was performed in 3 and 4 cases, respectively. There was neither mortality nor major morbidity, but prolongation of minor bile leak up to 1 month was observed in 3 patients. Their 5-year survival rate was around 40%, which is quite similar to 47% in our R0 major hepatectomy group (n = 214). Two significant risk factors affecting survival after resection were lymph node metastasis and curability of surgery.

Conclusions: Major hepatectomy offers an improved survival with a higher possibility of curative resection than PPLH, but it still carries a risk of non-negligible major morbidity and mortality. Less extensive procedures can be conducted safely and beneficially for old-aged patients with poor general condition and less advanced tumor stage if tumor-free resection margins are obtainable.

PPL25-098

EPSTEIN-BARR VIRUS ASSOCIATED FULMINANT HEPATITIS REQUIRING LIVER TRANSPLANTATION (CASE REPORT)

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Introduction: Epstein-Barr virus (EBV) is one of the most common viruses, infecting more than 90% of humans. Whereas most EBV primary infections of infants and children are asymptomatic or have nonspecific symptoms, infections of adolescents and young adults frequently result in symptomatic infectious mononucleosis.

Method: We report a case of fulminant hepatitis related to a primary EBV infection in an immunocompetent 19-year-old male.
Results: A previously healthy 19-year-old male developed a flu-like syndrome. A week after, the patient presented with myalgia, chills, and jaundice. He was admitted to medical icu. On admission, he was febrile, icteric. The serum ALT level was 3083 IU/L and AST level was 1796 IU/L suggesting an acute hepatitis. Abdominal CT revealed hepatosplenomegaly without biliary obstruction. The following day, the patient showed loss of consciousness with acute renal failure. Mechanical ventilation and extra-renal support were urgently applied. Results of blood tests for hepatitis A, B, C, and E viruses were not indicative of prior or current infection. The serum EBV-VCA antibody was positive, the EBV nuclear antigen antibody IgG was also positive which suggested recent primary EBV infection. He was put on liver transplant waiting list. Two days after, he underwent orthotropic liver transplantation. The study of extracted liver specimen showed positive for EBV PCR. After liver transplantation, he recovered after an uneventful course of 26 days.

Conclusions: Sporadic cases of acute liver failure caused by primary EBV infection have been reported in the literature, with an overall mortality of 87%. We report the case of a young patient who developed fulminant hepatitis immediately following EBV primary infection. In addition to common blood tests, the detection of EBV antibody must be considered in any young boy developing an acute onset of hepatitis after a flu-like syndrome, without obvious toxic or auto-immune cause. Our patient underwent emergent liver transplantation and he recovered well.

PPL25-100
CLINICAL FEATURES AND PROGNOSIS OF LIVER METASTASIS FOR COLORECTAL CANCER: CENTRALLY VERSUS PERIPHERALLY LOCATED LESION
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Introduction: Liver resection provides long-term survival for patients with colorectal metastases. However, controversies exist regarding the prognostic factors. Herein, the impact of centrally located liver metastasis on the clinical features and prognosis were evaluated.

Method: One hundred and fifty-nine patients who underwent liver resection with curative intent for colorectal liver metastasis between October 1991 and December 2006 were enrolled. Patients were divided into two groups: centrally located and peripherally located colorectal liver metastasis. Patient demographics, the characteristics of the primary and metastatic tumors, surgical outcomes, and long-term survival were analyzed.

Results: Compared to the peripherally located group, patients in the centrally located group showed dominant in multiple metastases (p = 0.016), multiple involved segments (p = 0.006), large metastatic lesion (p = 0.000), and bilobar distributed metastases (p = 0.000). The estimated 5-year recurrence-free and overall survival rates were 22.4% and 34.2%, respectively. Univariate analysis indicated that centrally located metastasis, primary tumor of transverse colon, positive regional lymph node metastasis, primary extrahepatic metastasis, synchronous liver metastasis, multiple and poorly differentiation of metastatic lesions, and hepatectomy with section margin <10 mm were prognostic factors for worse recurrence-free survival and overall survival. In addition, the advanced stage of the primary tumor, primary tumor with obstruction or perforation, multiple involved segments, lesion over 5 cm in diameter, and recurrence at extrahepatic or extrapulmonary regions were significant prognostic factors for overall survival alone. Multivariate analysis revealed that inadequate section margin of liver resection and centrally located liver metastasis were indicators for a worse overall survival.

Conclusions: Colorectal cancer with centrally located liver metastasis represents a prognostic factor after hep-
Liver resections can be safely performed in the elderly with acceptable morbidity and mortality and age should not be a contraindication to liver resections.

PPL25-102
LIVER RESECTIONS CAN BE SAFELY PERFORMED IN THE ELDERLY

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Introduction: Extended hepatectomies are defined as resection of four or more segments, and are reported to be associated with increased morbidity and mortality. Our study aims to compare morbidity and mortality of extended and non-extended hepatectomies.

Method: All hepatectomies performed by a single surgeon (KS Haghighi) at 2 centres between January 2007 and July 2013 were identified. Prospectively collected data on patient demographics, and postoperative complications (Dindo-Clavien classification) were retrospectively analysed between patients who underwent extended (G1) and non-extended resections (G2).

Results: Three hundred and sixty-four hepatectomies were performed between January 2007 and July 2013, with 188 and 176 patients in G1 and G2. G1 had a median age of 64 years (range 16–88) and G2 had a median age of 60 years (range 18–93), with G1 considerably older with 20.2% (n = 38) aged >75 years compared to 12.5% (n = 22) in G2. Within G1, extended right-sided resections were most common (n = 128). Within G1, 64, 20 and 10 patients underwent neoadjuvant chemotherapy, downstaging chemotherapy and redo resections for recurrent disease respectively. Intraoperative blood loss was higher in G1 (median 350 mL vs 150 mL), and 22% (n = 43) of patients were transfused a median of 2 units compared to 7.9% (n = 14) of patients in G2 transfused a median of 2 units. Length of HDU/ICU and hospital stay was longer in G1 (n = 1 and 9 respectively) compared with G2 (n = 1 and 7 respectively). Major complications were experienced in 3.7% and 5.1% patients in Groups 1 and 2 respectively, including radiological guided drainage of biliary collections (n = ), IVC filter for pulmonary emboli (n = 1) and return to surgery (n = ). Mortality at 90 days was 1.6% (n = 3) and 2.2% (n = 4) in G1 and G2 respectively.

Conclusions: This audit demonstrates that extended liver resections can be performed with acceptable morbidity and mortality in comparison to non-extended liver resections.

PPL25-103
EXTENDED HEPATECTOMIES CAN BE PERFORMED WITH MINIMAL MORBIDITY AND MORTALITY

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Introduction: Extended hepatectomies are defined as resection of four or more segments, and are reported to be associated with increased morbidity and mortality. Our study aims to compare morbidity and mortality of extended and non-extended hepatectomies.

Method: All hepatectomies performed by a single surgeon (KS Haghighi) at 2 centres between January 2007 and July 2013 were identified. Prospectively collected data on patient demographics, intraoperative findings and postoperative complications (Dindo-Clavien classification) were retrospectively analysed between patients who underwent extended (G1) and non-extended resections (G2).

Results: Three hundred and sixty-four hepatectomies were performed, with 188 and 176 patients in G1 and 2. G1 had a median age of 64 years (range 16–88), G2
had a median age of 60 years (range 18–93), and G1 was considerably older with 20.2% (n = 38) aged 75 years and over compared to 12.5% (n = 22) in G2. Within G1, right-sided resections were most common (n = 128), with 68% involving more than the minimum 4 segments (n = 45). Within G1, 64, 20 and 10 patients underwent neoadjuvant chemotherapy, downstaging chemotherapy and redo resections for recurrent disease respectively. Intraoperative blood loss was higher in G1 (median 350 mL vs 150 mL), and 22% (n = 43) of patients transfused a median of 2 units compared to 7.9% (n = 14) of patients transfused a median of 2 units. Length of HDU/ICU and hospital stay was longer in G1 (n = 1 and 9 respectively) compared with G2 (n = 1 and 7 respectively). Major complications were experienced in 3.7% and 5.1% patients in Groups 1 and 2 respectively, including radiological guided drainage of biliary leaks, IVC filter for pulmonary emboli and return to surgery. Mortality at 90 days was 1.6% (n = 3) and 2.2% (n = 4) in G1 and 2 respectively.

Conclusions: Our study demonstrates that extended liver resections can be performed with acceptable morbidity and mortality in comparison to non-extended liver resections.

PPL25-104

LAPAROSCOPIC REPEATED LIVER SURGERY: A FEASIBLE AND SAFE PROCEDURE

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Introduction: In recent years laparoscopic liver surgery (LLS) has become a real alternative to open approach. Only a few authors reported repeated hepatic resections performed by laparoscopic approach. The aim of this study is to report our experience of laparoscopic repeated liver surgery (LRLS) and to evaluate the feasibility and safety of this approach.

Method: Between January 1999 and December 2012, 140 patients underwent laparoscopic liver resection (LLR). All patients who were treated by LRLS after previous open or laparoscopic procedure were included in this study. Demographic data, preoperative risk factors, operative variables, histological analysis and postoperative course were recorded.

Results: Nine repeated procedures were performed. The mean age was 54.8 ± 16.6 (36–77) years. Two patients had two redo LLR. The first hepatectomy was performed by open approach in 2 patients (28%). Mean time between first and secondary hepatic resection was 53.3 months and between secondary and third hepatectomy was 24 months. One major hepatectomy was performed (a right hepatectomy combined with a right colectomy). Mean operative time was 101.2 ± 43.6 (60–200) minutes and mean estimated blood loss was 62.8 ± 53 (0–150) mL. No patients required transfusion. The only postoperative complication was an incisional abscess. Mortality was null. The mean hospital stay was 4 days. Two patients underwent a second LRLS. One had an early recurrence of HCC on segment V at 6 months and was treated by LLR. The second patient had a recurrence of biliary cyst at 4 months which was treated by cysts fenestration. The postoperative course was uneventful.

Conclusions: Laparoscopic redo liver surgery is a safe and feasible procedure for both benign and malignant pathologies with good short term results. Further studies are needed to better evaluate the long term outcome.
PPL25-106
DAY-CASE LAPAROSCOPIC LIVER SURGERY

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Introduction: Over the last decade, laparoscopic liver surgery (LLS) has been increasingly performed throughout the world. At the same time day-case surgery has been developed in many countries to increase patient satisfaction and reduce hospital costs. The aim of this study is to report a first experience of day-case minimally invasive liver surgery.

Method: Between 1999 and 2012, 141 patients underwent LLS including 120 laparoscopic liver resections (LLR) and 21 unroofing of simple hepatic cysts. All consecutive patients that underwent day-case LLS were included in this study.

Results: Twelve patients underwent outpatient LLS. Indications were: hepatic cysts (n = 10, 83.3%), angioma (n = 1, 8.3%) and focal nodular hyperplasia (n = 1, 8.3%). Median operating time was 92 minutes (range 50–240). There were no conversions to open surgery. Median blood loss was 35 mL (range 20–150 mL). There were no postoperative complications. All patients were hospitalized in our day-surgery unit and were discharged 5–7 hours after the end of surgery. Median postoperative pain score (standard 10-point visual analog scale) at hospital discharge was 2.5 (range 0–8). Median quality of life at initial postoperative visit was 8 (range 6–10) and median cosmetic satisfaction at initial postoperative visit was 8 (range 7–10).

Conclusions: This series supports that day-case LLS is possible and safe in selected patients.

PPL25-107
MULTIVARIATE ANALYSIS OF RISK FACTORS FOR POSTOPERATIVE COMPLICATIONS AFTER LAPAROSCOPIC LIVER RESECTION

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Introduction: The identification of modifiable per-ioperative risk factors in patients undergoing laparoscopic liver resection (LLR) should lead to a better selection and to further improvement in outcomes. The aim of this study was to determine the risk factors of morbidity after laparoscopic liver surgery using multivariate analysis on a prospective database.

Method: All patients who underwent elective LLR between January 1999 and December 2012 were considered eligible for this study. Data were prospectively recorded and retrospectively analyzed. Demographic data, preoperative risk factors, operative variables, histological analysis and postoperative course were recorded. Multivariate analysis was carried out using an unconditional logistic regression model expressed as an odds ratio (OR).

Results: During this period, 140 patients underwent LLR. There were 56 male (40%) and 84 women (60%) with a mean age of 57.8 ± 17 years. Major hepatectomy was performed in 20 patients (18.2%). Mean operative time was 209 ± 119 minutes. Conversion was necessary in 7 patients (5%). Mean length of stay was 6.7 ± 8.3 days. The morbidity rate was 20.7% (n = 29). The mortality rate was 3.5% (n = 5). Thirteen factors were found to be risk factors for postoperative complications: male sex, age, advanced age (>70 year old), obesity, ASA score = 3, major hepatectomy, malignant tumour, operative time, blood loss, blood loss ≥ 300 mL, transfusion, length of stay and conversion. Two independent risk factors for postoperative complications were identified: malignant tumor [OR = 9.8 (2.5–37.6); p = 0.001] and operative time [OR = 1.008 (1.003–1.01); p = 0.001].

Conclusions: The only modifiable risk factor which was independently associated to postoperative complication after LLR was the operative time. Surgeons should try to reduce the surgical duration even if conversion is required especially when operating patients with malignant tumor.

PPL25-108
ALTERNATIVE TREATMENT OPTIONS IN COMPLICATED ECHINOCOCOSIS.

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Introduction: Echinococcal disease is a major health problem for grazing countries. The profile of complicated cases may be helpful in identifying the proper type and time of treatment.

Method: The medical records of 13 patients who underwent surgery for complicated liver hydatid disease were retrospectively reviewed. Data collected included; age, gender, co-morbidities, laboratory findings, abdominal imaging modalities, performance of ERCP, duration of hospitalization, type of surgery performed and complications.

Results: The mean age was 56.3 years old and 10 were males. Six patients had rupture of the cyst in the biliary tree (RBT), 4 had simple communication (CBT) of the cyst with the biliar tree, 2 had a broncho-biliary fistula (BBF) while 1 had rupture of the cyst in the abdomen. Bilirubin was increased in 1/6 RBT cases while cholestatic enzymes were abnormal in 5/6 RBT cases and in all CBT and BBF cases. U/S was diagnostic in 2/6 RBT cases and in 2/4 CBT cases. CT was diagnostic in 2/6 RBT cases, in 1/4 of CBT, in both BBF cases. MRI/MRCP was diagnostic in 2/6 RBT cases and in 1/2 BBF cases. ERCP pre-operatively was performed in 1/6 of RBT cases, in 1/4 of CBT cases and in all BBF cases. Postoperative ERCP due to bile leakage was performed in 2/6 RBT cases and in 2/4 CBT cases. Surgery mainly performed was partial cystectomy, common bile duct exploration, suture of the biliary tree communication and omentoplasty (6/10). For BBF partial cystectomy and suturing of the fistula was performed.
**Conclusions:** Complicated cases mainly include the rupture in the biliary tree who may not present as acute cholangiitis. Laboratory and imaging examinations may be inconclusive and therefore diagnosis is established either after multimodality imaging or intraoperatively. ERCP preoperatively may be of value in decreasing the possibility for bile leakage postoperatively.

**PPL25-109**

**ACUTE BUDD CHIARI DUE TO A SIMPLE LIVER CYST – GOOD CYST GONE BAD?**

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**Introduction:** Simple liver cysts are common, rarely causing significant morbidity or mortality. Budd Chiari syndrome (BCS), caused by obstruction of hepatic venous outflow, is the leading cause of post-sinusoidal liver failure. We present a rare case of BCS caused by a simple hepatic cyst.

**Method:** A 16 × 16 cm liver cyst was found on computed tomography of a 66-year-old woman presenting with abdominal pain and nausea. Cyst exerted mass effect on portal vein bifurcation and almost complete compression of the IVC. Shortly after admission patient developed acute liver failure, with deranged clotting and hepatic encephalopathy. She developed multiorgan dysfunction requiring inotropic, ventilatory and renal support on the intensive care unit (ICU). Cardiac output studies showed a cardiac index of 1.4 (normal 2.5–4.0 L/min/m²).

**Results:** An emergency laparotomy with fenestration of cyst and drainage of two litres of purulent material lead to a full recovery. Cystic fluid aspirates taken intraoperatively later confirmed no evidence of echinococcus on parasitology studies and cultured mixed coliforms. The fibrous cyst wall contained inflammatory cells and foci of hepatocytes with no evidence of malignancy, confirming a simple liver cyst. Liver biopsies showed severe, confluent, bridging necrosis in a predominantly centrilobular distribution, with no evidence of parenchymal liver disease.

**Conclusions:** Acute BCS due to rapid compression of all major hepatic veins leading to fulminant hepatic failure is rare. Our case highlights a rare but clinically significant complication of a simple liver cyst that clinicians should be aware of when managing these “innocent” lesions.

**PPL25-110**

**SYNCHRONOUS COLORECTAL AND LIVER RESECTION IS SAFE: A SINGLE SURGEON’S EXPERIENCES**

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**Introduction:** The liver is the most common distant site of metastasis from colorectal cancer (CRC), and is commonly managed surgically. The timing of surgical resection of primary colorectal disease and metastases is controversial. This study will compare the morbidity and mortality of synchronous and sequential resections from a single surgeon at two Australian metropolitan centres.

**Method:** We retrospectively reviewed our prospectively collected database of liver resections performed by a single surgeon (Haghighi KS) between January-2007 and July-2013. We calculated overall survival for CRC patients who had synchronous resection or not at 1, 3 and 5 years. Patient demographics were compared. Outcome measures where then compared for all liver resections including hospital length of stay (LOS), ICU/HDU LOS, blood loss, blood transfusion, surgical mortality and complication rates (using clavien-dindo classification).

**Results:** Three hundred and sixty-four liver resections were performed, 144 for metastatic CRC. Twenty had synchronous bowel and liver resection (group 1), these were compared to 347 who had liver resection only (group 2). Demographics between the groups were comparable. Post-operative complications for all liver resections was 20% for group 1 and 14% for group 2. Hospital LOS (9 vs 9 days) and ICU/HDU LOS (1 vs 1 day) were the same. Blood loss was less in group 1 (150 mL vs 350 mL). Intra-operative transfusion rates were 3/20 (15%) for group 1 and 57/347 (16%) for group 2 and post-operative transfusion rates were 0/20 (0%) and 17/347 (5%). Of group 1 the proportion of extended (>4 segments) resections was 6/20 (30%) and for group 2 182/347 (52%). Within the 144 metastatic CRC group, the one, three and 5-year survival figures for the were 85%, 42%, 42% for the synchronous resection group and 94%, 71% and 44% for the non-synchronous group.

**Conclusions:** Synchronous colorectal and liver resection is safe, efficient and has comparable mortality and morbidity when compared to staged liver and colorectal resections when less than four segments are resected.

**PPL25-111**

**LIVER RESECTION FOR METASTASIS OTHER THAN COLORECTAL, HEPATOCELLULAR, CHOLANGIOCARCINOMA/ GALLBLADDER AND NEUROENDOCRINE TUMOURS ARE CONTROVERSIAL: A STUDY OF SURVIVAL AND BENEFITS**

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**Introduction:** Liver resections have become safer, indicated for the pool of potential hepatic metastasis that would benefit from liver resection continues to expand. We compare resection of hepatic metastasis other than colorectal carcinoma (CRC), hepatocellular carcinoma...
(HCC), cholangiocarcinoma/gallbladder carcinoma (CC/GBC) and neuroendocrine tumours (NETs) with non-routine metastasis. The purpose of this study is to compare the morbidity, mortality and survival of liver resections by pathology type from a single surgeon at two metropolitan centres in Australia.

Method: We retrospectively reviewed our prospectively database of liver resections performed by a single surgeon (KSH) between January 2007 and July 2013. Patients were divided into six pathological classifications: CRC, HCC, CC, NETs, other malignancy and benign. Patients for the other malignancy group were carefully selected using multi-disciplinary team tumour meetings. We calculated overall survival at one, three and 5 years. Patient demographics were compared. Outcome measures included hospital length of stay (LOS), ICU LOS, blood loss, blood transfusion, surgical mortality and complication rates (using clavien-dindo classification).

Results: Three hundred and sixty-four liver resections were performed for the six different pathology classifications: CRC (146), HCC (63), cholangiocarcinoma/gallbladder (44), NETs (13), other malignancy (39) and benign (79). Other malignancies included: ovarian (6), melanoma (5), sarcoma (4), breast (3), SCC (3), gastric (3), endometrial (2), RCC (2). Demographics between the groups were comparable. There was no difference in rates of post operative complications between the groups. Hospital and intensive care LOS and blood loss were comparable. For malignant conditions the 1, 3 and 5 year survival figures were CRC (93%, 70%, 46%), HCC (87%, 66%, 45%), Cholangiocarcinoma/gallbladder (84%, 61%, 43%), NETs (75%, 37%, 37%) and other malignant (90%, 74%, 69%), revealing no significant difference between groups.

Conclusions: For other hepatic metastasis, if carefully selected in MDT tumour group, similar survival benefit can be achieved when compared to CRC, HCC, CC and NETs.

PPL25-113
TREATMENT OF HEPATOBLIARY NEOPLASM A SINGLE CENTRE EXPERIENCE

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Introduction: Liver resection is considered the therapeutic gold standard for primary and metastatic liver neoplasm. RFA was performed mostly in patients with unresectable liver tumors. The objective of this study is to evaluate morbidity and mortality as a result of liver resection and RFA for hepatobiliary neoplasm.


Results: Eighteen for Hepatocellular carcinoma, 4 hilar cholangiocarcinoma, 16 colorectal liver metastasis, 1 adrenocortical liver metastasis, 1 intrahepatic cholangiocarcinoma, 1 oncocyteoma, and 2 mucinous cystadeno- noma, 6 for neuroendocrine tumors. Intermittent clamping used in 36 cases. Associated procedures in 16. Two colectomy, 6 resection of diaphragm, one pancre- atoduodenectomy, 2 small bowel resection, 4 distal pancreatectomy, one gastrectomy One IVC resection, two portal vein resection. Mean operative time 220 mts. Blood loss 530 mL, blood transfusion in 20 patients. 12 Right hepatectomy one extended right hepatectomy, 4 extended left hepatectomy. 7 left lobectomy, 3 posterior sectionectomy, 21 non anatomic resection. 20 patients developed major complications. 2 died in the postoperative period. 62 RFA procedures in 38 patients, 24 males and 14 females. 1 72 tumors ablated. 22 for Hepatocellular carcinoma, 16 metastatic liver tumors, 12 colorectal, 2 neuro endocrine tumors. Two laparoscopic, 8 along with other procedures, 6 colectomies, 2 distal pancreatectomies. 3 along with liver resections. All procedures done under ultrasound guidance. There were no mortality, 2 patients developed worsening of liver function. Mean hospital stay 25 days.

Conclusions: Liver resection can be performed with low mortality and morbidity, RFA is a relatively safe, treatment option for liver tumors which are unresectable.

PPL25-114
TECHNICAL ASPECTS OF SAFE LAPAROSCOPIC RESECTION OF HEPATOCELULAR CARCINOMA

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Introduction: This series was designed to report the technical aspects and outcomes of laparoscopic liver resection for hepatocellular carcinoma (HCC).

Method: This is a retrospective and prospective review of consecutive patients who underwent laparoscopic liver resection for HCC from 1999 to 2013. We analyzed the surgical techniques based on the site of tumour, looking at pre-operative details, pathology, and 1, 3 and 5-year survival/disease free survival.

Results: Forty-three HCCs were resected over 32 laparoscopic operations in 29 patients (19 male; 58 years old; range 44–78 years old). Types of resection included minor anatomic (n = 19; 8 left lateral sectionectomies), minor non-anatomic (n = 8), and major (n = 5). 65% of patients had cirrhosis. Mean operating time was 150 minutes (range = 90–294 minutes) and mean blood loss was 350 mL (range = 50–1600 mL). 2 conversions occurred. The mean postoperative length of stay was 5 days (range = 1–12 days). There was 1 postoperative death (decompensated cirrhosis). Margins were positive on 2 occasions. Rates of overall survival at 1, 3 and 5 years were 95.2%, 80% and 76.9% respectively. 5-year disease free survival was 61.5%. There were 2 intra-abdominal, extrahepatic recurrences.

Conclusions: Laparoscopic liver resection is feasible in selected patients. Good survival rates can be achieved.
with the use of various surgical techniques. We suggest a thoracoabdominal approach for lesions in segment 7 and 8.

PPL25-116
LONG-TERM OUTCOME OF RUPTURED HEPATOCELLULAR CARCINOMA: EXPERIENCE FROM A SINGLE INSTITUTE
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Introduction: The purpose of this study was long-term outcome of ruptured hepatocellular carcinoma (HCC).

Method: One hundred and fifteen patients presented with ruptured HCC from 2004 to 2009. The clinical, laboratory and imaging findings of these patients were collected. Survival analysis was conducted for patients with transarterial embolization (TAE) and patients without TAE. Multivariate analysis was to determine prognostic factors in patients receiving TAE.

Results: The presenting symptoms are: abdominal pain (87%), abdominal fullness (27%) and hemorrhagic shock (24%). Patients who underwent TAE had higher likelihood to present with shock, but the clinical tumor characters were: smaller tumor size, less tumor vascular invasion, lower alanine transaminase, bilirubin and alkaline phosphatase level. Patients who underwent TAE showed significantly better overall survival than those in the non-TAE group in 1 year (45% vs 14%, \( p < 0.001 \)), 3 years (35% vs 14%, \( p < 0.001 \)) and 5 years (29% vs 14%, \( p < 0.001 \)). Multivariate logistic regression analysis identified older age (hazard ratio 5.66, \( p < 0.01 \)), tumor with vascular invasion (hazard ratio 3.09, \( p < 0.01 \)), presence of shock (hazard ratio 4.65, \( p < 0.01 \)) as poor prognostic factors for the TAE groups.

Conclusions: Transarterial embolization provides effective initial hemostasis in patients with ruptured HCC. Patients who underwent TAE have better short-term and long-term survival. However, older age, tumor vascular invasion and presence of shock predict poor outcome.

PPL25-117
PARENCHYMAL SPARRING IN RESPECT TO VENOUS OUTFLOW IN PATIENTS UNDERGOING EXTENDED LEFT HEPATECTOMY- A MEVIS STUDY
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Introduction: In patients with small remnant liver, modified extended left hepatectomy (ELH) with preserving partial segment 8 and total segment 5 might avoid post-hepatectomy liver failure (PHLF) if a sufficient outflow could be ensured. The aim of the study is to find out whether preserving of segment 5 could avoid PHLF according to the clinical course as well as volumetric analysis by MeVis.

Method: Modified ELH was defined as resection of segment 2, 3, 4 and most of the segment 8, with or without segment 1. The segment 5 was kept in the remnant liver with at least 1 cm margin to the tumor. A liver volume analysis using 3D reconstruction by MeVis was carried out. Data, including transfusion, ICU stay, R0 status, postoperative complications, especially PHLF or bile leak, were analyzed.

Results: Modified ELH with preserving segment 5 can be carried out in five of seven patients who were otherwise indicated for a left trisectionectomy for patients with intrahepatic malignancy from April 2012. In the other two patients tumor involvement of segment 5 and 8 made left trisectionectomy mandatory. MeVis analysis showed that preserving segment 5 led to increasing remnant liver volume 26–67%. Remnant liver was drained by the right hepatic vein (RHV) alone in four patients, by the RHV and the middle hepatic vein (MHV) in two patients. R0 status was confirmed in all five patients. No posthepatectomy liver failure developed. One patient had Grad IIIb bile leak which was successfully managed by reoperation. No complication was developed in others.

Conclusions: Parenchyma-sparring in ELH is feasible and worthwhile. With respect to the venous outflow, segment 5 can be preserved in most of the case when no tumor involvement was found.

PPL25-118
VALUE OF TOTAL VASCULAR EXCLUSION IN PATIENTS UNDERGOING MAJOR HEPATECTOMY WITHOUT CAVAL VEIN RESECTION
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Introduction: Total vascular exclusion (TVE) has been mainly applied in resection of liver tumor involving the hepatocaval conference or caval vein. The value of TVE in patients undergoing major hepatectomy (>three segments resected) but not caval vein resection was rare reported.

Method: Patients underwent TVE since April 2012 was studied. The duration of TVE, extension of liver resection, intraoperative hemodynamic changes, transfusion, R0 status, ICU stay, postoperative complications were compared between patients with TVE for caval vein resection and TVE without caval vein resection.

Results: Among eleven patients requiring TVE, six patients (Group 1) had a caval resection and reconstruction. In other five patients (Group 2), TVE with occlusion of the middle hepatic vein (MHV) – the left hepatic vein (LHV) conference and the portal triad was carried out. Tumor infiltration to the MHV (\( n = 4 \)) or/ and LHV (\( n = 3 \)) led to partial resection and reconstruction of the hepatic vein in four patients. Preservation of MHV or/and LHV was the indication for TVE in this group. Compared to the patients with caval vein resection, the patients in Group 2 tolerated the TVE well with little clinical relevant hemodynamic change.
caused by clamping. The transfusion was significant less. The time of TVE was comparable in both groups. R0 status was achieved in five out of six patients in Group 1 and six out of seven venous resections in Group 2. One patient died within the hospital stay in Group 1 due to cardiac complication. Longer ICU stay and more postoperative complications in Group 1 was found to be associated with more extensive liver resection.

Conclusions: Compared to TVE for caval vein resection, TVE for major hepatic vein resection has less impact on the hemodynamics and thus to be well tolerated. The application of TVE in this population could increase the tumor resectability.

PPL25-119
SUGERY FOR RECURRENT INTRAHEPATIC CHOLANGIOCARCINOMA. WHAT CRITERIA?
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Introduction: Management of patients with recurrent intrahepatic cholangiocarcinoma (ICC) is not jet standardized. Criteria for repeated surgery are lacking. Surgical resection of recurrence is rarely reported, but better results have been obtained in comparison with other available therapies in selected cases.

Method: A 52-year-old woman was admitted in hospital complaining epigastric pain, nausea and weight loss. CT scan and NMR revealed a central mass of the liver involving also the left lobe and compressing the hepatic hylum and the caval vein. The patient underwent enlarged left hepatectomy with ligation of the anterior right portal pedicle (without margin exposure on vessels), and regional lymphadenectomy. One year after surgery a recurrence on the remnant liver was evident on CT scan and confirmed at NMR.

Results: In spite of the relapse with multiple nodules, repeated resection was considered because of the technical feasibility, the age, the good performance status of the patient, good differentiation and the node negative status at histology. Three atypical resection were performed on the remnant liver. The first involved 4 nodules, and the other wedge resection separately removed 2 nodules. Postoperative course was uneventful. The patient followed 6 cicles of adjuvant therapy. Eleven months after surgery the patient is alive and well without biochemical and radiological signs of recurrence.

Conclusions: An aggressive surgical approach is warranted in patients with ICC because resection offer the only hope for prolongation of patient survival. Good differentiation and lymphnodes negative status, that are good prog nostic factors for survival after primary resection, would be evaluated also for the surgical treatment of recurrence. Further experiences are required to know if re-resection can be offered also for multiple nodules when expected morbidity is low.

PPL25-120
TREATMENT OF COMPLICATED HEPATIC CYSTIC HYDATIDOSIS WITH INTRA-BILIARY RUPTURE BY PERICYSTECTOMY IN COMBINATION WITH ROUX-EN-Y HEPATICOJEJUNOSTOMY
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Introduction: Intra-biliary rupture is a serious complication of hepatic cystic hydatidosis. In some cases, the bile ducts are damaged severely and their continuity cannot be recovered by suture, and the reconstruction of biliary tract is difficult. Many surgeons employed ectocystic-enteric anastomosis to reconstruct biliary tract. With the ectocyst been conserved, the incidence of complication residual cavity, biliary obstruction and biliary stones were high post-operatively.

Method: This study retrospective reviewed the patients of complicated hepatic cystic hydatidosis with intra-biliary rupture who were surgically treated with pericystectomy in combination with Roux-en-Y hepaticojejunostomy in our hospital from 2005 to 2011. The clinical features, laboratory tests, B-mode ultrasonography and CT, post-operative recovery, hospital stay and complications were statistically analyzed and the patients were followed up.

Results: Nine cases suffered from hepatic cystic hydatidosis with intra-biliary rupture, they suffered from pain of the right upper quadrant and jaundice, 4 cases were accompanied with fever and chills. Preoperative B-mode ultrasonography and CT showed that 9 patients had single hydatid cyst, with their average diameter being 9.33 ± 1.58 cm. The lesions involved segments V, VI in 6 cases, and segment IV in 3 cases. By WHO classification, 7 cases were classified as CE3 and 2 cases as CE4. They all had choledochectasia. The pericystectomy in combination with Roux-en-Y hepaticojejunostomy were performed successfully. Intraoperatively, 2-4 biliary fistula orifices were found in each case, with the average of the orifice being (0.79 ± 0.20) cm. One patient suffered from incision infection, 1 patient suffered from pulmonary infection and 1 patient suffered from reflux cholangitis. No Anastomatic leaks and complication residual cavity took place and follow-up revealed no recurrence and biliary obstruction and deposition of biliary stones.

Conclusions: The pericystectomy in combination with Roux-en-Y hepaticojejunostomy can achieve satisfactory results for treatment of complicated hepatic cystic hydatidosis with intra-biliary rupture. The ectocyst removed is the key procedure.
PPL25-121
THE ASSOCIATION OF HYPOPHOSPHATEMIA WITH POST-HEPATECTOMY LIVER FAILURE AND RECOVERY
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Introduction: Hypophosphatemia is frequent following liver resection, and thought to represent use of phosphate during liver regeneration. Its association with postoperative liver function remains controversial, with opposite results from small cohorts. We sought to evaluate the association of post-hepatectomy hypophosphatemia with liver failure and recovery.

Method: Consecutive liver resections were retrospectively reviewed from 2003 to 2013 at a single institution. Primary outcome was occurrence of liver failure (“50/50” criteria). Secondary outcomes were persistence of liver failure at discharge, 30-day morbidity according to Clavien-Dindo classification, and 30-day mortality. Outcomes of clinically significant post-hepatectomy hypophosphatemia cases (HP [≤0.65 mmol/L]) were compared to non-hypophosphatemia controls (NHP).

Results: Among 400 patients retrieved, 320 (80.0%) experienced HP. Mean postoperative nadir phosphate was 0.49 mmol/L (SE: 0.10 mmol/L) in HP. Overall, liver failure occurred significantly more often with HP than NHP (19.7% vs 11.2%, p = 0.02). However, we observed a trend towards less liver failure at discharge in HP (1.7% vs 4.3%, p = 0.20). Length of stay, Clavien-Dindo complications, and mortality did not differ. Forty-one cases (82.0%) of liver failure recovered before discharge. More patients who recovered experienced HP compared to those who did not (70.7% vs 11.1%, p < 0.01). Among recovering patients, 20% experienced a drop in phosphate within 24 hours of surgery, compared to none non-recovering ones. Demographics, diagnosis and extent of surgery did not differ between hypophosphatemia or recovery groups.

Conclusions: Based on this large sample analysis, post-hepatectomy HP is associated with increased incidence of liver failure, but not with increased morbidity or mortality. HP occurred more often in patients who recovered, highlighting efficient liver regeneration. Further studies should explore the usefulness of the trend of phosphate drop for early identification of patients likely to recover fast from liver failure, and the need and benefit of aggressive phosphate repletion.

PPL25-122
BILE DUCT INVASION OF COLORECTAL LIVER METASTASIS LEADS TO INCREASED RECURRENCE AND POORER SURVIVAL AFTER LIVER RESECTION
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Introduction: Liver resection for colorectal liver metastases (CRLM) is now standard treatment. Risk scores like the MSKCC score and Basingstoke index have been used to predict prognosis. Bile duct invasion has not been previously defined as a poor prognostic factor. After noticing poorer long term outcomes in patients with bile duct invasion we studied further.

Method: Liver resection for CRLM patients between Jan 2003 and Dec 2012 were included. The unit maintains a prospective database recording key data on CRLM resection cases. Resection slides were independently reviewed utilizing Royal College of Pathologists guidelines by a pathologist to identify bile duct invasion. Follow-up data was obtained from the database and through General Practitioners. A minimum 6 months follow up was included. Survival was calculated using Kaplan–Meier method and comparisons made using the log rank test. A p < 0.05 was considered significant. Chi square test was used to compare recurrence rates.

Results: We are reporting initial data on 109 of 215 patients. There was a M:F ratio of 73:36 with age range 34–85, mean 65. The majority were open procedures (94.5%). All types of liver resection for CRLM were included. The perioperative mortality was 2.7%. Bile duct invasion occurred in 20 patients (18%). The 3 and 5 year actual survival in patients with bile duct invasion versus no bile duct invasion was 54% and 18% versus 70% and 45% (p = 0.07). The recurrence rates with bile duct invasion was higher (22%) than if there was no invasion (14%) (p = 0.24). Multivariate analysis and completion of data on the 215 patients is ongoing.

Conclusions: We have shown that bile duct invasion in liver resection for CRLM leads to higher recurrence and poorer survival. The survival data is not statistically different, likely due to Type II error. It is probable that with complete data collection we may find a significant difference.

PPL25-123
IMPAT OF ANTIVIRAL THERAPY ON LIVER REGENERATION IN HEPATITIS B CARRIER AFTER HEPATECTOMY
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**Introduction:** Liver regeneration occurs after partial hepatectomy to replenish the lost functional parenchyma. This process is affected by chronic liver disease. Antiviral treatment, e.g. nucleos(t)ide analog, has shown to reduce liver-related complications and improve survival in chronic hepatitis B patients after curative resection of hepatocellular carcinoma (HCC). This study aimed to evaluate the impact of nucleos(t)ide analog on liver regeneration in hepatitis B carrier after hepatectomy for HCC.

**Method:** We performed a retrospective study on hepatitis B carrier receiving hepatectomy in a teaching hospital from June 2009 to October 2012. Patients undergoing left lateral sectionectomy, left hepatectomy and right hepatectomy were included. Liver regeneration was measured by comparing the volume of liver remnant on post-operative 6-month computer tomography (CT) to the estimated future liver remnant on pre-operative scan. Liver volume was measured by summing the cross sectional area of CT images in 5-mm cuts and multiply by their slice thickness using computer software. Association between liver regeneration, antiviral treatment and type of operation were analysed by linear regression.

**Results:** Forty-two patients were included in the study, of whom 30 patients received antiviral drugs, whereas 12 patients had no treatment for chronic hepatitis B. There was no significant difference in the baseline characteristics between two groups. The mean and standard deviation of liver volume increase was $490.8 \pm 606.2 \text{mL}$. Type of liver resections ($p < 0.001$) and use of nucleos(t)ide analog ($p = 0.035$) had significant association between liver regeneration in univariate analysis. However, antiviral use became closely non-significant ($p = 0.077$) in multiple linear regression, leaving type of liver resections ($p < 0.005$) the only independent predictive factor.

**Conclusions:** Liver regeneration is associated with type of procedure which in-turn reflecting the volume being resected. Use of antiviral treatment might play in role in improving liver regeneration.

**Introduction:** Recurrence rates are high following curative resection for colorectal liver metastases (CRLM). In this study, using a smaller area as the IMD for a tumour, areas of necrosis and desmoplasia preclude the use of this method of quantification of IMD in vascular hot spots in Colorectal liver metastases (CRLM). In this study, using a smaller area within the $\times 200$ field to quantify IMD in CRLM was validated.

**Method:** Micro-sections cut at 5 $\mu\text{M}$ from the largest CRLM of 10 patients were immunostained for CD31. Five $\times 200$ (0.75 $\text{mm}^2$) fields from each slide, with no areas of necrosis and/or desmoplasia were selected. In the same HPF (0.75 $\text{mm}^2$) at $\times 200$ magnification, the total number of microvessels visualised in the whole field, and the microvessels within a 0.25 $\text{mm}^2$ graticule were counted separately. Microvessel counts were expressed as IMD per 0.25 $\text{mm}^2$. The intra class correlation coefficient was used to compare the consistency of the microvessels counted by the two methods.

**Results:** Total number of fields assessed was $n = 50$. The range of counted microvessels per 0.25 $\text{mm}^2$, with...
and without the graticule was 7–54 and 7–41 respectively. The Intra class correlation coefficient was 0.96 (95% CI: 0.91–0.98).

Conclusions: When areas of necrosis and desmoplasia interferes with quantification of IMD when using the hotspot microvessel counting method in CRLM an area under a 0.25 mm² graticule can be used with ‘excellent’ consistency as an alternative to the standard method.

PPL25-126
RESECTION OF SOLITARY LYMPH NODE METASTASIS FOR HEPATOCELLULAR CARCINOMA AFTER HEPATECTOMY.
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Introduction: Metachronous lymph node metastasis after hepatectomy for hepatocellular carcinoma (HCC) is rare and is usually associated with other extrahepatic metastases. There is no standardized treatment in these patients and the role of surgical resection in isolated lymph node metastasis after curative hepatectomy remains unclear.

Method: This is a retrospective study conducted in a university centre in Hong Kong. Surgical resection for lymph node metastasis would only be offered to patients who otherwise had no other intrahepatic or extrahepatic recurrence after hepatectomy. Data was retrieved from a prospectively collected database.

Results: From 1989 to 2011, 11 patients had resection of solitary lymph node metastasis after hepatectomy for HCC. Nine out of 11 were male and majority of them (9/11, 81.8%) were hepatitis B carrier. Median tumor size was 5 cm, 6 tumors (54.5%) were of well or moderately differentiation, 7 tumors (63.6%) had microvascular invasion and the mean macroscopic resection margin was 1 cm. All of these patients had intra-abdominal lymph node recurrence (4 were located in liver hilum, 4 in retroperitoneal/peripancreatic region and 3 at paraaortic region). There was no perioperative complication or hospital mortality.

The median time from hepatectomy to the development of lymph node metastasis was 18.2 months (6.77–80.6 months) and none of these patients received adjuvant treatment after hepatectomy for HCC.

The median time from lymph node to other extrahepatic metastasis was 6.0 months (2.2–45.6 months). The median overall survival was 18.6 months (2.8–108.7 months) and 1-, 3- and 5-year survival was 66.7%, 25.0% and 16.7% respectively among these patients.

Conclusions: As effective systemic treatment for HCC is lacking and the risk for surgical resection for lymph node metastasis is low. Surgical resection should be offered to HCC patients who developed solitary lymph node metastasis.

PPL25-127
KLEBSIELLA LIVER ABSCESSES SYNDROME: A WELSH PERSPECTIVE
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Introduction: Klebsiella pneumoniae is a well-recognised cause of liver abscess in Asia, often associated with bacteraemia and metastatic abscesses. Reports of Klebsiella liver abscess syndrome (KLAS) from Western countries are rare.

Method: PubMed search for English language publications on KLAS revealed 32 papers, the majority of which were single case reports. We found only one case report of KLAS in a diabetic patient from the United Kingdom. We present two cases of KLAS from the Cardiff Liver Unit.

Results: A 78-year-old non-diabetic Caucasian woman presented with fever and wound infection following surgery for hallux valgus. Blood cultures grew klebsiella pneumoniae. Ultrasound and CT scan revealed a multiloculated liver abscess. Antibiotics and percutaneous drainage failed to achieve source control. Laparotomy was performed to attempt open drainage of liver abscess. We found a multiloculated abscess, necrotic left liver parenchyma and thrombosed left portal and hepatic veins. A left hemihepatectomy was performed and led to prompt resolution of sepsis.

A 51-year-old Welshman was admitted with sepsis and parotitis. He was taking azathioprine and tacrolimus following renal transplant sixteen year earlier. He was not a known diabetic but hyperglycaemic at admission. Antibiotics were initiated but he remained septic. An abdominal CT was performed after blood cultures grew klebsiella pneumoniae. This showed multiple segment II liver abscesses. He underwent a segment II liver resection and began to make a good recovery. Antibiotics were continued for 6 weeks.

Conclusions: Klebsiella is a rare cause of liver abscess in the UK. Multiloculated abscesses are not amenable to percutaneous drainage and surgical drainage should not be delayed. Metastatic abscesses may be the presenting complaint or may cause persistent sepsis following drainage of the primary abscess.

PPL25-128
OUTCOMES OF TRANSCATHETER ARTERIAL CHEMOEMBOLISATION FOR HEPATOCELLULAR CARCINOMA
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Introduction: Hepatocellular carcinoma (HCC) accounts for 1% cancers in UK. 85–90% are non-operable at presentation. Liver transplantation is limited by selection criteria and availability. Transcatheter arterial chemoembolisation (TACE) aims to control growth, preserve liver function and prolong life. Our current service started in 2003. The number we are treating is increasing.
Method: All cases between 2003 and 2013 were reviewed. Demographics, baseline liver function, stage of disease, number of procedures and length of treatment were recorded and all patients followed-up.

Results: Fifty referrals were made between July 2003 and January 2013. There were 2 referrals in 2003 which increased to 12 in 2012. Of the 50, 86% were male with a mean age of 70.8 years (range 48–84). 64% had cirrhosis, 90% were Childs A. Tumour size ranged 1–20 cm. 4 had multifocal disease (1–5 tumours).

Forty-four patients were suitable after angiography. They had an average of 3.1 procedures (range 1–10) over a mean 12.9 months (range 1–73). They were followed-up with CT scans. One patient had severe symptoms of post-TACE syndrome so did not proceed with further treatment.

Twenty-six patients died at a mean of 15.2 months (range 1–58). Eighteen patients are alive at a mean 21.1 months (range 5–82). Cumulative survival is 57% at 1 year, 30% at 2 years and 11% at 3 years. We noted a significantly improved survival in those classed Childs A (p = 0.05).

Conclusions: TACE remains a valuable tool in the management of HCC. We noted a median survival of 12.5 months (range 1–82). Increasing incidence of HCC and referral will put significant demand on services. Patient factors should be considered as may influence treatment outcomes.

PPL25-129
ALPPS PROCEDURE FOR COLORECTAL CANCER LIVER METASTASIS: INITIAL EXPERIENCE

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Introduction: A prolonged survival of patients with Colorectal cancer liver metastasis (CRLM) is possible with surgical treatment however limited by the inadequate volume of residual hepatic parenchyma (FLR – Future Liver Remnant) and the resulting high risk of postoperative liver failure. Recently, a two stage technique has been developed with the acronym ALPPS (Associating Liver Partitioning and Portal Vein Ligation for Staged Hepatectomy) to obtain a more rapid increase in FLR.

Method: Between December 2012 and August 2013, 4 patients were candidates to ALPPS at the Hepatobiliary Surgery Unit of Ankara University Department of Surgery. All patients had significant medical comorbidities and all have undergone preoperative chemo-radiotherapy. One patient had left trisectionectomy, 2 patients had right trisectionectomy and 1 patient had extended right hepatectomy.

Results: The mean age of patients was 57 ± 7.9. All patients underwent R0 liver resection without significant postoperative liver dysfunction. The mean increase in FLR volume was 260.3 mL (p = 0.04). All but one patient underwent second stage operation on the 10th postoperative day. One patient did not show sufficient liver volume increase so surgery was delayed for an additional 2 weeks. The mean hospital stay was 33.2 ± 17.2 days. Two (50%) patients had bile leak that resolved with ERCP. One patient (25%) was lost due to pneumonia and sepsis on postoperative day 42.

Conclusions: ALPPS should be considered as a further option to offer potentially curative surgery to patients with CRLM who are not candidates for a single stage hepatectomy however with a considerable risk of mortality and morbidity.

PPL25-130
PARENCHYMAL-PRESERVING LIVER RESECTIONS DO NOT INCREASE THE RISK OF R1 RESECTION OR LEAD TO POORER LONG TERM OUTCOMES IN PATIENTS UNDERGOING LIVER RESECTION FOR COLORECTAL LIVER METASTASES

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Introduction: Traditionally, anatomical resections have been performed for colorectal liver metastases (CRLM). Early trials found non-anatomical resections to have a poorer outcome. We compare recent results from our institution.

Method: We analysed patients undergoing resections for CRLM from January 2003 to December 2012 at Cardiff Liver Unit. Prospective database recorded demographics, type of resection, blood loss, transfusion, hospital stay, mortality and morbidity. R1 resection was defined as histological margin less than 1 mm. Peri-operative chemotherapy was not routine. Data on neoadjuvant chemotherapy (a small proportion of patients) is being collected. Follow-up data was from our records and General Practitioners. We followed patients up to 30 June 2013. We used SPSS ver 20 for statistical analysis. Means were compared using Chi Square test. We used Kaplan Meier method to measure survival and Log rank test to compare various factors. p-value <0.05 was considered significant.

Results: Two hundred and fifteen resections for CRLM over 10 years; 146 males, 69 females, median age 67 years (range 34–86). Overall mortality 2.7% (6/215). Ninety-nine anatomical resections performed; right hepatectomy(56), left hepatectomy(15), left lateral sectionectomy(13), central hepatectomy(6), segment 6/7 resection(8), caudate lobectomy(1). Twenty-two underwent combined hepatectomy and metastatectomy. Ninety-four parenchymal-preserving metastatectomies performed. The number of anatomical, combined and parenchymal-preserving resections performed was 38, 11 and 31 respectively during 2003–2007 and 61, 11 and 63 during 2008–2012. 41 patients had R1 resection (19%). The distribution among the groups were anatomical 30/99 (30%), combined 9/94 (10%) and parenchymal-preserving 2/22 (10%) (p = 0.001). The 5 year survival and median survival in the groups were 34%, 49%, 58% and 3.3, 4.9 and 6.5 years respectively.

Conclusions: Parenchymal-preserving resections are performed increasingly. In the modern era, with improved surgical techniques, R0 resection can be
achieved in non-anatomical resections. This allows preservation of liver for any future resection. We conclude that parenchymal-preserving liver resection has good long term outcomes.

PPL25-131

PLATELET COUNT: A PREDICTOR FOR THE SAFETY OF THE HEPATECTOMY FOR HUGE (≥10 CM) HEPATOCELLULAR CARCINOMA

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Introduction: A large number of studies have made their efforts to identify the influencing factors of the safety of hepatectomy for HCC, but it is rarely reported for huge HCC (≥10 cm). For all the common factors influencing the safety of hepatic resection referred, ALT, AST, TB, peak total bilirubin(Tbmax), TC, PT, PTA, blood loss, blood transfusion, future liver remnant(FLR), Chid–Pugh, ICG, PLT, tumor size, HBV are included. This study aimed to determine whether hepatic resection carried out for huge HCC is safe and effective, and to identify a simple and effective method to predict the safety for huge HCC.

Method: From January 2010 to December 2012, 58 patients with huge HCC who underwent surgical resection were enrolled in this study. Complications, survival and recurrence data and clinicopathological factors were examined.

Results: An overall 60-day mortality for these patients was 5.17%. In multivariate analysis, only preoperative PLT and FLR were associated significantly with the 60-day mortality. 3 of 58 patients died with a platelet count less than 150 × 10^9/L. Patients with a low (<150 × 10^9/L) preoperative platelet count (LPPC) had worse postoperative liver function, higher serum markers of liver injury, and increased 60-day mortality compared with patients with higher platelet counts (≥150 × 10^9/L). A subgroup analysis of patients with a preoperative platelet count of <100 × 10^9/L compared with those with a count of 100 × 10^9/L to 149 × 10^9/L showed no difference in the rate of 60-day mortality and major complications. 36.2% of the patients suffered early recurrence in 1 year after resection.

Conclusions: Preoperative platelet counts is independently associated with the safety of the surgical resection for huge HCC. LPPC is identified as an independent predictor of increased risk of 60-day mortality. Vascular invasion and satellite nodules persisted to be independently associated with increased rate of postoperative early recurrence.

PPL26-001

OUTCOME OF LIVING LIVER DONORS IN LDLT: A FIRST REPORT FROM PAKISTAN

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Introduction: Liver transplant is the treatment of choice for end stage liver disease (ESLD). Living donor liver transplant (LDLT) has emerged as a viable option in countries like ours. We aimed to evaluate donor outcomes.

Method: From May 2012 to June 2013, 39 LDLT's were performed. Demographic, clinical, radiological, pathological, operative details and postoperative events were recorded and analyzed in SPSS 19.

Results: In donors, 59% (23) were males and 41% (16) were females. Mean donor age, BMI and LAI was 28.1 years (17–45), 25.9 and 11.7 respectively. Biopsy was done in 28.2% (11) donors, showing fat content (range 2–12%). Right lobe grafts without MHV were 48.7% (19), partial MHV 30.8% (8) and complete MHV were 12.8% (5). Two (5.1%) grafts were left lobe. One was a whole liver as domino graft. Biliary anatomy was variant in 20.5% (8); most common was RPHD draining into LHD 10.3% (4). Arterial variants were 43.6% (17). Most common was replaced RHA to SMA 12.8% (5). Mean blood loss was 554 mL (range 200–2000). Mean graft weight for right lobe was 772 g. Mean Post transection portal pressure was 10 (range 7–16). Postoperatively, mean peak bilirubin and INR were 3.1 mg/dL (1.5–7.1) and 1.49 (1.1–2.2) respectively. Mean hospital stay was 9 days (range 6–18). There was no donor mortality. One patient had a bile leak requiring ERCP. Six (15.7%) suffered minor complications.

Conclusions: The safety of a live donor is of paramount importance and is dependent on strict selection criteria, sound planning and safe surgical technique. This is reflected in our results.

PPL26-002

COMPARISON OF SIMULTANEOUS OR DELAYED LIVER SURGERY FOR SYNCHRONOUS COLORECTAL METASTASES: OUR EXPERIENCE.

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Introduction: The optimal surgical strategy for patients with synchronous colorectal liver metastases (CRLM) is still unclear. The aim of this study was to compare the outcome of simultaneous colorectal and hepatic resection with a delayed strategy.

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Method: Data from 108 liver resections for synchronous-metachronous CRLM from July 2005 to June 2013 were reviewed retrospectively. Thirty-eight patients had a simultaneous liver resection and colorectal resection (SG), 17 patients had a hepatectomy for synchronous-CRLM after a colorectal resection (SMG) and 53 patients had a hepatectomy for metachronous-CRLM (MG). Patients’ demographics, clinical and histopathological parameters, intra and perioperative results were analyzed. ANOVA and Student’s t tests were used for statistics; significance was defined as p < 0.05.

Results: The demographic data were similar among the three groups. Intraoperative blood transfusions were 161.1 ± 317.6 mL [0–1000], 229.4 ± 566.8 mL [0–2250] and 242.5 ± 535.6 mL [0–2500] in SG, SMG and MG, respectively (p = 0.7144). Minor LR were performed in 76.3%, 64.7% and 77.4% in SG, SMG and MG, respectively (p = 0.4974). Duration of surgical procedure was 473 ± 172 minutes [157–820], 475 ± 180 minutes [225–800] and 398 ± 165 minutes [160–655] in SG, SMG and MG, respectively (p = 0.9375). Postoperative complications were 18.4%, 11.8% and 18.9% in SG, SMG and MG, respectively (p = 0.7403). Thirty-day mortality was 2.6%, 5.9% and 0% in SG, SMG and MG, respectively (p = 0.2663). Postoperative hospital-stay was 12.03 ± 6.80 days [7–50], 13.44 ± 14.68 days [7–68] and 9.98 ± 4.28 days [4–29] in SG, SMG and MG, respectively (p = 0.2002).

Conclusions: The results of this study suggest that simultaneous colorectal-liver resection can be safely performed at the same time in selected patients with synchronous CRLM with similar short- and long-term results that delayed strategy.

PPL26-003
THE ROLE OF LIVER RESECTION IN THE TREATMENT OF NON-COLORECTAL AND NON-NEUROENDOCRINE LIVER METASTASES (NCNNLM): OUR EXPERIENCE.

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Introduction: Hepatic resection (HR) is an accepted treatment for patients with colorectal liver metastases (CRLM) and neuroendocrine liver metastases (NELM); however, the role of surgery remains ill defined and controversial for patients with NCNNLM. The present study was performed to analyze the outcome of our series of HR for NCNNLM.

Method: From January 2000 to June 2013, 300 HR have been performed with curative intent by one of the authors and were included in a prospective database. Two hundred fifty-three (84.3%) HR were done for CRLM, whereas 47 (15.7%) resections were performed for non-CRLM. Among these, 11 were performed for NELM and 36 for NCNNLM. Patients’ demographics, clinical and histopathological parameters, intra and perioperative results were analyzed. The chi-square and the Student’s t tests were used for statistics; significance was defined as p ≤ 0.05.

Results: NELM included 7 males and 4 females aged 63.54 ± 10.62 years [44–79]; NCNNLM included 17 males and 19 females aged 64.28 ± 10.06 years [47–80] (p = ns). Intraoperative blood transfusions were 268.18 ± 492.07 mL [0–1500] and 169.44 ± 289.20 mL [0–1000] in NELM and NCNNLM (p = ns). Duration of surgical procedure was 393 ± 133 minutes [235–680] and 282 ± 96 minutes [117–585] in NELM and NCNNLM, respectively (p = 0.004). Minor LR were 45.4% in NELM and 77.8% in NCNNLM, respectively (p = ns). Postoperative complications were 36.4% and 16.8% in NELM and NCNNLM, respectively (p = ns). There was no postoperative death. Postoperative hospital-stay was 13.09 ± 8.23 days [7–36] and 10.83 ± 5.71 days [5–36] in NELM and NCNNLM, respectively (p = ns). The median overall survival, calculated from the time of LR, was 25.0 ± 37.9 months [1–129] in the NELM and 25.9 ± 32.8 months [0–118] in the NCNNLM, respectively (p = ns).

Conclusions: In our experience LR for NCNNRM had similar perioperative results than hepatectomy for NELM and can offer acceptable long-term survival. Besides, immediate and long term results are similar to those of hepatic resection for CRLM.

PPL26-004
HEPATIC RESECTION AFTER SEQUENTIAL TRANSCATHETER ARTERIAL CHEMOEMBOLIZATION (TACE) AND PORTAL VEIN EMBOLIZATION (PVE) FOR ADVANCED HEPATOCELLULAR-CARCINOMA: AN OPTIMAL STRATEGY

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Introduction: Sequential transcatheter arterial chemoembolization (TACE) and portal vein embolization (PVE) was proposed for reduced liver failure after resection and controlled tumour progression. The aim of this study was to evaluate the early post-operative course of HCC resection after TACE and PVE.

Method: From January 2012 to June 2013, 49 patients with HCC on cirrhosis liver were included from two-institutional database. Thirty-three underwent surgical resection immediately and 3 had PVE alone. Due to a small future remnant liver (>50%), in 13 patients (26.5%) a sequential TACE + PVE was programmed. Clinicopathological data were analysed.

Results: The total strategy (TACE + PVE + surgery) was performed in 12 patients. In one case (7.7%) it was not possible due to tumor progression. TACE-PVE was well tolerated in all patients. The mean increase of the future liver remnant (FLR) volume was 10%. All patients underwent a subsequent hepatic resection: 9
right hepatectomy, 2 posterior sectoriectomy and 1 extended right hepatectomy. Anterior approach with hanging manoeuvre was carried out in 88%. Intermittent pedicle clamping was required in 66.6% (median 44 minutes; range 17–63) and in 1 was associated a total vascular exclusion. Resection of diaphragm (n = 3) and lymphadenectomy of hepatic pedicle (n = 1) were associated. The post-operative mortality and morbidity were 8% and 58%, respectively. Major complications (Dindo ≥ III) were present in 25% and minor complications (Dindo ≤ II) were present in 41.5%. The incidence of hepatic failure was 8.3%. The mean hospitalisation stay in ICU was 3.25 days (1–16 days). The mean hospital stay was 13.6 days (7–35 days). Pathological examination revealed 100% tumour necrosis in 16.6%, 60–80% necrosis in 58.3%, <50% necrosis in 16.6% and 8.3% without necrosis. Conclusions: Despite a relatively high morbidity rate, the sequential TACE and PVE allows to propose liver resection in patients primary not eligible for surgery.

**PPL26-005**

**OUTCOMES OF TRANSCATHETER ARTERIAL CHEMOEMBOLIZATION FOR GIANT IRRESECTABLE HEPATOCELLULAR CARCINOMA: CASE SERIES OF 24 PATIENTS FROM A TERTIARY HOSPITAL**

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**Introduction:** Hepatocellular carcinoma (HCC) is a common malignancy with a global increasing incidence. Only 30–40% of patients are surgical candidates. Surgery is often contraindicated due to advanced disease or poor hepatic function. Advances in management of irresectable HCC using TACE has improved survival. Presently, there is limited data on clinical outcomes in patients with giant HCC (defined as ≥10 cm in this study) who are treated with TACE. This study evaluates the survival data of patients with giant irresectable HCC who have undergone TACE.

**Method:** This retrospective study was performed on patients in our institution with radiologically or histologically proven giant irresectable HCC. These patients underwent TACE and had their survival data reviewed.

**Results:** Between 2002 and 2012, 24 patients were diagnosed with giant irresectable HCC. 20 (83%) were males and 4 (17%) were females. Mean age was 69 years old (50–82 years old). Main contraindications to surgery were multiple co morbidities and poor liver function. Median Childs’ score was 6 points (5–8). No distant metastasis was present at diagnosis. 16 patients (66%) underwent conventional TACE while 8 (33%) underwent TACE with beads. Average tumor diameter was 14.0 cm (10.1–19.0). The median number of courses of TACE was 2. 17 (71%) patients achieved same or reduction in tumor size post treatment while 7 (29%) patients had increase in tumor size. No patient was admitted for tumor rupture. 3 (12.5%) patients developed immediate post procedural complications; 1 patient died from acute liver failure while 2 patients developed liver abscesses. 12 patients (50%) achieved 1 year survival. 3 patients (12.5%) achieved 2 year survival.

**Conclusions:** TACE is a safe and feasible treatment option for patients with giant irresectable HCC.

**PPL26-006**

**INTERDISCIPLINARY STRATEGY TO TREAT PRIMARY UNRESECTABLE LIVER METASTASIS OF COLORECTAL CANCER: 5 YEAR FOLLOW-UP**

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**Introduction:** The aim of the study is to show the effectiveness of the interdisciplinary approach in the treatment of primary unresectable liver metastasis of colorectal cancer (mCRC).

**Method:** Treatment results of 122 patients with mCRC were included in the retrospective analysis. Strategy of treatment were developed due to the interdisciplinary approach of oncology, medical oncologist and intervention radiologist. All patients in this group had a 3–4 course of neoadjuvant chemotherapy (FOLFOX, FOLFIRI) and 9 patients additionally intraarterial chemoembolization (an average 2 courses). In 62 (50.9%) patients liver resection combined with RFA. Two-stage hepatectomy was performed in 7 (5.7%) patients. Median follow-up was 48.7 months (12–68).

**Results:** Tumor response after a first-line chemotherapy gave possibility to perform a resection in 81% of patients, 19% had held the second line chemotherapy, which was combined with embolization in 7.4% patients. 3- and 5-year survival rates were 51% and 36.2%, respectively. The median survival was 41 months.

**Conclusions:** The multimodal approach in treatment of primary unresectable hepatic colorectal cancer metastases increased the 5-year survival rate till 36.2%. 5-year disease-free survival rate was 26.2%.

**PPL26-007**

**VARICO-CAVAL SHUNT PROCEDURE**

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**Introduction:** Management algorithms for patients with cirrhotic portal hypertension have evolved into accepted protocols. That of upper gastrointestinal (GI) bleeding due to non cirrhotic causes remains confounding. We present an approach to the management of a patient with extensive gastro-esophageal and duodenal varices secondary to portal, splenic and superior mesenteric vein thrombosis further complicated by recurrent GI bleeding. In such a patient, TIPSS procedure is not an option; other surgical shunts being inappropriate due to venous anatomy. We describe a primary varico-caval shunt technique.

**Method:** A 68-year-old man with GI bleeding refractory to medical and endoscopic management and ongoing transfusion requirement was reviewed by a hepatobiliary surgeon (KSH). Multiple imaging modali-
ties demonstrated complete portal vein occlusion with extension into the splenic and superior mesenteric veins. No cause was found. Liver disease was not present.

Multidisciplinary team review concluded that TIPSS and standard shunt procedures were not feasible. Prominent duodenal varices adjacent to the IVC were considered options for shunting.

After informed consent under general anaesthesia, the abdomen was opened. The lesser sac was entered and portal triad defined. Prominent omental, gastric, duodenal and head of pancreas varices were evident. Inflow and outflow control of the IVC was established and a side to side varico-caval anastomosis performed to a 6 x 10 mm duodenal varix. Following removal of vascular clamps, immediate variceal decompression was noted. The patient underwent an uneventful post-operative course.

**Results:** Progress gastroscopy confirmed marked reduction in variceal calibre; no further GI bleeding reported.

**Conclusions:** We present a primary varico-caval shunt technique for consideration in patients with non-cirrhotic portal hypertension with large varices and appropriate surgical expertise to perform this operation.

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**PPL26-008**

**EARLY OUTCOME AFTER HEPATIC RESECTION – EXPERIENCE FROM A DEVELOPING COUNTRY WITH LIMITED RESOURCES**

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**Introduction:** Recent enhancements in understanding of surgical anatomy of liver and technological innovations have made hepatic resection a common procedure in the developed world. But due to lack of resources and infrastructure, the patients from the developing world are still not offered such procedures as a routine. We are a tertiary care hospital located in a developing country with limited resources and lack of modern sophisticated equipments. The objective of our study was to review the initial experience and early outcome of hepatic resections performed at our hospital.

**Method:** Formal hepatic resection at our hospital was started in 2008. All the patients who underwent hepatic resection for various malignant and benign lesions of liver between Jan 2008 and June 2013 were included in the study. The variables studied included indications of surgery, type of hepatic resection, blood loss, early morbidity and mortality. The frequencies were calculated using SPSS v 19.

**Results:** A total of 42 patients underwent hepatic resection during the study period. Indications for surgery included primary hepatic malignancy (23), metastatic malignancy (9), and benign hepatic tumors (9). One third of the patients underwent major hepatectomy. Mean duration of surgery was 297 minutes with mean estimated blood loss of 809 mL. Overall morbidity rate was 38%, hospital mortality rate was 2.3%, while mortality rate at 1 year was 14.2%. In a sub-group analysis, 1-year mortality rate in cirrhotic patients with HCC was 9.5%, as compared to 4.7% in non-cirrhotics; and 27.7% of the patients developed recurrence during the follow up period.

**Conclusions:** Despite limitation of resources, hepatic resection can be performed in our setup with reasonable early postoperative outcome. Mean blood loss is on the higher side and can be improved by modification of technique and introduction of new technology. The outcome of cirrhotic patients is comparatively modest.
**Introduction:** For patients with Hepatocellular carcinoma (HCC) fulfilling the Milan criteria, especially for those with compensated liver function, both liver transplantation and resection could be indicated. Studies have suggested that cirrhosis is a significant adverse prognostic factor for liver resection, and liver transplantation is superior to resection. Due to organ shortage, liver transplantation cannot be effectively applied to every patient on the waiting list. Severity of cirrhosis has never been staged for evaluation on long-term outcomes of liver resection, and whether long-term outcomes of resection could be further improved through patient selection by staging cirrhosis remains unknown.

**Method:** Two hundred and seventy-six patients with HCC fulfilling the Milan criteria undergoing either liver resection or liver transplantation were retrospectively reviewed. The patients with Child–Pugh A in the resection group were stratified by different stages of cirrhosis that were determined by the Laennec fibrosis scoring system, and the survivals of the subgroups with different stages of cirrhosis were compared with those of the transplantation group.

**Results:** The 5-year recurrence-free and overall survival rates were 49.3% and 71.8%, respectively, in the resection group, and 83.6% and 89.2%, respectively, in the transplantation group. The 5-year recurrence-free and overall survival rates were 68.5% and 92.5%, respectively, in the subgroup of no cirrhosis; 63.4% and 85.9%, respectively, in the subgroup of mild cirrhosis; and 28.6% and 50.4%, respectively, in the subgroup of moderate/severe cirrhosis. There was no significant difference between the subgroups of either no cirrhosis or mild cirrhosis and the transplantation group in recurrence-free survival or overall survival, whereas patients in the subgroup of moderate/severe cirrhosis had significantly worse recurrence-free and overall survival than those of the transplantation group.

**Conclusions:** Liver resection achieves similar outcomes as liver transplantation in the HCC patients with no cirrhosis or mild cirrhosis. Liver resection could be the first-line treatment for these patients.

**PPL26-011**

**LASER SPECKLE CONTRAST IMAGING FOR INTRA-OPERATIVE ASSESSMENT OF LIVER MICROcirculation: A CLINICAL PILOT STUDY**

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**Introduction:** Liver microcirculation can be affected by a wide variety of causes relevant in liver transplantation and resectional surgery. Intra-operative assessment of the microcirculation can possibly predict postoperative outcome. The present pilot study introduces laser speckle contrast imaging (LSCI) as a new clinical method for assessing liver microcirculation.

**Method:** LSCI measurements of liver microcirculation were performed on 10 patients undergoing liver resection. Measurements were made during apnea with and without liver blood inflow occlusion. Hepatic blood flow (HBF) was assessed by subtracting zero inflow signal (ZIS) from the total signal. ZIS was obtained after hepatic artery and portal vein occlusion and included movement artifacts due to heart beatings. Perfusion was expressed in laser speckle perfusion units (LSPU) and intra- and inter-individual variability in liver perfusion was investigated using the coefficient of variability (CV).

**Results:** Hepatic microcirculation measurements were successfully made in all patients resulting in analyzable speckle contrast images. Mean HBF was 410 ± 36 LSPU. ZIS amounted to 40 ± 4% of the total signal. Intra-and inter-individual CV in liver perfusion were 25% and 28%, respectively.

**Conclusions:** LSCI allows a fast non-contact way to assess hepatic microcirculation, permitting simultaneous and continuous measurement of a large surface area. By Averaging perfusion over a larger area, absolute perfusion values can be compared between subjects without the need for relative measurements. Technical and software development is needed to reduce movement artifacts due to heart beatings, which were found to be considerable.

**PPL26-012**

**MIR-526B IS INVOLVED IN DOWN-REGULATION OF KU80 EXPRESSION AND TUMOR PROGRESSION OF HEPATOCELULAR CARCINOMA**

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**Introduction:** Ku80 is a component of the protein complex called DNA-dependent kinase. Previous study has revealed that Ku80 is frequently downregulated in HCC compared with the adjacent liver tissue. But the mechanism for Ku80 down-regulation is still unknown. MicroRNA (miRNA) is a new class of small, noncoding RNAs that can down-regulate protein expression. However, what microRNAs are involved in regulation of Ku80’s expression is still unknown.

**Method:** Based on 5 released databases named miRanda, miRDB, miRWalk, RNA22, Targetscan that can be used to predict the relationship between microRNA and target protein, mir-31, mir-340, mir-188, mir-297, mir-520, mir-524, mir-526b and mir-623 were implicated to be involved in the regulation of ku80 expression with the highest possibility. All these microRNAs were transfected into HepG2 and PLC cell lines, respectively, and Ku80 expression was detected by Western blot. After the stable cell lines were chosen, and the antagonim corresponding to the most effective microRNA was transfected into the cell lines with the higher expression of this microRNA. The cell growth and apoptosis were studied in vivo. Furthermore, the microRNA expression was further investigated in human HCC and its adjacent liver tissue. The relationship between the micro RNA expression and biological features of the tumors were analyzed in 60 different patients with HCC.

**Results:** miR-526b was able to down-regulate the expression of Ku80 in HepG2 and PLC cell lines. After blocking miR-526b by the antagonist, the expression of
Ku80 was up-regulated in PLC cells. The down-regulation of miR-526b resulted in growth inhibition and apoptosis in PLC cells. miR-526b was found up-regulated in HCC comparing with its adjacent liver tissue in 41% patients. And the up-regulated miR-526b was significantly correlated with poor differentiation of the tumor.

**Conclusions:** miR-526b is involved in down-regulation of Ku80, and increased miR-526b expression is associated with tumor progression of HCC.

### PPL26-013
#### LIVER REGENERATION AFTER PORTAL VEIN LIGATION FOLLOWED BY PET/MRI IN RATS

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**Introduction:** Portal vein ligation (PVL) produces atrophy of the ligated and hypertrophy of the non-ligated liver lobes. The aim of present study was to selectively evaluate the glucose utilization of ligated and non-ligated lobes in parallel with morphological alterations after PVL using FDG PET/MRI scanner for small animals.

**Method:** Male Wistar rats (n = 24) underwent PVL. The portal branches feeding approximately 80% of liver mass were ligated. The animals were sacrificed before (0 h), and 24, 48, 72 hours after PVL and morphological examinations (regeneration rate, necrosis, apoptosis, mitosis, glycogen content) were performed. In a separate study additional 6 animals underwent PET/MRI imaging by injection of 6.5 ± 1.1 MBq of [18F]-2-Fluoro-2-deoxyglucose in the tail vein 12 hours before and 24, 48, 72 hours after PVL.

**Results:** PVL induces atrophy in ligated lobes caused by extensive necrosis and apoptosis accompanied by significant macrophage activity. Glycogen content almost completely disappeared in these lobes after PVL and remained significantly lower than the base line level throughout the entire experiment. In contrast, the non-ligated liver lobes underwent compensatory hypertrophy with increased mitotic activity of hepatocytes. The glycogen content of these lobes did not show any significant differences compared to the base line. In the ligated lobes the irreversible uptake of FDG was unchanged, while the reversible tracer kinetics decreased as a result, there was an increased accumulation of FDG. In contrast in the non-ligated lobes both the irreversible and the reversible uptake of FDG showed a moderate decrease.

**Conclusions:** In the ligated lobes accumulation of FDG was observed caused by the increased metabolic demand of apoptosis and inflammation and the enhanced glygenolytic activity of cells. On the other hand, in the non-ligated liver lobes, both the reversible and irreversible kinetics of FDG decreased moderately despite the high energy requirement of regeneration.

### PPL26-014
#### PRIMARY MALIGNANT PERIPHERAL NERVE SHEATH TUMOR OF THE LIVER

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**Introduction:** Primary malignant peripheral nerve sheath tumor (MPNST) in a young female patient, not associated with von Recklinghausen's disease is an extremely rare in the liver. We report a case diagnosis based on detailed immunohistochemical and electronmicroscopic examination and its follow up.

**Method:** A 33-year-old female, with a history of surgery for left ovary cystectomy, 8-year ago was admitted in suncheonhyang University Hospital in cheonan, her chief complaint was a right flank pain for a weak, on physical examination, there was no lesion on skin (ex café au lait) with neurofibromatosis type I, and laboratory date was not specific findings. The CT scan showed with 12.5 × 11 cm sized mass located at right lobe, and operative findings were a 20 × 16 cm sized mass on right lobe with invasion on right diaphragm, so right heptectomy and shaving of diaphragm was done. Histologically, on FNCLCC system, the tumor differentiation score was 3, mitotic count was 8 on 10 HPFs, necrosis was 30%. On immunohistochemistry, the tumor cells were strong positive for s-100 protein, bcl-2, vimentin, The patients discharged at POD#13 without complication and received 30-cycles, 6000 cGy radiation therapy, and doing well 2-month after surgery. Eight cases of malignant shwanoma have been reported in the liver, its prognosis are generally poor and its associated with von Recklinghausen's disease, but we first report its follow up including radiation therapy.

### PPL26-015
#### SIMULTANEOUS AND STAGED RESECTIONS OF COLORECTAL CANCER WITH SYNCHRONOUS LIVER METASTASES

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**Introduction:** The surgical strategy for colorectal cancer with synchronous liver metastasis remained controversial. The aim of the study was to review the outcome, and cost-benefit of simultaneous and staged resection of hepatectomy with colorectal surgery at our center.

**Method:** Between December 2007 and December 2012, 131 patients received liver resection for synchronous colorectal liver metastases; 93 patients received synchronous hepatectomy and colorectal surgery, and 38 received staged colorectal surgery and liver resection. The operative and peri-operative data, complications, hospital stay and cost were reviewed.

**Results:** The simultaneous resection group had more minor hepatectomy (< 3 Couinaud segments) (p = 0.016) and were younger than staged resection
group (59 vs 67 years old, p = 0.001). There was no mortality in both groups. There were no significant differences in total or severe (grade ≥ 3, Clavien-Dindo classification) complication in both groups (53.8% vs 41.2%, p = 0.252; 28.0% vs 15.8%, p = 0.181). Patient required fewer hospital stay and cost in simultaneous group (18.8 days vs 25.7 days, p < 0.001; 234,579 NTD vs 282,834 NTD, p = 0.001). Oncological outcome were similar in both group (3 year overall survival 68.6% vs 61.5%, p = 0.61).

Conclusions: Simultaneous colorectal and liver resection is as safe as staged surgery with no difference in morbidity and mortality rate, comparable oncological outcome, and fewer hospital stay and less cost.

PPL26-016
COMPARISON OF THE OUTCOME OF PRIMARY AND REPEAT SURGICAL TREATMENT FOR RECURRENT COLORECTAL LIVER METASTASES
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Introduction: The aim of this study is to investigate the outcomes of repeat surgical treatment for recurrent colorectal liver metastases (CLM) compared with primary surgical treatment.

Method: From October 1994 to December 2009, synchronous CLM patients who underwent R0 or R1 surgery were identified from our prospectively collected database. The patients were excluded if there had been extrahepatic metastases. The patients were divided into two groups according to the location of the primary colorectal cancer: lower rectal cancer (group 1) and upper rectal or colon cancer (group 2). The recurrence patterns and survival were investigated.

Results: A total of 316 patients were included: 78 patients in group 1 and 238 patients in group 2. After a median follow-up of 37 months, the extrahepatic recurrence rate in group 1 (37 patients, 47%) was significantly superior to that of group 2 (69 patients, 29%) (p = 0.003). The disease-free and overall survival curves of group 1 were inferior to those of group 2 (p = 0.011) (p = 0.002). Lower rectal cancer was a significant risk factor for extrahepatic recurrence in multivariate analysis (HR = 1.603, p = 0.037).

Conclusions: The extrahepatic recurrence rate is high in lower rectal cancer patients after surgical treatment for synchronous CLM. If there is CLM from lower rectal cancer, a short-term follow up and detailed work up are necessary.

PPL26-018
EARLY CUTANEOUS METASTASIS POST HEPATOCELLULAR CARCINOMA RESECTION – CASE REPORT
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Introduction: Hepatocellular carcinoma (HCC) with cutaneous metastasis is rare, occurring in 2.7–3.4% of HCCs and accounts for <0.8% of all known cutaneous metastasis. Majority of the cutaneous metastasis originate from needle track or surgical wound contamina-tions. Spontaneous cutaneous metastasis is very rare. The median survival time and 1 year survival rate for these patients are very poor.

Method: We report a case of an elderly gentleman who was diagnosed with hepatocellular carcinoma and developed cutaneous metastasis after surgery.

Results: The patient presented to our institution with loss of appetite, loss of weight and a palpable liver mass. Multiphasic computed tomography (CT) scan of the liver showed a large right lobe liver tumor and intrahepatic duct dilatation. Staging CT scan does not show distant metastasis. Right portal vein embolisation was done to obtain adequate liver volume for resection. A right hepatectomy, with an en bloc resection of the diaphragm was subsequently done. Histopathological examination (HPE) confirmed hepatocellular carcinoma with adequate resection margins. Upon follow up...
PPL26-019
LIVER DAMAGE AFTER BLUNT ABDOMINAL TRAUMA: LAPAROSCOPIC APPROACH.
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Introduction: To value our results of using a laparoscopic approach for patients with blunt traumatic liver injuries.

Method: Single hospital experience: ten man and two woman had a blunt abdominal trauma (BAT) resulted in liver damage. Mean age 30.7 years (range 15–53 years). The causes of BAT were: sport n = 1, falls n = 2, motor vehicle accidents or car-pedestrian accidents n = 4, unknown reason n = 5. Time before an admission: in first 3 hours n = 6, 72 hours n = 1, unknown period of time n = 5. BAT n = 7, combined trauma n = 5. Laparoscopy was performed for hemodinamically stable patients with hemoperitoneum by ultrasound ≤ 500 mL or 12 hours later trauma incident with any volume of hemoperitoneum. Grade I n = 8, grade II n = 2, grade III n = 1 and grade IV n = 1 [Moore]. Mean volume of hemoperitoneum 458.3 mL (range 150–1100 mL).

Results: Treatment laparoscopy n = 9 (coagulation n = 5, coagulation and laparoscopic spleenectomy n = 1, exploration and drainage n = 3), conversion n = 3. Reasons for conversion: severe bleeding (grade IV [Moore]) or combined injuries of liver and spleen), paraduodenal hematoma. There were no lost injuries in this study. Complications rate: 2 out of 12 patients (right lobe of liver central hematoma was percutaneously drained; relaparoscopy without any finds). Mortality rate 1 out of 12 patients (grade IV [Moore] with conversion). Mean length of hospital stay 24.4 days (range 5–105 days).

Conclusions: Laparoscopy could be an adequate and informative alternative to laparotomy for hemodinamically stable patients with liver damage after blunt abdominal trauma.

PPL26-020
IMPACT OF HBV DNA LEVEL & ANTIVIRAL AGENT ON THE RECURRENCE OF PATIENTS AFTER LIVER RESECTION FOR HEPATITIS B VIRUS–RELATED HEPATOCELLULAR CARCINOMA
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Introduction: To investigate the significance of HBV DNA levels & antiviral agent for predicting recurrence in HCC patients who underwent curative liver resection.

Method: From 2005 to 2010, 341 HBV-related HCC patients who underwent tumor resection in Seoul National University Hospital were enrolled. HBV DNA levels (pre-, postop. viral load) and antiviral treatment were analyzed for association with HCC recurrence, together with other clinical variables.

Results: Of the 294 patients, patients (n = 197) with low preop. HBV DNA level (2.5 × 10^5 IU) had better recurrence outcome than those (n = 97) with high level (5 year-RFS = 36.3 vs 26%, p = 0.01). Also in postop. period, the group (n = 164) with low viral titer (1 × 10^5 IU) had better outcome than those (n = 130) with high viral load in recurrence (5 year-RFS = 43.2 vs 22.2%, p < 0.001). In terms of Antiviral agents, untreated group (n = 136) had worse outcome than treatment group (n = 158) in recurrence (5 year-RFS = 28.3% vs 56.3%, p < 0.001). In subgroup analysis, if the treatment group had high HBV viremia postoperatively, they had good recurrence free survival (RFS) as group with low viremia (5 year-RFS = 54.1% vs. 58.3%). But, even if untreated patients had low viremia, they had poor outcomes as untreated group with high viremia (5-year RFS = 37.1% vs. 11.9%). Moreover, whether it is advanced stage (III) or not, low postop. HBV viral load showed the better recurrence outcome but, antiviral treatment did not present difference in advanced stage. Finally, postop AFP levels (HR = 3.52, p < 0.001) as well as postop HBV DNA (HR = 2.2, p < 0.001), antiviral therapy (HR = 2.28, p < 0.001), tumor size (HR = 1.54, p = 0.025), microvascular invasion (HR = 1.997, p = 0.005) were independent risk factors for RFS in multivariated analysis.

Conclusions: Low HBV DNA load and antiviral therapy may be important factors after the curative treatment of HBV-related hepatocellular carcinoma in terms of tumour recurrence.

PPL26-021
LOCALLY ADVANCED HEPATOBlastOMA IN CHILDREN: OPTIMAL MANAGEMENT STRATEGY
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**Introduction:** Hepatoblastoma is the most common primary liver tumour in children. Complete surgical removal is the treatment of choice for cure; however, in most cases the tumour is unresectable because of its extensive hepatic involvement. This study aims to assess the influence of the combination chemotherapy and advanced surgical principles in hepatic resections on the tumor resectability and the outcome of patients with advanced hepatoblastoma.

**Method:** Ten pediatric cases of advanced Hepatoblastoma (8 boys, 2 girls) with ages ranging from 2 months to 14 years were referred for the management to our hospital from 2010 to 2013. All were conventional hepatic resections, done with ipsilateral extra hepatic inflow and out flow vascular control. Parenchymal transection done with Kelly clysis and harmonic scalpel. Cisplatinum and adriamycin chemotherapy regimen (preoperative/post operative) was used in unresectable/residual tumor patients.

**Results:** All but one suffered from abdominal distention. Serum alpha-fetoprotein levels were elevated in all patients. Right hepatectomy in 6, right extended hepatectomy in 2, left hepatectomy in 1 and non anatomical liver resection in 1 patient were done. Preoperative chemotherapy (cisplatin + adriamycin) was given in 3 patients due to unresectability because of its extensive hepatic involvement. One patient received post operative chemotherapy due to margin and lymph node involvement. In 6 patients, no chemotherapy was given and curative resection was done in them and kept on regular follow up. 30 day hospital mortality was 10%. One patient had minor bile leak managed conservatively.

**Conclusions:** A combination of improved chemotherapy and technical advances in anesthesia and hepatic resection caused the obvious improvement in the survival of advanced hepatoblastoma. Preoperative chemotherapy resulted in an increased resectability of the tumor, whereas postoperative chemotherapy played an important role in the increased cure rate of cases with either an incomplete tumor resection or metastasis.

**PPL26-022**

**SELECTIVE GLISSONIAN PEDICLE CONTROL: A USEFUL TECHNIQUE IN LAPAROSCOPIC LIVER RESSECTION**

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**Introduction:** Laparoscopic liver resections are becoming a common procedure and bleeding remains the major concern during parenchymal transection. Pringle’s maneuver can be performed but ischemic reperfusion injury can lead to postoperative morbidity. Selective hemihepatic inflow control can reduce the severity of visceral congestion and total liver ischemia. The purpose of this report was to describe our experience with laparoscopic selective Glissonian pedicle control for minor hepatic resection.

**Method:** Ten patients submitted to laparoscopic liver resection in our institute due to malignant lesion.

**Results:** The technique was successfully performed without complication. The tumor size was 4.3 cm (range, 2.5–8.0 cm). Mean operative time consumed to achieve complete control of right or left pedicle was 26.5 minutes (range, 18–46 minutes). Mean intraoperative blood loss was 150 mL (range, 50–300 mL) and no blood transfusion was needed. The postoperative course of the patients was uneventful and they were discharged an average of 4.8 days (range, 3–7 days) after the operation.

**Conclusions:** Safe laparoscopic liver surgery requires knowledge of the regular techniques of vascular occlusion for on-demand use when necessitated to reduce blood loss.

**PPL26-023**

**ROBOTIC LAPAROSCOPIC ASSOCIATING LIVER PARTITION WITH PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS).**

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*Tel Aviv University School of Medicine, Israel*

**Introduction:** Associating Liver Partition with Portal Vein Ligation for Staged Hepatectomy (ALPPS) is a new procedure and a variant of two stages Hepatectomy, allowing quick remnant hypertrophy and potential cure surgery with low incidence of postoperative liver failure. Trauma of the major liver surgery is a major concern and may be decreased by minimally invasive approach. Based on our experience in robotic liver surgery accounting more than 50 cases with approximately 50% Major Liver Resections we proposed Robotic ALPPS.

**Method:** A 68-year-old male suffering 6 centimeters hepatocellular carcinoma in the right lobe as per biopsy and macrovesicular steatosis up to 30% and mild liver fibrosis as per biopsy from the future remnant. We proposed two-staged liver resection by ALPPS technique and minimally invasive laparoscopic robotic approach using Da Vinci surgical System.

**Results:** Both steps have been done fully robotically with 14 days interval. Duration of the first stage was 390 minutes and the second 190. There was no blood transfusion during the both steps of the surgery. The patient was discharged 7 days after the first step and on the day 3 after the second in good general condition without complications.

**Conclusions:** Combination of two stages surgical strategy with minimally invasive approach by using robotic laparoscopic technique allowed uneventful recovery of this patient with impaired liver parenchyma. Minimally invasive robotic liver resection may have added value in quick recovery process and should be used in specialized centers with expertise in both liver surgery and robotics.
**PPL26-024**

**Splenectomy: An Effective Adjuvant Therapy for Hepatocellular Carcinoma?**

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**Introduction:** The role of spleen in the development of hepatocellular carcinoma remains blurry. The aim of this study was to clarify the effect of splenectomy on growth and metastasis of hepatocellular carcinoma.

**Method:** Hepa1-6 and H22 cancer cells were injected subcutaneously behind the anterior forelimb of C57 and Balb/c mice respectively. The tumors were sliced into 1 mm³ nodules which were implanted in the left lobe of mice liver when they grew into 1 cm³. The cancer cells were inoculated into the splenectomy group and control group. Mice were divided into splenectomy group and control group. The size of implanted tumors and metastatic models, overall survival rates, metastatic state and metastatic nodules, overall survival rates, metastatic state and MDSCs from the periphery blood were compared.

**Results:** The size of implanted tumors was significantly smaller in splenectomy group than control group in both type of mice. The lung metastatic rate was lower in splenectomy group than control group (0% vs 20%, p < 0.05) in C57 mice. For Balb/c tumor-implanted mice models, lung metastasis (0% vs 20%, p < 0.05), diaphragm invasion (0% vs 20%, p < 0.05), abdominal cavity implantation (25% vs 40%, p < 0.05), abdominal wall invasion (50% vs 60%), intrahepatic metastasis (0% vs 20%, p < 0.05), and ascite rates (0% vs 20%, p < 0.05) were different between the two groups. For tail vein injection of Balb/c mice models, the nodules in lungs were smaller and fewer in splenectomy group than control group, liver metastasis (20% vs 50%, p < 0.05) and overall survival rates were also significant between the two groups. MDSCs from periphery blood in all mice models decreased in splenectomy group.

**Conclusions:** Splenectomy inhibited the hepatocellular carcinoma growth and metastasis, which could be involved with decreases in the periphery blood of MDSCs induced by splenectomy. The deeper mechanisms are being invested and clinical data are being collected.

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**PPL26-025**

**Appraisal of Indication and Technique of Couinaud’s Sectoriectomies for Hepatocellular Carcinoma in the Left Liver**

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**Introduction:** Hepatocellular carcinoma (HCC) should fundamentally be anatomically resected under portal venous ramification (Couinaud’s classification) since HCC potentially metastasize via portal vein. Therefore, ‘left lateral sectoriectomy (segment 2)’ and ‘left paramedian sectoriectomy (segment 3 and 4)’ are oncologically recommended for HCC in the segment 2, and segment 3 and 4, respectively, if the background liver function is insufficient for left hemihepatectomy. However, in the liver resection guidelines based on the classification of liver anatomy defined in IHPBA Brisbane 2000 terminology, the second-order division based on portal vein is treated to be “alternative” in “addendum”. In this study we appraised precise indication and technique of Couinaud’s sectoriectomies for HCC in the left liver.

**Method:** In the latest 3 years, 120 hepatectomies for HCC were performed in our institution. Among them left lateral sectoriectomy was carried out in two cases, and left paramedian sectoriectomy in one case. In the former sectoriectomy, Glisson of segment 2 was ligated at first, and transection was done along the demarcation line. In both cases, the main trunk of the left hepatic vein was exposed over an approximately whole length on the transection surface. In the latter sectoriectomy, hepatic artery to segment 3 and 4, and umbilical portion of portal vein were ligated, followed by transection along the demarcation line exposing the main trunk of the left and middle hepatic veins. Intraoperative cholangiography showed preserving of the segment 2 biliary branch.

**Results:** In all three cases, operative bleeding amount was under 1254 mL, and perioperative transfusion of RCC was not needed. Postoperative serum bilirubin value was all under 2 mg/dL. Postoperative course was satisfactory.

**Conclusions:** Oncologically-recommended Couinaud’s sectoriectomies in the left liver can be done safely under the precise indication and the established operative procedures.

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**PPL26-026**

**Role of Shunt Surgery in Budd Chiari Syndrome – 20 Years Experience of a Single Tertiary Care Center**

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**Introduction:** Decompressive shunt surgery, liver transplantation and transjugular stenting are the accepted modes of treatment in Budd Chiari syndrome (BCS). The aim of the study was to evaluate the effectiveness and outcome of shunt surgeries.

**Method:** This is a retrospective study of 146 patients who underwent shunt surgery for BCS between January 1994 to August 2013, in PGIMER, Chandigarh, a tertiary referral centre in India. All the patients underwent Doppler and Magnetic Resonance Venography (MRV)
to establish the diagnosis and the level of occlusion. Patients with obstructed and partially thrombosed inferior vena cava (IVC) further underwent IVC graphy and pressure gradient measurements.

**Results:** One hundred and forty-six patients underwent 148 shunt procedures which included 85 mesoatrial, 36 mesocaval, 18 cavomesoatrial, 3 cavoatrial, 1 portocaval, 1 cavoatrial combined with a separate splenorenal shunt, 1 peritoneovenous shunting, 1 revision of thrombosed mesoatrial shunt and 1 redo mesocaval for shunt thrombosis. A hypercoagulable haematological disorder could be identified in 32 patients. There were 6 (4.1%) deaths within 30 days of surgery (perioperative period). Late complications included subdural haematoma in 2 patients, reversible encephalopathy in 6 patients and meningitis in 1 patient. Three late deaths occurred due to liver failure during follow up.

**Conclusions:** Decompressive shunt surgery in BCS is a good option with acceptable morbidity and mortality. Long term anticoagulation is important to maintain patency of these shunts.

**PPL26-028**

**BIOIMPEDANCEMETRY OF THE LIVER AS A METHOD OF ESTIMATION OF HEPATIC FUNCTIONAL RESERVE**

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**Introduction:** Aim of the study: estimation of hepatic functional reserve by liver parenchyma full electric impedance measurement.

**Method:** The study included experimental and clinical part. The **experimental** part based on examination of 27 white rats Vistar, which has undergone laparotomy and measurement of bioelectric impedance of liver parenchyma. The invasive bioimpedancemetry (BIM) performed with bipolar needle electrodes and the original device for measurement of full electric impedance of biological tissues “BIM II” (patent ¹ 2366360). Major hepatectomy performed (about 70% of the liver) and measured bioelectric impedance of residual liver parenchyma. In 72 hours after the procedure was performed relaparotomy and measured liver impedance one more time. After relaparotomy animals were taken out of the experiment and the fragment of the liver sent to morphological examination. The **clinical** part based on bioimpedancemetry of liver by percutaneous approach under US control (n = 15), laparoscopic (n = 48), during laparotomy (n = 23). For the control in all cases hepatic functional reserve was estimated by traditional methods (biochemical data, cirrhosis class according Child scale etc.)

**Results:** In the **experiment** the electric impedance of intact liver was 3.18 ± 0.12 kIm. Immediately after major hepatic resection parameters slightly decreased to 3.04 ± 0.17 kIm (differences are not significant, p > 0.05). After 72 hours the electric impedance of the liver significantly increased to 4.00 ± 0.2 kIm (n = 14, p < 0.05). The microscopic examination of residual liver in all survived animals showed fatty hepatosis. In the **clinical study** in all cases the results of bioimpedancemetry matched with control.
Conclusions: The results of bio impedancemetry reflect the changes of functional activity of liver parenchyma and could be used for the assessment of liver function for liver surgery.

PPL26-029
PRIMARY SQUAMOUS CELL CARCINOMA OF THE LIVER: PRESENTATION AS LIVER ABSCESS
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Introduction: Primary squamous cell carcinoma (SCC) of the liver is rare. It has a high malignancy rate and poor prognosis and survival is typically no longer than 1 year. The pathogenesis of the disease is unclear, but is generally considered to be correlated with the long-term inflammation or metaplasia of biliary epithelial cells and congenital cyst of the liver. We report here, a case of primary SCC of the liver presenting as liver abscess.
Method: A 42 year female presented with complains of pain upper abdomen of 20 days associated with fever. She gives history of being evaluated elsewhere and diagnosed to have liver abscess. She underwent percutaneous catheter drainage of liver abscess 9 months back. Abdominal examination revealed discharging sinus at epigastic region with tender hepatomegaly. Ultrasound abdomen reveals a large lobulated, hyper echoic mass with cystic areas in the left lobe displacing the porta hepatitis and gallbladder. Triphasic CT liver shows a large cyst with hyper intensity areas in the left lobe of liver extending into segment 8 and 5. Mild dilatation of intrahepatic biliary radicals was seen. No plane between the mass and IVC, middle and left hepatic veins. Spleenomegaly was present. Ps culture was sterile.
Results: A left extended hepatectomy with caudate lobe excision and Hepaticojejunostomy was done. A 10 x 12 cm solid cystic mass involving the segments 2–5, 8 and 1. Gallbladder and hepatic hilum were densely adherent to the mass. Hepatic veins and icve were inseparable from the mass. Histopathology shows keratin producing squamous cell carcinoma (SCC) in a non parasitic liver cyst. Immuno histochemistry confirmed the SCC.
Conclusions: Primary SCC of the liver presenting as liver abscess is rare. Few cases were reported in the literature. Primary SCC of the liver has been reported to be associated with hepatic teratoma, hepatic cyst, hepatolithiasis/caroli and cirrhosis. It requires multimodality treatment.

PPL26-031
THE EXPRESSION OF DNA METHYLTRANSFERASE DNMT3A IN CONVENTIONAL AND FIBROLAMELLAR VARIANT OF HEPATOCellular CARCINOMA
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Introduction: The epigenetic regulation of DNA-templated processes has been studied extensively during the last 15 years. As was revealed, DNA modification such as methylation possess great impact on cell fate and can result in abnormal protein expression patterns what can lead to the induction of carcinogenesis. DNA (cytosine-5)-methyltransferases are enzymes that catalyse the transfer of methyl groups to specific CpG structures in DNA. The methylation of these sequences can lead to inappropriate gene expression such as the silencing of tumor suppressor genes in cancer cells. DNMT3a gene encodes a DNA methyltransferase that
is thought to function mainly in de novo methylation. In the normal liver DNMT3a is usually expressed on the medium level, as was described in literature. Hepatocellular carcinoma (HCC) still remains one of the most common cause of death among patients with cancer. Fibrolamellar hepatocellular carcinoma (FL) represents rare subtype, which affects usually young people (an onset between 20 and 30 years) and its etiology is poorly understood. In our study we compared the presence of DNMT3a protein between two different types of HCC – conventional and fibrolamellar one.

**Method:** Immunohistochemical staining of formalin fixed paraffin embedded tissue sections obtained from 30 patients (22 HCC and 8 FL).

**Results:** We found that DNMT3a immunoreactivity is significantly more pronounced in the typical variant of HCC than in the fibrolamellar one. The DNMT3a immunoreactivity was predominantly localized in cancer cell nuclei in a form of separate large granules spotted in proximity to heterochromatin region.

**Conclusions:** The reduced presence of DNMT3A in the fibrolamellar variant of HCC may suggest that different epigenetic mechanisms are involved in development of this particular type of liver cancer. Improving our understanding the roles of DNMT proteins in hepatocarcinogenesis can benefit in the development of epigenetic – based therapy designed for specific HCC subtype.

**PPL26-032**

**WHAT LOCAL ABLATIVE TREATMENT OF COLORECTAL LIVER METASTASE NEEDS TO ACCOMPLISH TO BE AN ALTERNATIVE TO RESECTION**

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**Introduction:** Liver metastasis of colorectal cancer will occur in 25–30% of patients, two-thirds at diagnosis of the primary (synchronous) and one-third at follow-up (metachronous). Ablative treatment is typically reserved for patients not fit for surgery or as an adjunct to resection to achieve a tumour free liver at time of surgery, where residual liver volume is an issue. Microwave ablation is effective with tumours <30 mm in diameter and away from central biliary ducts. It has the added benefit of activating local and systemic immune response to denaturated tumour antigens. Microwave ablation has in several studies showed a local recurrence rate of 5–10%. Minimal invasive ablation (percutaneous or laparoscopic) of a single lesion typically involves 1 day of hospitalisation.

It is very difficult to perform a randomised non-inferiority study of resection versus ablation as such a study would need to include around 1600 patients in each arm (90% power, alpha = 5%, 60% survival at 3 years).

**Method:** With kind permission of the Liver Met Survey register, all patients with a complete registry and single metastasis of <3 cm were analysed regarding survival, liver recurrence, complications and postoperative hospitalisation, stratified by type of surgery defined as wedge resection (non-anatomical, 1–2 segments), minor resection (anatomical 1–2 segments) and major resection (>2 segments).

**Results:** There is no difference in survival with the three different treatments. Major resection has higher 30-day mortality than the other resections, the other parameters are not significantly different between groups.

**Conclusions:** Non-anatomical resection of a single liver metastasis compares favourably to an anatomical resection. There is a need for a multicentre trial comparing ablative treatment with resection, as a minimal invasive approach could be as effective but with less complications and shorter hospitalisation, generating much lower costs.

**PPL26-033**

**VALIDATION OF OUR POLICY OF LONG-TERM DRAINS MAINTENANCE AFTER HEPATIC RESECTION: RESULTS OF A PROSPECTIVE COHORT ANALYSIS.**

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**Introduction:** The utility of drains after hepatic resection is still debated. The aim of this study was the validation of our definition, and management of biliary fistula after hepatic resection. We also sought to review the main literature, in particular the definition by the International Study Group of Liver Surgery (ISGLS).

**Method:** Data on abdominal drains and on clinical, pathological and short-term outcome were reviewed in a prospective cohort of patients who underwent hepatic resection between 2004 and 2013. Drains were maintained at least 7 days, and the bilirubin levels were measured in POD 3, 5, and 7. Drains were removed if the bilirubin level in POD7 was inferior than in POD5, and less than 10 mg/dl. Statistical analysis on prognostic factors for biliary fistula was performed.

**Results:** Among 475 consecutive patients, 39 (8%) had biliary fistulas. Only 8 (1.7%) patients required interventional procedures. The area under the receiver-operating-characteristic curve on POD7 had the highest predictive value (0.81, p < 0.001). The multivariate analysis found a protective role for cirrhosis (OR = 0.56, p = 0.045), while a Pringle’s maneuver >90 minutes (OR = 3.45, p < 0.001), extended resections (OR = 6.45, p = 0.007), blood transfusions (OR = 2.4, p = 0.035), and resections including segment-I (OR = 1.94, p = 0.033), and segment-V (OR = 1.87, p = 0.024) were found to be associated with increased risk. Using the definition proposed by the ISGLS 66% of our patients would have received a diagnosis of biliary fistula.

**Conclusions:** The maintenance of abdominal drains up to POD7 reduces the risk of biliary fistulas after hepatic resection. The greater is the complexity of hepatic
resection the greater is the risk of biliary fistula, which may effectively managed with drains maintenance.

PPL26-034
HALPSS: A MODIFIED ALPPS TECHNIQUE FOR TWO-STAGE LIVER RESECTION
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Introduction: Patients with primary or secondary liver tumours require hepatic resection for long-term survival. The future liver remnant (FLR) must be at least 25–30% of the liver volume to avoid liver failure and mortality. Portal vein embolization (PVE) is used to increase the size of the FLR, allowing for hepatic resection. More recently the associating liver partition and portal vein ligation for staged hepatectomy (ALPPS) procedure has been used allowing for a greater increase of the FLR volume but with a high morbidity. The HALPSS technique involves a laparoscopic first stage in situ liver splitting using ablation only without complete transection. We hypothesise that this will rapidly increase the size of the FLR without the associated morbidity from liver transection.
Method: We prospectively reviewed three patients who had HALPSS and compared them to three age-, sex-, and liver function- matched PVE patients. The primary endpoint was the increase in FLR volume. Secondary endpoints were morbidity, mortality, and postoperative liver function.
Results: There were two males and one female in each group with a median age of 66 (HALPSS) and 68 (PVE) years. All patients underwent a second-stage right hepatectomy. The mean% increase in the FLR volume was 59.05 ± 8.87 measured after a mean of 16 ± 6.2 days following the first procedure for HALPSS. This compared to a% increase of 22.81 ± 23.32 after 57 ± 13.9 days following PVE. There was no 30-day mortality or morbidity. There was no difference in postoperative liver function between the two groups.
Conclusions: The HALPSS procedure is a feasible technique, with a greater increase in FLR volume in a shorter time period compared to the PVE group in this series. Larger studies are required to fully evaluate postoperative outcome and morbidity.

PPL26-035
SINGLE-INCISION TRANSUMBILICAL LAPAROSCOPIC UNROOFING OF SYMPTOMATIC GIANT SPLENIC CYST
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Introduction: The report of single-incision laparoscopic surgery (SILS) for unroofing of splenic cyst (USC) is limited. We report an efficacy and our techniques of SILS-USC in patients with symptomatic giant splenic cyst.
Method: Two patients, a 31-year-old male and a 33-year-old female, respectively, with a symptomatic splenic cyst were undergone SILS-USC. The patient was positioned in the right semi-lateral decubitus position with left arm fixed over the head. A 2.5-cm mini-laparotomy was made in the umbilicus for placement of a SILS™ Port with three 5-mm trocars as a single access site. Under the pneumoperitoneum, a flexible 5-mm laparoscope and an articulating grasper were used in addition to standard laparoscopic equipment. Under laparoscopic ultrasonography, the cyst was percutaneously aspirated and decompressed. Then the cyst wall was widely resected using LigaSure™.
Results: SILS-USC was successfully performed in both cases without any intra- or post-operative complications. The operation times were 285 and 120 minutes, respectively, with minimal blood loss (uncountable). The meal was started on postoperative day 1, and the patients were discharged uneventfully on postoperative day 4. Postoperative follow-up at 33 and 14 months, respectively did not reveal recurrence or any complications, and the incisions were almost invisible in both cases.
Conclusions: SILS was safely applied in USC in the current cases. However, the indication and limitation of SILS-USC should be investigated.

PPL26-036
MORPHOLOGICAL AND CLINICAL ANALYSIS OF A RARE CASE OF HCC WITH STEM CELL FEATURES
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Introduction: Recent findings showed that within the group of HCC a small fraction of tumors with stem/progenitor cells immunohistochemical profile can be found. According to few current reports such tumors are characterized by poorer prognosis and more aggressive biology in comparison to conventional HCC.
Method: A 37-year-old, healthy woman with no evidence of liver disease was incidentally diagnosed with 3 adjacent liver tumors (8 cm in total diameter) in left lateral segments of the liver and serum AFP of 5700 ng/mL. A resection of segments 2 and 3 was performed without complications. AFP levels returned to normal 4 months following surgery. Two and a half a year later, the patient has no sign of recurrence in a 4-month CT scan and her AFP remains normal. Histologically all 3 tumors shared the same morphology. They were heterogeneous and composed mainly of hepatocyte-like cells, with areas of pleomorphic cells and cells with clear cell cytoplasm. Most of them were positive with HepPar 1. Immunohistochemistry revealed 7% of cells with stem/progenitor cell phenotype, positive for CK19, nuclear cell adhesion molecule (NCAM/CD56) and KIT. These cells appeared mainly within clear cell areas and were not recognizable in routine HE stain.
Results: The case of this patient is unique in some features: despite evident stem cell component the clinical course so far has been benign. Progenitor cells were
identified in a tumor that occurred in a healthy liver. Stem/progenitor cells, not distinguishable with classical HCC stains could have been identified with multiple specific immunohistochemical stains.

Conclusions: We believe some HCC tumors can share stem/progenitor cell morphology, even in cases with no liver disease, and hence routine immunohistochemical staining is encouraged. In spite they are thought to have poor prognosis, clinical course of such cases needs further investigation.

PPL26-037

RESECTION OF LIVER METASTASES FROM COLORECTAL CANCER AFTER METALLIC STENT PLACEMENT FOR COLORECTAL OBSTRUCTION

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Introduction: Colorectal stent placement is a procedure to treat colorectal obstruction using self-expandable metallic stent (SEMS). Traditionally, obstructive colorectal cancer was treated by emergent operation to perform temporary colostomy. However, this technique has decreased patients’ quality of life (QOL). In this study, we analyzed the patients with simultaneously liver metastasis from obstructive colorectal cancer, which treated using SEMS avoiding the temporary colostomy.

Method: From 1993 to 2013, 114 cases with obstructive colorectal cancer were inserted SEMS at our department. Among these cases, 6 cases with simultaneously liver metastases were operated with one stage or two stage hepatectomies after SEMS placement for obstruction.

Results: The duration between colorectomy and hepatectomy was 94 ± 83.4 days. Preoperative percutaneous transhepatic portal embolization (PTPE) was performed in 2 cases. Hepatectoies included 3 cases of right hepatectomy, one case of medial sectionectomy, and 2 cases of partial resection. Regarding to the recurrence after hepatectomies, 3 cases were occurred hepatic recurrence, which were operated re-hepatectomies, and 2 cases were occurred lung metastasis, which were operated pneumectomy. Chemotherapy was introduced after surgery in 5 cases, and chemotherapy regimens were followed: FU/LV in 2 cases, FOLFOX in 2 cases, and XELOX in 1 case.

Conclusions: Regarding to the therapeutic strategy of the obstructive colorectal cancer, SEMS is a preferable management, which is possible to perform one stage colorectomy avoiding to the temporary colostomy. This management seems to perform hepatectomies in short interval and may improve the patient’s QOL. Furthermore, this strategy is able to introduce the chemotherapy after surgery.

PPL26-038

TRANSARTERIAL CHEMOEMBOLIZATION FOR INTRAHEPATIC MULTIPLE RECURRENT HCC AFTER LIVER RESECTION OR TRANSPLANTATION

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Introduction: Transarterial chemoembolization (TACE) can reduce tumor progression rate in HCC patients to achieve good locoregional effect even after liver resection (LR) with multiple intrahepatic multiple recurrences (IHMR). The effect of TACE for HCC with IHMR after liver transplantation (LT) remains unclear. The purpose of this study is to investigate the effect of TACE for IHMR after LR or LT.

Method: A hospital-based retrospective study was conducted, in which 968 and 180 HCC patients undergoing LR and LT in past decade were included. There were 101 and 11 patients diagnosed IHMR during follow-up. The parameters were recorded from the computerized data bank included clinical characteristics, AFP level, Child classification, tumor size in recurrence, the tumor stage in first treatment, recurrent and survival status. Univariate and multivariate factors were analyzed by t-test or chi-square test. Survival and recurrence were analyzed by Kaplan–Meier method. Differences were significant at P < 0.05.

Results: There are 112 patients diagnosed IHMR after LR or LT. There are statistics differences in age, gender and HCV infection in clinic characteristics. All patients underwent LT had HCC recurrence occurred with 36 months after LT. The risk factors of death from tumor recurrence are the larger tumor size in recurrence, poor Child classification in tumor recurrence, hyperbilirubinemia, hypoalbuminemia, and no TACE treatment. In Cox regression analysis, only vessel invasion, Child C and no TACE treat are the independent factors for death from tumor recurrence.

Conclusions: TACE is beneficial to IHMR, either LR or LT.

PPL26-039

ENHANCED RECOVERY PROGRAMME FOR LIVER SURGERY. EFFECT ON LONG TERM SURVIVAL

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Introduction: Several studies have demonstrated that an enhanced recovery programme for liver surgery (ERPLS) shortens hospital stay without compromising morbidity and mortality. However to date no study has reported on the effect of ERPLS on survival. The aim of this study was to assess the effect of the ERPLS on patient survival.

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**Method:** This is a retrospective study comparing patients who experienced an ERPLS to those who experienced standard care following liver resection. The outcome measures assessed were morbidity, mortality, length of hospital stay and long term survival. Fifty patients in the ERPLS group were compared to sixty patients in the standard care group.

**Results:** The mean age of the patients was 66 years (range 25–88 years). 58% of patients in the ERPLS group were male, and 59% in the standard care group. There was no difference between the groups in terms of indication for resection, type of resection, age or sex. There was no difference in morbidity (p = 0.31) or mortality (p = 0.49) between the groups. Patients on the ERPLS had a decreased length of hospital stay compared to those receiving standard care (8 days vs 9 days, p = 0.15). The 2 year survival was 73% and 77% for the ERPLS and the standard group respectively with no statistical difference (p = 0.422).

**Conclusions:** The multi-modal enhanced recovery programme for liver surgery can improve length of stay following liver resection without adverse impact on the overall quality of care. In addition the ERPLS does not appear to have a negative impact on survival. Long term results in terms of its effect on 5 year disease free and overall survival are needed.

**PPL26-040**

**INITIAL EXPERIENCE OF ROBOTIC LIVER SURGERY IN A LIVER TRANSPLANTATION CENTER**

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**Introduction:** Nine hundred and ninety liver transplants have been performed at our institution and more than one hundred laparoscopic liver resections were carried out mainly in cirrhotic patients with hepatocellular carcinoma (HCC).

During the last year, after the completion of a training period in a well known Italian school of robotic surgery, we start a program of robotic liver surgery with the aim to evaluate the safety profile and the impact on a liver transplantation program of this new technology.

**Method:** Nine patients underwent to robotic surgical resection: one for benign lesion and one for a metastatic nodule. Seven patients were cirrhotic with resectable HCC according the BCLC classification. We will report demographics, type of liver resection, complications, length of hospital stay and outcomes of all patients.

**Results:** The median operative time was 190 minutes and one case was converted to open surgery for prudential care in our initial learning curve due to difficult management of a lesion at the biliary biforciation for an HCC nodule located between segments III and IV. During the followup, our first patient experienced the new onset of unresectable HCC and he is now in our waiting list for liver transplantation. No perioperative mortality was observed.

**Conclusions:** In conclusion we consider robotic liver resection a feasible and safe procedure that potentially could expand the application of minimally invasive approach to the liver surgery, above all, in liver transplantation centers in order to complete and potentiate the conventional cure of hepatocellular carcinoma and limits the allocation of the few organs available to the patients that really have a benefit from liver transplantation.

**PPL26-042**

**PREVENTION AND TREATMENT OF COMPLICATIONS IN LIVER RESECTIONS FOR FOCAL DISEASES**

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**Introduction:** Improvement of the results of surgical treatment in patients with focal lesions of the liver.

**Method:** The results of treatment of 260 patients with focal lesions of the liver are presented. The indication for surgery were metastatic colorectal cancer in 118 (45.38%) cases, cancers metastasis of other abdominal organs – in 29 (11.15%), hepatocellular carcinoma – in 20 (7.69%), hepatic hemangiomas – in 75 (28.85%), parasitic hepatic cysts – in 18 (6.92%). Liver resection was performed to 205 patients (78.85%), including large liver resections (≥3 segments) – 87 (42.44%) patients, and small – 118 (57.56%).

**Results:** Intraoperative blood loss was reduced at the expense of applying blood-accumulating technologies from 2700 ± 250.3 to 1100 ± 200.5 mL for large resections, from 683 ± 43.3 to 356 ± 45.4 mL for small resections. Biliary complications occurred in 4 (1.95%) cases: lobar bile-duct stump failure – 1 (0.49%), choledochochal wall necrosis – 1 (0.49%), biloma – 2 (0.98%). Hepatic stump bleeding developed in 4 (1.95%) cases. Abdominal abscesses formed in 4 (1.95%) patients, reactive pleurisy – in 5 (2.44%), thrombosis of IVC retrohepatic segment – in 1 (0.49%). Postoperative mortality was 1.46% (n = 3).

**Conclusions:** Observance of fundamental technological approaches for liver resection can significantly reduce the number of postoperative hemorrhagic complications. In case of extensive resections of the liver, it is preferable to perform ligation of the lobar bile ducts intrarehernically so as to prevent bile-duct wall necrosis and subsequent biliary complications. Implementation of adequate hemostasis and cholestasis during surgery permits to avoid septic complications in the postoperative period. Hepatoprotectors are important for prevention of liver failure.

**PPL26-043**

**CLINICAL PATHOLOGY OF HEPATIC HYDATID CYST EVALUATED BY CONTRAST ENHANCED CT-SCAN**

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Introduction: To investigate the correlation between CT images and the clinical pathological changes of Hepatic hydatid cyst and to understand the natural history by CT images.

Method: Five hundred and fifty-eight cases with 691 hepatic hydatid cysts which had been confirmed by CT diagnosis and pathology were collected. The CT appearances and intra-operative findings were analyzed retrospectively.

Results:
1. The variability of the CT value of the different types of mother cyst and daughter cyst was statistically significant (p < 0.001). The CT value of mother cyst was increased from type CL to type CE5.
2. According to CT characteristic findings in the cases with biliary fistula, 36 cases with dilated bile duct, 67 cysts with “crescent-like” apophysis, 25 cysts with calculus, 29 cysts with “concentric circles sign”, 24 cysts with gas-fluid level, 42 cysts with daughter cyst eccentric arrangement.
3. Intrahepatic rupture: 158 cysts, the incidence of 22.9%. CT showed by “gourd-like” lesions, the prominent cystic wall was thinner than original one. Extrahepatic rupture: 92 cysts, the incidence of 13.3%.
4. According to CT characteristic findings in 267 cysts, which indicated by “liver capsule annular depressed”, of 454 cysts which with an exophytic component or adjacent liver edge. The variability of the CT characteristic images of the different types was statistically significant (p < 0.001).
5. 273 cysts had calcification in varying degrees, and the calcification rate was 38.4%. The variability of the calcification rate of only cyst wall or content of two kinds of cyst (no daughter-cyst and daughter-cyst) was statistically significant respectively (p < 0.001).

Conclusions: The CT images had an important role in reflecting the cystic content, shrink and the calcification trend in natural history of Hepatic hydatid cyst. And it’s useful for determine biliary fistula and rupture of hydatid cyst. According to CT characteristic findings, growth state of hydatid cyst could be acknowledged.

PPL26-045
1 CASE OF ALPPS FOR INITIALLY UNRESECTABLE MULTIPLE AND BILobar SYNCHRONOUS COLORECTAL LIVER METASTASES
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Introduction: Associating liver partition and portal vein ligation for staged hepatectomy(ALPPS) has been recently devised to improve resectability and to minimize the risk of liver failure.

Method: We reports a case of associating liver partition and portal vein ligation for staged hepatectomy (ALPPS) and low anterior resection simultaneously for initially unresectable multiple and bilobar synchronous colorectal liver metastases.

Results: A 64-year-old male, with rectal cancer and initially unresectable multiple hepatic metastases received 8 cycle neoadjuvant chemotherapy with FOLFOX regimen. After 6 months, we performed the procedure in two steps. During the first operation, two wedge resection of metastatic nodules in the left liver, right portal vein ligation and in situ splitting as a right hepatectomy were performed. A CT scan on POD 7 showed FLR hypertrophy. At POD 12, complete right hemihepatectomy and low anterior resection (for rectal cancer) was performed.
performed simultaneously. Postoperative course was uneventful and patient was discharged at POD 23.

**Conclusions:** ALPPS can be a feasible and safe treatment option to provide curative resection to unresectable patients with multiple and bilobar colorectal liver metastases because of insufficient volume of FLR.

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**PPL26-046**

**HEPATOCELLULAR ADENOMA IN A YOUNG MALE – A RARE CASE REPORT**

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**Introduction:** Hepatocellular Adenoma is rare benign liver neoplasm strongly associated with oral contraceptive use. It is even rare in men with a sex ratio of 1:9. Here we are presenting a rare case of Hepatocellular Adenoma in an young male without any metabolic disease of liver.

**Method:** Sixteen year old young male presented with history of sudden severe pain Right upper quadrant 1 month ago and since then he had continuous pain of less intensity. There is no history of Trauma, blood transfusions or anabolic steroid usage. No history of any metabolic liver disease.

**Results:** He was evaluated, CECT Abdomen revealed heterogenous mass lesion in segment 5 and 6 of liver of size $8 \times 6$ cm. Bisegmentectomy was performed and Histopathology revealed as Hepatocellular Adenoma.

**Conclusions:** Hepatocellular adenoma is very rare in an young male without any history of anabolic steroid use and without metabolic diseases of liver and this case is being presented for its rarity.

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**PPL26-047**

**COMPLICATION PROFILES AND OUTCOME AFTER SYNCHRONOUS LIVER AND BOWEL RESECTION FOR COLORECTAL CANCER PRESENTING WITH HEPATIC METASTASES**

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**Introduction:** Synchronous hepatic and bowel resection for colorectal cancer with liver metastases (CRLM) avoids the need for two major operations for the same cancer episode. However, the cumulative morbidity may be appreciable. This study assesses complication profiles and outcome after synchronous surgery.

**Method:** A consecutive series of 28 patients undergoing synchronous liver/bowel resection for metastatic colorectal cancer in a regional liver surgery unit during the period 17/4/2008 to 8/2/2013 constitute the study population. Data were collected prospectively and analysed in retrospect.

**Results:** Median (range) age was 67 (29–85) years, 18 (64%) male. Median BMI was 26 (19–35), 21 were ASA grades 1 or 2 pre-op. The primary was right/ transverse colon in 13, left 7 and rectum 8. The median (range) number of metastases was 2 (1–8), median size 1.9 (0.8–13.0) cm and 7 bi-lobar. Neoadjuvant chemotherapy was used in 8 of 20 non-rectal tumours (40%), chemoradiotherapy in 5 (63%) rectal tumours. Median operative time was 375 (217–642) minutes. Eight (28%) received blood transfusion. 27 had a colonic anastomosis [6 (21%) de-functioned]. Major liver resection (two or more Brisbane 2000 sections) was undertaken in 10 (36%). Post-operatively 4 (14%) required intensive care [median stay 0 (0–12) days] and 27 High dependency (level II) support for 3 (0–18) days. Median in-patient stay was 14 (7–133) days. There were no 30-day readmissions and in-hospital mortality was 0. Complications scored by the Clavien-Dindo system were: Grade 0-2 in 19 (68%), Grade 3 in 6 (22%) and Grade 4 in 2 (7%). Histologically, an R0 margin was achieved in 17 (61%). Adjuvant chemotherapy administered to 71%.

**Conclusions:** Synchronous liver and bowel resection is associated with low mortality but a high complication rate (although the majority were grade I or 2) and this may compromise uptake of adjuvant chemotherapy. Important questions remain about long-term outcome.

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**PPL26-048**

**EARLY RECURRENCE IN ALPPS PROCEDURE. PRELIMINARY DATA**

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**Introduction:** Since Schnitzbauer and coworkers published an article about associating liver partition and portal vein ligation for staged hepatectomy (ALPPS), there have been an increasing interest for this technique in literature. Discussion have mainly focused on morbidity and mortality and on technical variations but only one issue about recurrence rate in short-term outcome.

**Method:** We analized the patients with liver metastases operated on ALPPS technique from October 2011 to December 2012.

**Results:** Eight patients were operated on in this period. Median age was 58.5 years (46–51). All patients had previous chemotherapy with 6 cycles of FOLFOX plus bevacizumab. Every case had at least one metastasectomy of the liver remnant during the first procedure. Five patients were operated as “first liver” surgery (67.5%); one of them has not had the primary rectal cancer resected yet. There was no mortality; one patient had a postoperative liver failure and another one, with S7 and S8 as the sole remnant, had a biliary fistula, treated by percutaneous drainage and endoscopic sphincterotomy. Time span between both procedures of the ALPPS was 11.5 days (7–14), obtaining a median volume increase of the liver remnant of 56.7%. The point that we want to emphasize is the early local recurrence found in 3 patients (37.5%), which appeared at 4, 5
ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS) – SINGLE CENTRE EXPERIENCE
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Introduction: PVE has been used for FRL volume enhancement to offer a curative hepatectomy in patients with insufficient FRL. ALPPS is a procedure of great potential and promise to promote a rapid FRL hypertrophy and perform R0 resection. We present herewith our experience with this technique.

Method: Over 24 months, 23 patients underwent an ALPPS procedure. The mean age was 57.60 years. The disease distribution was as follows: CRC = 2, CCA = 2, HCC = 2. The pre-ALPPS mean FRL/TLV was 28.45%.

Results: All 23 patients underwent an ALPPS procedure combined with resection of disease from left lobe (n = 17) (FRL) or purely to enhance liver volumes. 2 patients had a colorectal resection combined with the ALPPS procedure, for synchronous liver metastases. 2 patients underwent a liver first approach for synchronous liver metastases. 1 patient could not have completion hepatectomy due to progressive disease. The absolute FRL increment as a result of ALPPS was obtained at a mean of 67.78% which equated to a volume increment between 16–519 mL, mean = 282.82 mL. Mean time to FRL increase was 13.72 days. Mortality was 1/23 = 4.34%. Overall morbidity was 13/23 (56.52%). Grade 3 and 4 complications were noted in 6/23 (26.08%). R0 resection was achieved in 21 patients (95.45%).

Conclusions: ALPPS can be performed with an acceptable morbidity and mortality in patients with borderline disease or those with borderline liver volumes. It can be performed in the same hospital admission and is achieves quicker hypertrophy with greater efficacy as compared to PVE. This has significant impact on costs as well as may influence survival due to lesser time to initiation of adjuvant chemotherapy. ALPPS should be offered wherever possible and should be considered as a viable substitute for PVE.

INTRAOPERATIVE RADIOFREQUENCY ABLATION AND PERITONEAL LAVAGE WITH DISTILLED WATER FOR SPONTANEOUSLY RUPTURED HEPATOCELLULAR CARCINOMA
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Introduction: Spontaneous rupture of hepatocellular carcinoma (HCC) is a rare but life threatening complication by causing a hemoperitoneum and worse prognosis. Prognosis of patients with ruptured HCC has not been fully evaluated.

Method: Data of 4 consecutive patients who underwent intraoperative radiofrequency ablation and peritoneal lavage with distilled water for spontaneously ruptured HCC was evaluated. Patients with ruptured HCC that accompany neither distant metastasis nor existence of tumor thrombus at PV or HV were targeted. Bleeding control was performed by gently packing gauzes on the cancer lesion and applying ablation with RFA probe at corresponding site. Blood transfusion was also applied at the same time. Depending on the consequences, resection was done if needed. After the operation, lavage with 10L of distilled water was followed for 20 minutes to prevent tumor seeding.

Results: Between Jan. 2012 and Oct. 2012, 4 patients were operated using RFA on ruptured HCC. Among these, 3 patients had hepatitis B related LC and the other was alcoholic LC. 1 patient ended the operation after RFA only and 3 patients went through partial hepatectomy in addition to bleeding control with RFA. Amount of intraoperative PRC transfusion was 37 units for RFA + Rt. Hepatectomy, 2 and 7 unit for RFA + Lt. lateral sectionectomy (LLS) patients, respectively and 7 unit for RFA only patient. Average length of hospital days in ICU was 5.5 days and average hospital days in general ward were 22 days. 6 month survival rate for all patients were 100% but 1 patient died of lung metastasis, 7 months after the operation. All patients had no peritoneal metastasis.

Conclusions: Intraoperative RFA and peritoneal lavage with distilled water for spontaneously ruptured HCC is easy to perform and theoretically safe method, although further study is needed after accumulation of more cases.
**Introduction:** Surgical treatment remains difficult for hepatocellular carcinoma (HCC) originating in the caudate lobe. Resection of the caudate lobe combined with an adjacent segment or lobe can be reasonable if the patient’s liver function permits. However, various problems are encountered because of the complicated anatomy. In this report, we evaluated the safety of and problems associated with caudate lobectomy combined with other types of hepatectomy.

**Method:** We performed caudate resection for primary HCC in 14 patients from January 1995 to December 2010. Clinical and operative characteristics and survival were analyzed.

**Results:** Tumors were located in the Spiegel lobe in four patients, the caudate process in six and the paracaval portion in four. The procedure performed most was isolated partial caudate lobe resection (7 patients). Three patients underwent partial caudate lobe resection combined with other hepatectomy and the remainder underwent subtotal caudate lobe resection combined with other hepatectomy. Tumors of those patients who underwent combined subtotal caudate lobe resection were mainly in the paracaval portion. The median operation time of the seven patients who underwent combined resection was 446 min and their median intraoperative blood loss was 2.086 mL. There was no postoperative complication in patients who underwent combined subtotal caudate lobe resection, except one case of subtotal resection combined with central bisegmentectomy; the remaining right posterior sector was twisted after liver extraction, causing blockage of the outflow of the right hepatic vein. The overall and the recurrence-free survival rates did not differ between isolated and combined resection.

**Conclusions:** For removal of HCC located in the caudate lobe, especially the paracaval portion, partial or subtotal caudate lobe resection with other types of hepatectomy contributes to safe and curative surgery, if the liver functional reserve and complications associated with surgery are well understood.

**PPL26-052**

A MULTIPLE ABLATION STRATEGY IN PATIENTS WITH BORDERLINE RESECTABLE OR IRRESECTABLE COLORECTAL CANCER LIVER METASTASES

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**Introduction:** In patients with colorectal cancer liver metastases liver resection is indicated when a complete (R0) resection with preservation of a sufficient future liver remnant (FLR) is achievable. Some patients, initially irresectable can be converted to resectable with combinations of chemotherapy, local ablation or liver volume manipulation. We present results of an aggressive treatment strategy using multiple microwave ablation (MWA) in patients where curative intended treatment is precluded by absence of a tumour-free FLR due to extensive segmental tumour engagement.

**Method:** In patients where the whole liver or a FLR could be rendered macroscopically tumour-free with multiple ablations, MWA was performed at laparotomy, using ultrasound guidance or computer-assisted navigation. In cases where a FLR was identified and cleared, resection was performed as a second procedure, whereas an ablate-and-wait approach was adopted in patients with total liver clearance. Mortality and morbidity was recorded and the overall and disease-free survival of the ablated patients was compared to the survival data of two historic cohorts.

**Results:** Twenty patients were treated with the multiple MWA strategy. There was no perioperative mortality and complications associated with the MWA was mostly mild to moderate. After a median follow-up of 640 days 11 patients were alive, of which 5 were disease-free. The MWA group showed a 3-year overall survival of 33%, compared to 60% for the historic cohort representing the best-case scenario (resected patients) and 15% for the worst-case scenario cohort (patients treated palliatively).

**Conclusions:** Results of the multiple MWA approach in the defined population suggest that a favourable disease-free outcome with potential cure can be achieved in a small number of patients. Patients where curative efforts with this strategy fail seem to benefit from an increased survival, compared to palliative chemotherapy only.

**PPL26-053**

POSTOPERATIVE BUT NOT PREOPERATIVE TREATMENT WITH SORAFENIB INHIBITS LIVER REGENERATION IN RATS.

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**Introduction:** Sorafenib, a tyrosine multikinase inhibitor, has been shown to halt the growth of hepatocellular carcinoma. The aim of the present study was to investigate the effect of sorafenib on liver regeneration in healthy rats.

**Method:** In two sub-studies, we examined the effect of pre- or post-operative treatment with sorafenib (15 mg/kg/day). 120 Wistar rats received either sorafenib or placebo. Following 70% partial hepatectomy, the rats were euthanized on postoperative days (PODs) 2, 4 or 8. Body weight and liver weight were recorded and regeneration rate was calculated. Hepatocyte proliferation was estimated by immunohistochemistry for Ki-67 antigen using unbiased stereological methods.

**Results:** Eleven animals (9%) died following surgery. In the Post-Op sub-study, significantly lower values of liver weight gain, liver regeneration rates and hepatocyte proliferation were found in the S group. In the Pre-Op sub-study, lower body weight gains during the gavage period in the S group were found. No differences were found between the groups regarding liver

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weight gain, liver regeneration rates and hepatocyte proliferation on PODs 2 and 4.

Conclusions: In our rat model, sorafenib did not seem to increase post-hepatectomy mortality. Postoperative treatment significantly impaired liver regeneration. Preoperative treatment impaired body weight gain during the gavage period, but did not affect liver regeneration.

PPL26-054
PERIOPERATIVE OUTCOMES OF LAPAROSCOPIC AND ROBOTIC MAJOR HEPATECTOMIES: A MULTICENTER COMPARATIVE STUDY
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Introduction: Laparoscopic major hepatectomies (LMH) have been showed to be a valid alternative to open surgery when performed in highly specialized centers. Recently, the robotic approach to minimally-invasive liver surgery has been proposed as an alternative to the laparoscopy. Aim of this study was to compare short term perioperative outcomes of LMH versus robotic major hepatectomies (RMH).

Method: A retrospective analysis was made comparing RMH (n = 25) and LMH (n = 25) performed at four Italian hepatobiliary centers (two robotics and two laparoscopic) between January 2009 and December 2012. Demographic data, operative, and postoperative outcomes were collected from prospectively maintained databases and compared.

Results: Demographic characteristics and operation type of RMH and LMH group were similar. The were no significant differences in operative outcomes including operating time, estimated blood loss and blood transfusions between the two groups. Patients undergoing LMH had more need for intermittent vascular clamping (32% vs 0%, p = 0.001). Overall conversion rate was 1/25 cases (4%) in both groups. There was no difference in ICU and total hospital stay but the LMH group had a faster postoperative recovery including first flatus (LMH = 1 vs RMH = 3 days, p = 0.001) and first liquid diet (LMH = 1 vs RMH = 2 days, p = 0.001). There were no significant differences in complication rates, 90-day mortality and readmission rates.

Conclusions: In this retrospective multicenter study the robotic approach leads to similar short term perioperative outcomes compared to the laparoscopic one. More studies are needed to validate these results and to clarify the role of minimally invasive liver surgery for major hepatectomies.

PPL26-055
WEIGHT LOSS AT TIME OF CANCER DIAGNOSIS PREDICTS SHORTER SURVIVAL
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Introduction: The syndrome cancer cachexia causes many metabolic changes in cancer patients and the most obvious change is weight loss. We studied a cohort of cancer patients that at the time of diagnosis were divided into three groups: Cancer cachexia (CC), weight loss caused by obstruction (WLO) and weight stable (WS). After a minimum of 5 years follow up, difference in survival between the groups was investigated.

Method: All patients with a newly diagnosed cancer in the upper gastrointestinal tract referred to the Karolinska University Hospital in Sweden were consented for the study. Nutritional status was evaluated and weight loss assessed. Weight loss was defined as >5% in the last 3 months or >10% in the last 6 months. Patients with weight loss were allocated to CC or WLO depending on the presence of obstruction. Therapy conference management plan operations results, pathological reports and time of death were recorded prospectively. Survival was defined as the time from inclusion into the study to time of death. Statistics were performed with ANOVA, Spearman correlation, Kaplan–Meier survival and Cox regression.

Results: There were 17 patients in the CC group, 22 in WS and 12 in WLO group. Nutritional status was poorest in WLO and best in WS (p < 0.05). There was significant difference in survival between all groups, both at the time of diagnosis and in patients assessed curable following therapy conference, WLO survival shortest and WS longest. Patients in WLO had 3.5 times shorter survival than WS and all patients with weight loss had 2.5 times shorter survival than WS patients. There was significant correlation between % weight loss and survival (R = 0.57).

Conclusions: Weight loss at time of cancer diagnosis predicts shorter survival, especially if obstruction is present and is not related to estimated curability.

PPL26-056
EARLY EXPERIENCE WITH INTRA-OPERATIVE IRREVERSIBLE ELECTROPORATION IN THE TREATMENT OF LIVER METASTASES
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Introduction: Irreversible electroporation (IRE) is an emerging treatment option that may effectively control hepatic malignancies that abut upon major vascular and biliary structures. We present our early experience with IRE.

Method: Medical records of patients who underwent IRE in a single institution between June 2011 and July
Radiofrequency ablation (RFA) has had its surgery recently. within 6 months of surgery except for 2 patients who had their surgery recently.

Results: Fifteen patients (male = 9; female = 6) underwent IRE treatment. Patients underwent ablation of hepatic lesions (n = 2), hepatic resection followed by margin ablation (n = 9) or both (n = 4). The histologies included colorectal cancer (n = 11), hepatocellular carcinoma (n = 1), angiosarcoma (n = 1), prostate cancer (n = 1), and cholangiocarcinoma (n = 1). Most patients (n = 12 of 15) had bilobar disease and a majority (n = 12 of 15) had undergone pre-operative chemotherapy. Complications within a 30 day period occurred in 4 patients and included intra-abdominal collection requiring drainage (n = 1), wound infection (n = 2), readmission for pain (n = 1) and pleural effusion requiring drainage (n = 1). Complications at 60 days occurred in 2 patients and included readmission for pain (n = 1) and Clostridium difficile colitis (n = 1). Post-operative imaging within 6 months indicated patency of major arterial, venous and biliary structures in all patients.

Conclusions: Our early experience shows that IRE is safe for the treatment of hepatic metastases that are close to or abutting major hepatic vasculature; furthermore, IRE can be used to ablate the hepatic parenchyma around major vascular structures when resection margins are microscopic. Our short term results suggest that IRE may be effective in the multidisciplinary management of hepatic malignancies.

PPL26-057
LONG TERM RESULTS AND PROGNOSTIC FACTORS IN 185 PATIENTS WITH HEPATOCELLULAR CARCINOMA TREATED BY RADIOFREQUENCY ABLATION, 10 YEARS EXPERIENCE

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Introduction: Radiofrequency ablation (RFA) has gained widespread popularity in the treatment of hepatocellular carcinomas (HCC). However, uncertainties remain concerning favorable patient and tumor characteristics.

Method: In this single-center retrospective study, from 2003 to 2013, the local recurrence-free survival, overall survival, and prognostic factors for 185 patients undergoing RFA as primary treatment were assessed.

Results: There were 185 patients undergoing RFA in 10 years. Patients with up to three lesions, 3 cm or smaller, or one lesion up to 5 cm, were considered for ablation. 49% of our patients received percutaneous RFA, while others received open or laparoscopic assisted RFA. 4 patients (2.2%) suffered from incomplete tumor ablation, requiring further treatment. Two-year local recurrence free survival was 68%, with a median of 43 months (95% CI: 33.5–52.5). On multivariate analysis, four independent favorable prognostic factors were identified: patients with tumors 3 cm or smaller (HR: 0.527; p = 0.021), without symptoms (HR: 0.412; p = 0.024), with an AFP ≤ 8 (HR: 0.548; p = 0.023), and without ascites (HR: 0.477; p = 0.039). Median overall survival was 58 months (95% CI: 39.3–76.7), with a 5 year overall survival of 49%. On multivariate analysis, independent favorable prognostic factors for overall survival include solitary tumors (HR: 0.575; p = 0.038), absence of Hepatitis C infection (HR: 0.448; p = 0.009), and Child Pugh score of A (HR: 0.478; p = 0.005). The median hospital stay was 7 days, and 24 patients (13%) suffered from complications requiring intervention. The 30-day mortality rate was 3.8%.

Conclusions: RFA achieves good local control of HCC, especially in asymptomatic patients with small tumors, no ascites, and low AFP. Overall survival is worse in Hepatitis C affected patients with multifocal HCC, and decompensating cirrhosis.

PPL26-058
USEFULNESS OF KYOTO CRITERIA AS EXPANDED SELECTION CRITERIA FOR LIVER TRANSPLANTATION FOR HEPATOCELLULAR CARCINOMA

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Introduction: We previously proposed expanded selection criteria for liver transplantation (LT) for hepatocellular carcinoma (HCC), the Kyoto criteria, involving a combination of tumor number ≤10, maximal diameter of each tumor ≤5 cm, and serum des-gamma-carboxy prothrombin levels ≤400 mAU/mL, and we have used these criteria since January 2007. In the present study, the usefulness of the criteria was prospectively as well as retrospectively validated.

Method: One hundred and ninety-eight patients with HCC who underwent living donor LT (LDLT) at our institute between February 1999 and December 2011 were enrolled in this study. Overall survival and the recurrence rate were investigated in patients classified according to the Kyoto criteria, the Milan criteria, or previous treatments for HCC. Tumor biological aggressiveness, including microvascular invasion and histological differentiation, according to selection criteria was also examined.

Results: The 5-year overall survival rate for patients within the Kyoto criteria (n = 147, 82.3%) was significantly higher than that for the 49 patients exceeding them (n = 49, 42.2%) (p < 0.001). The 5-year recurrence rate for patients within the Kyoto criteria (4.4%) was significantly lower than that for patients exceeding them (51.0%) (p < 0.001). Intention-to-treat analysis of the 62 patients who underwent LDLT after implementation of the Kyoto criteria showed that the 5-year overall survival rate and the recurrence rate were
81.5% and 6.5%, respectively. Tumor biology was significantly less aggressive in patients within the Kyoto criteria.

Conclusions: The Kyoto criteria are useful expanded criteria for LDLT for HCC and could help achieve favorable outcomes.

PPL26-059
USEFULNESS OF THE THREE-DIMENSIONAL (3D) PRINTED LIVER MODEL IN HEPATIC SURGERY: A NEW SIMULATION AND NAVIGATION SYSTEM

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Introduction: Three-dimensional (3D) analysis has enabled preoperative simulation and intraoperative navigation in liver surgery. However, the 3D images were demonstrated only on the 2D monitor. Recently, we became able to make a 3D liver model with vascular structures and tumors by a 3D printer. Herein, we present simulation and navigation using 3D printed liver models in liver surgery.

Method: Preoperative CT images were reconstructed in a 3D configuration, including the liver parenchyma, portal vein, hepatic vein, and tumors. A transparent liver model with precise internal structures was made by a 3D printer. Preoperatively, the surgeons simulate surgical procedures using the 3D model for a hand and acquire a real image inside the liver. Intraoperatively, liver resection is performed according to navigation using the 3D liver model in a sterilization bag.

Results: Two types of 3D model were made by 3D printer, i.e. whole liver type and detachable type. Whole liver type was adapted to extended right hepatectomy for a patient with large metastatic tumors in the right liver and the caudate lobe. Preoperatively, we could get the 3D position of the tumors and vessels and image of the liver transection surface. A detachable type was adapted to anatomical liver resection of the segment 8 for a patient with hepatocellular carcinoma. Preoperatively, we could detach the segment 8 from the 3D liver model and observe the transection surface. In both types, planed liver resections were successfully carried out by the simulation and navigation using 3D printed model.

Conclusions: 3D printed liver model is useful in liver surgery, and it can be a new system for pre-operative simulation and intra-operative navigation.

PPL26-060
LAPAROSCOPIC MANAGEMENT OF CYSTIC DISEASE OF THE LIVER

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Introduction: Cystic disease of the liver can occur in isolation or in combination with polycystic disease of the kidney. The treatment of symptomatic liver cysts has evolved from an open surgical procedure to a laparoscopic approach.

Method: Retrospective review of 58 patients managed by a single surgeon from 2000 to 2013. Analysis was performed to compare and contrast with the previously reported Pittsburgh series.

Results: All surgically resected patients underwent either subtotal cystectomy or a total resection for lesions with suspicious cyst linings. Median age of patients was 61 years of age, BMI of 27, with 19% being obese (>35) with an ASA of 3. The median cyst size was 10.8 cm. In the 54 laparoscopic patients, 42% underwent major hepatic resection (formal lobe) with a median resection of 3 segments in the full cohort. Resection required hand-assist in 60% of cases with a median operative time of 120 min, 100 cc blood loss and 12 staple loads. A total of 5 cystadenomas were encountered. Four cases early in the cohorts experience were approached via an open technique for suspected cystadenoma and complexity. Incidence of complications was 11% (bile leak n = 3, pulmonary n = 2, ileus n = 2).

Conclusions: This experience confirms laparoscopic resection is the gold standard for the management of hepatic cysts. In our experience open resection was rapidly abandoned for laparoscopy. An early incidence of bile leak was identified and addressed by deployment of staplers for cyst wall transection. Both series confirm a laparoscopic approach can be utilized with a low incidence of complications and recurrence.
Results: Glutamine decreased the CRP response in liver resection in a statistically significant manner (p = 0.028) on the fifth post operative day. This may signify that glutamine decreases the post operative inflammatory response associated with liver resection. Glutamine did not have any significant effect on liver function tests. Postoperative morbidity was less in patients who received glutamine.

Conclusions: CRP response was blunted in patients who received glutamine postoperatively. Decrease in morbidity following glutamine administration is an attractive area of prospective research and requires further trials involving larger patient groups along with consideration of additional immunoreactive-nutritional parameters.

PPL26-062
OPEN VERSUS LAPAROSCOPIC TREATMENT FOR CYSTIC HYDATID DISEASE OF LIVER: A 6-YEAR SINGLE-CENTER EXPERIENCE

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Introduction: Recently, with the introduction of minimal invasive technique into hydatid surgery, increasing number of laparoscopic surgical practice was reported with promising results. But there are still some controversies in terms of the safety and efficacy of laparoscopic treatment. Herein, we present a comparative result of both open and laparoscopic treatment in the context of a 6-year single-center experience.

Method: A Total number of 686 patients with cystic hydatid disease underwent surgery in our center during May 2005 to December 2011. Among them, 353 patients were eligible for this study with the following exclusion criteria: unfit for general anesthesia, previous upper abdominal surgery, intra-biliary ruptured cyst, intra-parenchymal located cyst, recurrent cyst, multiorgan cyst, cyst located in segment 1 and 7, and cyst larger than 15 cm in size. Operative morbidity and mortality, hospital stay, and recurrence rate were measured.

Results: Among 353 eligible patients, 60 were considered for laparoscopic approach and 293 for open approach. In laparoscopic group, 24 cystectomies, 26 pericystectomy and hepatectomy in 10 patients. However, 181 cystectomies, 101 pericystectomies and 11 hepatectomies were carried out in open group. Operative time was significantly decreased in laparoscopic group. Postoperative hospital stay was significantly short in laparoscopic group (3.8 ± 1.2 days) than that in open group (7.4 ± 1.4 days). The overall morbidity was 13.3% (8/60) in laparoscopic and 19.8% (58/293) in open group without significance. Neither major blood loss nor blood transfusion occurred. Both conversion rate and mortality was 0%. One recurrence in laparoscopic and 5 in open group was occurred during follow-up.

Conclusions: Laparoscopic treatment of liver hydatid disease seems to be safe and effective in selected patients and offers all the advantages of laparoscopic surgery. Large, prospective and randomized trials are strongly needed to determine a universally accepted standard technique.

PPL26-063
CASE REPORT AND LITERATURE REVIEW OF NONALCOHOLIC FATTY LIVER DISEASE ASSOCIATED HEPATOCELLULAR CARCINOMA

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Introduction: NAFLD is a metabolic stress-induced liver injury that is closely related to insulin resistance and genetic susceptibility. It has now become one of the most common liver diseases. Recent studies found that, as the disease evolves, NAFLD may gradually progress into nonalcoholic steatohepatitis (NASH) related liver fibrosis, cirrhosis and HCC. Two cases of NAFLD associated HCC were encountered in China-Japan Friendship Hospital during the period from December 2010 to September 2011. To analyze the clinical characteristic of non-alcoholic fatty liver disease (NAFLD) associated hepatocellular carcinoma (HCC).

Method: The clinical features, imaging presentation, pathological types and treatment outcome of two cases with NAFLD associated HCC were studied.

Results: The two cases were both young and obese male, with different CT findings from typical HCC and both reported well-differentiated adenocarcinoma pathologically. Both patients underwent surgical resection and were followed-up post-operatively for 24 months and 14 months respectively, with no sign of recurrence or metastasis.

Conclusions: NAFLD associated HCC has different clinical presentation from the typical HCC. Incidental finding of any liver occupying lesions in NAFLD patients should warrant immediate clinical attention.

PPL26-064
DUAL TREATMENT: A NOVEL STRATEGY FOR HIGHLY-ADVANCED HEPATOCELULAR CARCINOMA

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Introduction: The selection criteria for the treatment of highly-advanced hepatocellular carcinoma (HCC) is still controversial, and its therapeutic efficacy is unsatisfactory. Conversely although survival benefit of surgical resection for these cases have not been reported yet, portal vein (PVTT) or IVC (IVC/T) tumor thrombus is an life-limiting factor and accordingly surgery is selected as a treatment option in the hope of long-term survival. Previously we aggressively performed surgical resection and thrombectomy for these patients.
However with longer survival time after surgery, intra-hepatic recurrence often developed in the remnant liver. From this experience, we developed a novel strategy for highly-advanced HCC patients; dual treatment.

**Method:** At the first stage, we performed surgical resection including thrombectomy (reduction surgery). Within a month we performed percutaneous isolated hepatic perfusion (PIHP) as the second stage for the prevention of recurrence. PIHP is a high-dose regional chemotherapy we developed at our facility. With PIHP, we could administer cytotoxic agents at a dose up to 10 times while reducing the side effect of the agents from the entire body.

**Results:** Until December 2012, we treated 95 cases with dual treatment and completed in 85 cases. Among them 32 cases were categorized in vp4 stages. More than 70% patients were performed lobectomy at the first stage. Twenty-three (27.1%) patients showed complete response, 36 (42.4%) showed a partial response, 15 (17.6%) showed no response, and 11 (12.9%) showed progressive disease. Response rate was 69%, and survival rate of the 85 patients were 73% (1-year), 31% (3-year), and 24% (5-year) respectively.

**Conclusions:** Dual treatment could achieve median and long-term prognosis, indicating that this would be a novel strategy for highly-advanced HCC.

**PPL26-065**

**NEO-ADJUVANT CHEMOTHERAPY AND PRIMARY-FIRST APPROACH FOR RECTAL CANCER WITH SYNCHRONOUS LIVER METASTASES**

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**Introduction:** Up to a quarter of patients with rectal cancer have synchronous liver metastases at the time of diagnosis. This is a predictor of poor outcome. There are no standardized guidelines for treatment. We reviewed the outcomes of our patients with synchronous rectal liver metastases treated with a curative intent by neo-adjuvant chemotherapy with or without chemoradiotherapy followed by resection of primary tumor and then liver metastases.

**Method:** Between 2004 and 2012, patients who presented with rectal cancer and synchronous liver metastasis were treated with curative intent by neo-adjuvant chemotherapy with or without chemoradiotherapy followed by resection of primary tumor before the progression of further micrometastases. Furthermore, patients that do not respond to chemotherapy can be identified and may avoid major surgical intervention.

**Conclusions:** Rectal resection before hepatic resection, combined with perioperative chemotherapy is associated with promising clinical outcome. It allows down-staging of liver lesions and removal of the primary tumor before the progression of further micrometastases. Furthermore, patients that do not respond to chemotherapy can be identified and may avoid major surgical intervention.

**PPL26-066**

**A MODIFIED SUGIURA PROCEDURE FOR CONTROL OF VARICEAL BLEED**

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**Introduction:** A proportion of patients with variceal bleed need surgical intervention. This study evaluated a modified gastro-esophageal decongestion combined with esophageal stapling (MGEDEST) procedure in controlling variceal bleed after endoscopic therapy.

**Method:** A MGDEDEST procedure was performed in 62 patients with acute variceal bleeding that could not be controlled by endoscopic therapy or with a history of massive bleed after endoscopic therapy.

**Results:** Perioperative mortality occurred in 1.6% (1/62) patient. No esophageal leak or stenosis occurred. Six months after operation, esophageal varices disappeared in 78.7% (48/61) patients, diminished in size in 18% (11/61), remained unchanged in 3.3% (2/61); Fundal gastric varices disappeared in 98.4% (60/61) patients, diminished in size in 1.6% (1/62). The rebleed rate was 0, 3.27% (2/61) and 6.56% (4/61) in 6 months, 3 years and 5 years, respectively.

**Conclusions:** The MGDEDEST procedure is safe and effective for long-term control of variceal bleed after endoscopic therapy.

**PPL26-067**

**SHORT-TERM POSTOPERATIVE OUTCOME OF CENTRAL HEPATECTOMY FOR CENTRALLY LOCATED HEPATOCELLULAR CARCINOMA**

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**Introduction:** For the treatment of centrally located hepatocellular carcinoma (HCC) at Couinaud’s segment 4, 5, and 8, central hepectomy including central bisectionectomy, right anterior sectionectomy, and left medial sectionectomy can preserve more nontumorous parenchyma than conventional hemihepatectomy or trisectionectomy. However, meticulous surgical techniques are indispensable in central hepectomy to perform 2-sided broad hepatic parenchymal transection and to reduce the risks of intraoperative bile duct injury or postoperative bile leakage attributable to the extended exposure of Glisson’s pedicle at the hepatic hilum.
Method: From a single institution liver surgery database for HCC between January 2006 and June 2013, 17 patients undergoing central hepatectomy (Central group) and 41 patients undergoing other types of anatomical resection (Non-central group) were identified, and perioperative variables were retrospectively analyzed and compared between the 2 groups.

Results: The Central group consisted of 4 central bisegmentectomy, 11 right anterior sectionectomy and 2 left medial sectionectomy. As for preoperative liver function, the Non-central group had a higher Child-Pugh score (5.4 vs. 5.0, p = 0.01) and lower KICG value (0.137 vs. 0.159, p = 0.047). The Central group had an increased operative time (503 minutes vs. 400 minutes, p = 0.014), but blood loss, transfusion rate, postoperative liver function, and complication rates including posthepatectomy liver failure and bile leakage were equivalent between the 2 groups, resulting in the similar hospital stay.

Conclusions: Although central hepatectomy is technically more demanding, it provides a similar short-term postoperative outcome as other types of anatomical resection.

PPL26-068
A CASE OF PRIMARY CARCINOSARCOMA OF THE LIVER UNDERGOING CENTRAL BISECTIONECTOMY.

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Introduction: Carcinosarcoma of the liver is a very rare malignant tumor worldwide containing an intimate mixture of carcinomatous and sarcomatous elements. The terminology and pathogenesis of hepatic carcinosarcoma remain controversial issues.

Method: We experienced a case of 70-year-old male who complained of GERD with liver dysfunction and jaundice. Hepatitis B and C markers showed negative. CT and MRI demonstrated a well-vascularized multinodular huge mass combined with calcification of 15 cm in size at segments 4-5 and 8 as well as intrahepatic bile duct dilatation. Neither clear distant metastases nor vessel thrombi were observed. Tumor marker such as AFP and PIVKA-II were extremely high level, and diagnosed hepatocellular carcinoma. Child-Pugh score was B at the diagnosis and the risk of liver failure was expected after surgery, although patient desired to be done a surgery.

Results: We underwent central bissectionectomy as surgically curative operation. Child–Pugh score was changed to C during the evaluation period for a month, though. Pathological findings revealed a tumor contained a carcinomatous element showing positive immunohistochemical (IHC) markers of CK, Hepatocyte and AFP, and a sarcomatous element showing positive IHC markers of Vimentin, CD68 and SMA, and diagnosed carcinosarcoma of the liver. Ki-67 labeling index was 20% at carcinomatous element and 80% at sarcomatous element. Moderate and mild grade of infiltration to portal vein and hepatic vein were observed, respectively. No clear complication was occurred during hospitalization, however, local recurrence, pleural and peritoneal dissemination were observed on CT 64 days following surgery. The patient died 72 days after surgery. Autopsy revealed all recurrence and metastases lesions were consisted of sarcomatous element.

Conclusions: The prognosis of this neoplasm is extremely poor which may be largely due to the advanced stage of disease at the time of clinical presentation. Early detection and treatment with radical resection may improve the outcome of this disease.

PPL26-069
SURGICAL STRATEGY FOR PERITONEAL DISSEMINATION OF HEPATOCELLULAR CARCINOMA (HCC)

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Introduction: Even in the patients with advanced stage, peritoneal dissemination of HCC is rare. Although the recent improvements of the treatment for HCC such as surgical operation and radiofrequency ablation are remarkable, the proper treatment for peritoneal dissemination has not been established. In this paper, we would focus on the nine cases and discuss on the particular features of HCC with peritoneal dissemination.

Method: Five hundred and eight cases of HCC were treated from April, 2000 to August, 2013 in our department. Tokyo medical and dental university hospital. The nine cases (9/580; 1.5%) of peritoneal dissemination were treated with the surgical operation. The five of nine was male and others were female. The average age was 66.4 years old. Tumor markers were elevated in all cases.

Results: Seven of 9 cases had previous treatment including 2 cases of ruptured HCC, one had lung metastasis to be resected and the other has multiple resections. Only one case has no previous treatment. In 7 cases, there was no intrahepatic lesion at the end of the surgical procedure for peritoneal disseminations. Case Report; A 74-year-old male diagnosed with ruptured HCC in the right lobe was underwent emergency TACE followed by right hepatectomy. After initial treatment, repeat operation was performed during several years. In the latest operation, the upper mediastinal lymph nodes metastasis was resected followed by resection of peritoneal dissemination.

Conclusions: Even in cases of peritoneal dissemination, repeat surgical procedure is also possible and one of the effective strategies. Peritoneal dissemination of HCC has some clinical features different from other GI cancers in terms of growth rate. Since it’s difficult to be enclosed in a single category, it is necessary to carefully consider the strategy of treatment for each case.
PPL26-070
SPONTANEOUS NECROSIS OF HEPATOCELLULAR CARCINOMA
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Introduction: We present a rare case of hepatocellular carcinoma (HCC) in which spontaneous necrosis was confirmed with surgical resection.

Method: A 64-year-old man began to be treated with PEG-Interferon and Ribavirin because of chronic hepatitis C on October 2011, and HCV-RNA was turned negative 12 weeks later. When he stopped the treatment because of pancytopenia 53 weeks after, abdominal CT scan revealed a hypovascular mass measuring 41 mm at anterior segment of liver. We diagnosed the lesion as HCC and performed a right hemihepatectomy on December 2012.

Results: On macroscopic examination, the tumor was yellow, firm with fibrous capsule. Histopathological examination showed that the tumor in cirrhotic liver had been completely replaced by central coagulative necrosis infiltrated by inflammatory cells. This tumor was surrounded by capillary vessels and was fed with several thick arteries, but organized thrombi in the hepatic artery were not detected. No viable HCC cells were found in this tumor. The patient was discharged 20 days after the operation.

Conclusions: Spontaneous regression of HCC was reported to be a rare event with a rate of 1 in 14,000 cases of HCC. It is said that thrombosis of feeding vessels, deprivation of oxygen or noxious agents have relation to this change, but the mechanism is still unclear.

PPL26-071
PROLONGED CHEMOTHERAPY AND OXALIPLATIN IMPAIR LIVER HYPERTROPHY AFTER PORTAL VEIN OCCLUSION
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Introduction: The volume of the future liver remnant (FLR) is clearly a predictor of postoperative hepatic dysfunction. The rate of liver hypertrophy after portal vein occlusion (PVO) predicts FLR function, representing an important “liver stress test”. The aim of the study is to identify factors affecting liver hypertrophy after PVO.

Method: Inclusion criteria were patients affected by metastatic liver disease scheduled for preoperative PVO (portal vein embolization or ligation) between 01/2000 and 06/2013 at the two institutions. Patients scheduled for ALPPS procedure were excluded. PVO was scheduled whenever FLR volume was <30%. The standardized FLR volume was assessed by volumetric CT-scan. Liver hypertrophy was assessed by volumetric increase [(FLR post% – FLR pre%)/FLR pre %].

Results: 118 patients were analyzed (71 males, median age 62.5 years); 63 (53%) were scheduled for a two-stage hepectomy. The median FLR before PVO was 23.6 ± 6.2%. PVO included 82 (69%) right portal vein embolizations (extended to Sg4 in 4) and 36 (31%) right portal vein ligations. 74 (63%) patients received chemotherapy before PVO (median 6 cycles) and 14 (19%) after PVO (median 3.5 cycles). Chemotherapy included oxaliplatin in 36 (49%) patients, irinotecan in 28 (38%), both in 4 (5%) and other drugs in 6 (8%). Bevacizumab was associated with chemotherapy in 32 (43%) patients. The median FLR after PVO was 34.6 ± 7.8% and the median volumetric increase was 0.46 ± 0.38. Five (4.2%) patients didn't undergo the planned operation because of disease progression. At univariate analysis, volumetric increase negatively correlated with prePVO chemotherapy, prePVO chemotherapy ≥8 cycles, oxaliplatin-based regimen and FLR prePVO >20%. Bevacizumab and postPVO chemotherapy didn't affect liver hypertrophy. At multivariate analysis prePVO chemotherapy ≥8 cycles (OR 5.3, p = 0.025), oxaliplatin-based chemotherapy (OR 3.5, p = 0.040) and FLR >20% (OR 0.023, p < 0.001) were independent predictors of lower hypertrophy.

Conclusions: Prolonged chemotherapy (≥8 cycles) and oxaliplatin-based regimen impair liver hypertrophy after PVO. Small FLR before PVO doesn’t preclude an adequate liver hypertrophy.

PPL26-072
LAPAROSCOPIC VERSUS OPEN LIVER RESECTION FOR ELDERLY PATIENTS WITH MALIGNANT LIVER TUMORS: A SINGLE CENTER EXPERIENCE.
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Introduction: It remains unclear if the short-term benefits of laparoscopic liver resection could be safely applied to elderly patients with medical co-morbidities. The aim of our study was to evaluate the perioperative outcomes of laparoscopic liver resection in patients with advanced age.

Method: Patients aged ≥70 years old who received liver resections for malignant liver tumors between Jan 2002 and Dec 2012 were included. The perioperative outcomes of 17 patients with laparoscopic approach were matched and compared with 34 patients with conventional open approach in a 1:2 ratio.

Results: There was no significant difference with regard to age, gender, incidence of co-morbid illness, hepatitis B positivity and Child grading of liver function. The median tumor size was 3 cm for both groups. The types of liver resection were similar between the two groups with no significant difference in the duration of operation (laparoscopic: 195 minutes vs open: 210 minutes, p = 0.436). The perioperative blood loss was 150 mL in the laparoscopic group and 330 mL in the open group (p = 0.046) with no significant difference in the number of patients with blood transfusion. The rate of recovery in liver function between the two groups
was also not significantly different in terms of the serum levels of bilirubin and aspartate aminotransferase, which tended to be normalized from postoperative day 3 onwards. The duration of hospital stay was 6 days (3–15 days) for the laparoscopic group and 8 days (5–105 days) for the open group (p = 0.005).

Conclusions: Laparoscopic liver resection is safe and feasible for elderly patients with lesser blood loss and shorter hospital stay when compared with the open approach.

PPL26-073
LIGATING THE CORRESPONDING INFLOW AND OUTFLOW VESSELS DURING HEPATECTOMY: A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL AND ANIMAL STUDY
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Introduction: Innovation of the surgical procedure for improving prognosis of primary hepatocellular carcinoma (HCC) is under emergency request. We have devised a simple bleeding control technique ligating the corresponding inflow and outflow vessels without hilus dissection before the parenchyma transection during hepatectomy, and have identified its feasibility, security and efficacy. However, the prognosis of this technique is still unknown. The main objective of this study is to investigate the role of this simple technique on postoperative metastasis and long term survival.

Method: During the past 10 years, 330 patients with primary HCC were performed hepatectomy with the new hemorrhage control technique, and prospective randomized controlled trial (RCT) was applied. We further applied a mice model ligating the pedicle of the lesion-located hepatic lobe before hepatectomy to imitate the clinic practice, and evaluated the role of the new technique on postoperative metastasis and survival.

Results: The new technique prolonged postoperative overall and disease-free survival for patients with primary HCC. In the animal model, hepatectomy with the new technique showed lower intrahepatic metastasis, lung metastasis, abdominal implantation metastasis and incision metastasis, and longer overall and disease-free survival when compared with conventional surgery. Tumour thromboses were detected either in the portal veins or bronchial arteries. Human specific-AFP expressed at a high level in the serum of the metastasis bearing mice, but not expressed in metastasis-free mice.

Conclusions: Ligating the inflow and outflow vessels of the lesion-located hepatic lobe before hepatectomy reduces postoperative metastasis and prolongs survival of primary HCC. These results also indicate a potential mechanism that the new technique prevents hematogenous metastasis owing to its coincidence to principles of oncological surgery to avoid the intraoperative spread of tumour cells during hepatectomy.

PPL26-074
EVALUATION AND ANALYSIS OF THE DEPARTMENT OF HEPATOBILIARY SURGERY, ICU NURSING WORKLOAD BY USING TISS-76
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Introduction: To evaluate the nursing workload in the department of hepatobiliary surgery ICU by using the TISS-76.

Method: The total TISS score for the 7 day of the week and every different shifts of TISS score were measured and compared.

Results: There was no significant difference in the nursing workload between different working days for 1 week; there was no significant difference between day and night work (p > 0.05), there was significant difference between eve night shift and before dawn shift and there was significant difference between day shift and before dawn shift (p < 0.01).

Conclusions: Nursing managers should adjust the nursing human resources in the weekend and at night according to the characteristics of special ICU in order to meet the needs of nursing workload.
whereas one patient underwent surgery in emergency setting. Patients treated by laparoscopy were younger, presented smaller hepatic lesions and underwent mainly minor resections. Operatively, open and laparoscopic liver resections did not differ, except for the number of pedicular clamping that was significantly higher in the open resection group (50% vs 27%; p = 0.04). Three laparoscopic right hepatectomies (8.3%) were converted to open due to technical difficulties. Post-operative complication rate was similar between open versus laparoscopic groups. Mortality was nil. In two patients, atypical lesions borderline HCA/hepatocellular carcinoma were found.

**Conclusions:** Open and laparoscopic liver resections are alternative approaches for the surgical management of HCA. Open resection is indicated for major hepatectomy whereas laparoscopy is safe and feasible for isolated lesions requiring limited resections.

**PPL26-077**

STREAMLINE FLOW OF PORTAL VEIN AFFECTS THE LOBAR DISTRIBUTION OF COLORECTAL LIVER METASTASES AND HAS A CLINICAL IMPACT ON SURVIVAL

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**Introduction:** There is an understanding that blood flow from superior mesenteric vein and splenic vein mix incompletely in the portal vein and maintain a streamline flow influencing its anatomic distribution. Although, several experimental studies demonstrated the existence of streamlining, clinical studies showed conflicting results. We investigated whether streamlining of portal vein affects the lobar distribution of colorectal liver metastases and estimated its impact on survival.

**Method:** Data of histologically verified colorectal liver metastases were retrospectively collected from Samsung medical center database. Chi-square test and Cox analysis were used to analyze the difference in lobar distribution and risk factors for survival, respectively. Fisher’s exact test was additionally used for analyzing the difference in hepatic recurrence in the remnant liver after right hemihepatectomy for solitary liver metastasis.

**Results:** A total of 410 patients underwent hepatectomy for colorectal liver metastases. Right to left ratio of liver metastases were 2.20:1 in right-sided colon cancer and 1.39:1 in left-sided colorectal cancer (p = 0.017). Cox analyses showed that margin<5 mm (p < 0.001, HR = 2.837), age ≥ 60 (p = 0.004, HR = 2.149), N2 status (p < 0.001, HR = 2.595), tumor size ≥ 45 mm (p = 0.014, HR = 2.087) and additional distant metastasis (p = 0.012, HR = 2.722) were risk factors for survival, while primary tumor location was not (p = 0.485). However, subgroup analysis including 70 patients who underwent right hemihepatectomy for solitary metastasis showed that left-sided cancer was a risk factor for survival (p = 0.019, HR = 4.818). Fisher’s exact test revealed that patients with left-sided cancer had more hepatic recurrence than right-sided cancer (43.1% and 15.8%, respectively, p = 0.049) in these 70 patients.

**Conclusions:** This study showed significant difference in lobar distribution of colorectal liver metastasis. Furthermore, survival of left-sided colorectal cancer was poorer than the right in patients who underwent right hemihepatectomy for solitary metastasis. These findings can be helpful for clinicians plan the treatment strategy.

**PPL26-078**

SINGLE SMALL LIVER SIMPLE CYST INCREASED IN A SHORT PERIOD AND MIMICKED A COMPLEX TYPE A CASE REPORT

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**Introduction:** Liver simple cyst is benign disease, particularly single small cyst is thought it never grow up in decade. But very rarely it become large (>4 cm), which sometimes present several symptoms and problems in distinguishing from pathological cystic diseases of liver. We experienced a single small cyst had become large one in only 5 years without any symptoms, which mimicked a complex type.

**Method:** Case report.

**Results:** A 64-year-old female was diagnosed as having cholecystolithiasis and a single liver simple cyst of 2 cm in diameter in lateral sector by CT in 2005. She had no other congenital cystic disease. Until 2007, CT revealed no change of cyst in size and shape. In 2012, in order to observe asymptomatic cholecystolithiasis, CT and MRCP were done. This CT demonstrated the cyst apparently increased to more than 6 cm in diameter. MRCP revealed heterogeneous content and septum formation of cyst and small mural nodules inside. Ultrasound couldn’t show neither mural nodule nor septum formation. Although these discrepancies among imaging diagnoses were existed, we performed surgical resection because this simple cyst apparently increased during only 5 years and had possibility of neoplastic potential. Due to its proximity of umbilical portion of left portal vein, left liver resection was done. Macroscopically it was 6 × 5×3 cm unicocular cyst containing clear liquid, and had no mural nodule. Histological examination revealed single columnar epithelium without any cellular atypia of cyst wall, which diagnosed it simple cyst.

**Conclusions:** Simple small cyst could grow up to large one in only 5 years without any symptoms and etiology. Moreover, there is seldom that the evolutional change in a short period from small to large simple cyst like our case had been reported.
FOLATE-PEI600-CYCLODEXTRIN NANOPOLYMER VECTOR IMPROVES THE THERAPEUTIC EFFICACY OF ALPHA-FETOPROTEIN PROMOTER-MEDIATED TBID GENE THERAPY IN HEPATOCELLULAR CARCINOMA (HCC)

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Introduction: Treatment for advanced HCC remains suboptimal. We previously reported the application of Ad/AFP-tBID, which over-expresses tBID controlled by the human alpha-fetoprotein (AFP) promoter, was effective against AFP-producing HCC cells in vitro and in vivo. However, due to the potential safety issues of the adenovirus vector, we have to search for safer and more effective gene constructs and delivery systems.

Method: A total of 15 different AFP genotype transcriptional regulatory sequences were cloned based on human AFP promoter variants found. We then chose the promoter variant (EA4D) with the highest luciferase activity to construct a new gene therapy agent using Folate-PEI600-cyclodextrin nanopolymer vector (H1), pGL3-Basic and the tBid sequence. Such agent is named in short as ‘H1-pGL3-EA4D-tBid’. The effects of H1-pGL3-EA4D-tBid were tested in 6 cell lines including Hep3B, HepG2, Huh-7, Bel7402, SK-Hep-1 and A549 as well as HCC xenograft-bearing nude mice.

Results: H1-pGL3-EA4D-tBid was effective against AFP-producing HCC cells. In the cell culture, H1-pGL3-EA4D-tBid was able to significantly reduce HCC cell growth and proliferation by inducing apoptosis. In HCC xenograft-bearing nude mice, H1-pGL3-EA4D-tBid markedly inhibited the growth of HCC tumor compared with the control. Importantly, in all these experiment, we did not observe any obvious toxicity towards normal cells and there were no damage to liver and renal function. Furthermore, H1-pGL3-EA4D-tBid significantly sensitized cultured HCC cells to sorafenib. In the presence of H1-pGL3-EA4D-tBid, the dose of sorafenib can be significantly reduced when compared to sorafenib alone; in achieving the same cytotoxic effect to HCC cells.

Conclusions: H1-pGL3-EA4D-tBid, a novel nanoparticles-based delivery system that coupled with a construct with the improved AFP promoter activity, can be used to specifically target and effectively suppress the AFP-producing HCC. By sensitizing the HCC cells to sorafenib, H1-pGL3-EA4D-tBid may help minimize the side effects through the use of smaller dose of sorafenib.

SURVIVAL AFTER REHEPATECTOMY OR RADIOFREQUENCY ABLATION (RFA) FOR RECURRENT HEPATOCELLULAR CARCINOMA (HCC) – A RETROSPECTIVE COHORT STUDY

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Introduction: Optimal management of post-hepatectomy recurrence of HCC is yet to be determined. This study aims to review the outcomes after rehepatectomy or RFA in this group of patients.

Method: This is a retrospective review of patients with recurrent HCC ≤5 cm after initial hepatic resection who underwent rehepatectomy or RFA. Data was retrieved from a prospectively collected database of HCC treated from April 2004 to July 2012. Survival between the cohorts were compared and multivariate analysis performed to identify factors associated with recurrence.

Results: Eighteen and 20 patients underwent rehepatectomy and RFA respectively, with median follow-up of 32 months. The mean age was 57.4 with male predominance (4.4:1). The ASA score were similar between the two groups. All but four patients in RFA group were hepatitis B carrier, and all had Child-Pugh grade A cirrhosis. During the first operation, 77.8% and 75.0% of patients underwent minor hepatectomy (<2 segments) in the rehepatectomy and RFA groups respectively (p = 0.841). Most patients had solitary intrahepatic recurrent HCC (83.3% vs 80.0% for rehepatectomy and RFA respectively, p = 0.791) with median size of 2.0 cm in both groups (p = 0.649). Percutaneous approach was used in 80% of patients in RFA group. Only two patients in the rehepatectomy group experienced post-operative pleural effusion, there was no complication in the RFA group. There is a non-significant trend towards improved disease free survival after rehepatectomy (Median DFS – 28.4 months vs 10.7 months, Log Rank test p = 0.051). There was also an apparent improvement in overall survival but the median survival has not been reached yet. Upon multivariate analysis, treatment allocation to RFA was the only independent predictor of further disease recurrence (p = 0.049).

Conclusions: With appropriate patient selection, rehepatectomy can improve the long term outcome of the recurrent HCC by reducing further recurrence as compared with RFA, with low morbidity and mortality.
PPL26-081
THE EFFECT OF TRANSARTERIAL RADIOEMBOLIZATION WITH YTTRIUM 90 FOR UNRESECTABLE HEPATOCELLULAR CARCINOMA
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Introduction: To study the effect of transarterial radioembolization with Yttrium 90 for unresectable hepatocellular carcinoma (HCC).
Method: From 1-12-2006 to 31-12-2012, all patients referred for Yttrium 90 (Y90) treatment due to unresectable HCC were reviewed. Patient’s demographic data, Child-Pugh’s score, tumour characteristics, portal vein status and treatment outcome of Y90 were analysed.
Results: There were 46 patients in our series and the mean age was 65.3. Majority (37 patients) of our patients had Child’s A liver disease and most (24 patients) of our patients had diffuse tumour involvement. The mean sum of the diameters in the 2 biggest tumours was 12.0 cm (SD 6.3 cm). Absence of portal vein invasion was seen in 27 patients, right or left portal vein invasion in eleven patients and main portal vein invasion in eight patients. Yttrium was given to 30 patients. Coil embolization was performed in thirteen patients. After Y90, the mean survival and standard error were 679 days (148 days) in Child’s A patients, and 168 days (100 days) in Child’s B patients (p = 0.023). The survival was 776 days (197 days) for patients without portal vein invasion, and 299 days (133 days) for patients with portal vein invasion (p = 0.036). For those with portal vein invasion, the survival after MAA assessment date was 311 days (132 days) if Y90 could be given, it became 114 days (16 days) if Y90 was contraindicated. Child Pugh’s score, portal vein status and Y90 treatment were independent variables affecting survival. Complications of treatment included 3 irradiation induced gastritis, 1 arterial dissection making Y90 not possible, and 1 alcohol withdrawal syndrome and death 9 days after Y90.
Conclusions: Y90 is able to prolong survival in patients suffering from unresectable HCC. The complication profile was acceptable. Child Pugh’s score, portal vein status and treatment with Y90 were shown to be the independent variable affective survival.

PPL26-082
SHOULD NODAL STATUS OF THE PRIMARY TUMOR CONTRAINDICATE RESECTION OF SYNCHRONOUS COLORECTAL LIVER METASTASES?
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Introduction: A poor survival has been reported after simultaneous resection of colorectal primaries with 4 or more lymph node metastases and synchronous liver metastases with no 5-year survival. But primary’s nodal status is not available preoperatively. This study focused on preoperative criteria that could select candidates for simultaneous resection.
Method: From 1998 to 2012, 163 patients underwent both primary resection and liver resection for synchronous liver metastases at our institution, either simultaneous (n = 57) or delayed (n = 106), with available complete pathological examination. Studied preoperative criteria included age, sex, carcinoembryonic antigen level, number of liver metastases at diagnostic, maximal size of liver metastases, site of primary cancer (colon or rectum), uni- or bilateral metastases, prehepatectomy chemotherapy and performance of a major hepatectomy. Pathological characteristics of the primary tumor were also collected, such as depth of wall invasion, presence of lymph node metastases, vascular and perineural invasion. Uni- and multivariate analyses were performed.
Results: At univariate analysis on the whole population, resection of two or more liver metastases was the only preoperative predictive factor with a 37% 5-year survival compared to 68% for single metastasis (p = 0.007), but was neither significant on multivariate analysis nor predictive in the simultaneous resection group. Regarding primary tumor, the number of lymph node metastases was not significantly correlated with 5-year survival, seeing that patients with 4 or more lymph node metastases had a 51% 5-year survival versus 48% (ns) for the whole population as well as for the simultaneous resection group (63% vs 73%, ns).
Conclusions: The number of lymph node metastases of the primary cannot be used to contraindicate simultaneous or delayed resection of synchronous liver metastases since this histological data is not available preoperatively and does not seem to significantly impact overall survival when upfront liver resection is technically possible.

PPL26-083
INCIDENCE OF CLINICALLY SYMPTOMATIC DEEP VEIN THROMBOSIS (DVT) AND PULMONARY EMBOLISM (PE) IN LIVER RESECTION PATIENTS WITHOUT PHARMACOLOGICAL PROPHYLAXIS
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Introduction: The perceived risk of bleeding after liver resection has limited the use of medical pharmacologic thromboprophylaxis to prevent deep vein thrombosis (DVT). Recently, it is evident that liver resection can unbalance haemostatic equilibrium towards hypercoagulable state and cirrhotic patient is not protective from thrombotic risk.
Method: A retrospectively reviewed of all patients undergoing liver resection operations in Tan Tock Seng Hospital, Singapore from January 2010 to August 2013 was performed and those developing DVT and PE was highlighted. In addition, the radiology database (RADWED) was reviewed to ensure or computed tomography. Patients with pharmacological prophylaxis were excluded from the study.

Results: Eighty-eight patients (67 male and 21 female) with a mean age of 62 years underwent liver resection operations either wedge resection, segmentectomy (up to 2 segments) or hemihepatectomy during the study period. A major hemihepatectomy was performed in 35 patients (39.7%). 18 patients had wedge resection (20.5%) and 35 patients had segmentectomy (39.8%). Indication of liver resection are hepatocellular carcinoma 49 patients, colorectal liver metastases 29 patients, 2 Klatskin Tumour, 2 gallbladder carcinoma, 1 gastric carcinoma with liver invasion, 1 pancreatic neuroendocrine tumour, 3 hepatic haemangiomia and 1 focal nodular hyperplasia. Thrombotic complications were seen in 1 patient in hemihepatectomy group (2.86%) with radiologically evident. There is no DVT or PE in wedge resection or segmentectomy group (0%). All patients have TED stocking post-operatively.

Conclusions: Majority of liver resection patients without pharmacological prophylaxis do not have clinically symptomatic thromboembolism events despite on TED stocking only. It is still uncertain whether the benefits of pharmacologic prophylaxis outweigh risk of bleeding in liver resection patients especially in Asian population and further case-control study is suggested.

PPL26-085

ALPPS IN DIFFERENT CONTEXTS

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Introduction: Since the introduction of ALPPS, the technique has been applied in various clinical settings in our department. The indications, effect, complications and results are reported.

Method: A retrospective study of all patients where the ALPPS technique was used during a 9 months period was conducted. The study included demographic factors, indications for treatment, growth of future liver remnant (FLR), complications and results.

Results: During the period Oct 31 2012 to Aug 1 2013 six patients were selected for ALPPS. They were 5 males and 1 female, median age was 67.5 (62–80) years. Indications were colorectal liver metastases (n = 3), HCC (n = 2) and Klatskin tumour (n = 1). The median size of the FLR was 465 mL (250–707) corresponding to 19% (17–31%) of the total liver volume before stage one operation. Three patients had portal vein embolization (PVE) before ALPPS treatment. The second stage operation was done 8 days (7–9) after procedure one and the median volume of the FLR was 890 mL (352–1164) at that time. This corresponds to a 91% (35–129) increase in FLR size. The resections were right sided hemihepatectomy (n = 3) and extended right sided hemihepatectomy (n = 3). Hepaticojejunostomi was done in the second operation in 1 case. Resections were performed in the FLR in 2 cases. Post-operative complications occurred in 3 patients, with the highest Clavien-Dindo score 3a (in 2 patients). All patients stayed in hospital between the two operations and median stay after the second operation was 11 days (4–19).

Conclusions: The ALPPS procedure is applicable to a wide variety of hepatic- and biliary tumours were strong growth of the FLR is necessary. This includes bilateral colorectal liver metastases, large HCCs and Klatskin tumours and may be specially indicated when PVE fails to induce the growth needed in the FLR.
PPL26-086
PURE LAPAROSCOPIC HEPATECTOMY FOR THE PATIENTS WITH UPPER ABDOMINAL SURGICAL HISTORY
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Introduction: With the expanding indication of laparoscopic hepatectomy, there is increasing number of laparoscopic hepatectomy performed in patients with a surgical history. The aim of this study was to assess the clinical outcomes of laparoscopic hepatectomy in patients with a history of upper abdominal surgery.

Method: Of 69 pure laparoscopic hepatectomies, 15 patients underwent laparoscopic hepatectomy after previous upper abdominal surgery, excluding laparoscopic cholecystectomy. Previous surgeries included hepatectomy (n=5), pancreatectomy (n=3), cholecystectomy and common bile duct excision (n=1), splenectomy (n=1), distal gastrectomy (n=1), ovarian carcinoma with extensive lymph-node dissection (n=1), and colectomy with the involvement of transverse colon (n=3). Out of 15 previous surgeries, 3 hepatectomies, 1 splenectomy, 1 gastrectomy, and 1 colectomy had been performed laparoscopically. Clinical indicators of perioperative course were examined.

Results: In 11 out of 15 patients (73.3%), there were severe adhesions in the area around the liver. However, there was no conversion to a laparotomy in this group. In 54 patients without a history of upper abdominal surgery, the median operative time was 390 minutes and blood loss was 200 mL. On the other hands, the operative time was 334 minutes and blood loss was 143 mL in 15 patients with the history. Complication occurred in 1 patient (7.1%) and the median hospital stay was 14 days in patients with the history. There were no differences in the perioperative results between the two groups.

Conclusions: Laparoscopic liver resection in patients with a history of upper abdominal surgery is feasible and safe. However, since there is no case of anatomical liver resection after the history of anatomical liver resection, further investigations are needed for such cases.

PPL26-087
EPIDURAL ANALGESIA IN LIVER SURGERY – IS IT SAFE AND EFFECTIVE?
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Introduction: Epidural analgesia is the reference standard for the provision of postoperative pain relief in patients recovering from major abdominal operations. However a failure rate of 20–32% has been reported. The aim was to analyse the effectiveness of epidural analgesia and the outcome in patients who underwent liver surgery.

Method: Data were collected from a prospectively maintained database of 70 patients who underwent open liver surgery by a bilateral sub-costal incision during a period of 20 months (Feb 2009 to Sep 2010). Consultants with expertise in anaesthesia for liver surgery performed the epidural catheter placement. A dedicated pain team assessed the postoperative pain scores using the Verbal Descriptor Scale. The outcome was measured in terms of success rates, complications and length of stay.

Results: The study group included 43 males and 27 females. The indication for resection was liver secondaries (70%), primary tumours (19%), and benign disease (11%). While major (≥3 segments) and minor (≤2 segments) resections were performed in 44% and 47% respectively, 9% were inoperable. Epidural analgesia was successful in 64 patients (91%). Among the patients with successful epidural only 9 patients (13%) reported moderate or severe pain at 1 or more tome intervals in the first 3 days. All other patients reported either mild or no pain. Bacterial colonisation of the epidural tip without neurological complications was noticed in 2 patients. Five patients (7%) had radiologically confirmed chest infection. Four patients (6%) had wound infection. One patient died due to liver failure. The median length of stay was 6 days (3–27 days).

Conclusions: Our experience shows that epidural analgesia is safe, successful and effective in providing adequate pain relief following open liver surgery.

PPL26-088
HEPATOCELLULAR CARCINOMA WITH INVASION OF SURROUNDING ORGANS: IS EN-BLOC RESECTION JUSTIFIED?
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Introduction: T4 hepatocellular carcinoma (HCC) carries poor prognosis. This study aims to determine the survival outcomes after en-bloc resection of HCCs with invasion of surrounding organs at a tertiary referral center.

Method: Data of the 59 patients (Group 1) who underwent en-bloc resection of HCCs with surrounding organs (invasion confirmed by histology) in the period from 1989 to 2010 were reviewed. A control group of 118 patients (2:1 match) (Group 2) without HCC invasion of surrounding organs was matched to age, tumor size, tumor number, and TNM staging (AJCC 5th edition). Survival was estimated by the Kaplan–Meier method and compared by the log-rank test. A p < 0.05 were regarded as statistically significant and all p values were two-tailed.

Results: The two groups had no statistical difference in demographics, postoperative complication rate, and survival rates. The 5-year and 10-year overall survival rates in Group 1 were 21.7% and 16.7% respectively.
and those in Group 2 were 25.1% and 18.2% respectively (p = 0.430). The 5-year and 10-year disease-free survival rates in Group 1 were both 14.8% and those in Group 2 were 13.4% and 10.9% respectively (p = 0.459).

Conclusions: The survival outcomes of patients with HCC with and without direct invasion are comparable. At centers with expertise, en-bloc resection should be attempted for clinical T4 disease if the patient is fit for operation.

PPL26-089

DILI-CHOLESTATIC AND ALLERGIC REACTION FROM VALPROIC ACID – CASE REPORT

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Introduction: Drugs are an important reason of hepatotoxicity. In general more than 1000 drugs, toxins and herbs have been reported to cause hepatotoxicity. Acute hepatitis with or without cholestasis is the usual histological pattern of DILI (drug – induced liver injury). Most cases of DILI resolve on discontinuation of the drug, but recovery can take months or rarely disease can progress despite drug withdrawal. In elderly patients DILI is more frequent than in younger. DILI is a potential complication, because of central role of the liver in drug metabolism and elimination. Generally, hepatotoxicity caused by drugs is known to be: type A dose dependent (intrinsic toxicity) or type B idiosyncratic. It can be accompanied with immunoallergic features such as eosinophilia, rash, antibody titer.

Method: We report a case of valproic acid (VPA) induced hepatotoxicity and to discuss the incidence rates, risk factors, possible etiologies, preventive measures, and treatment courses for this severe reaction.

Results: A 62-year-old male patient presented to the emergency department in an altered condition, confused with severe jaundice without transaminase elevation, itching and cutaneous rash. He was treated with antihypertensive drugs (aprilvel) and valproic acid for 2 years for epilepsy. He denied any drug reactions before. The ultrasound and CT Scan of the liver was normal, also there was no viral hepatitis (B, C). Other cholestatic diseases were excluded. He was treated successfully with UDCA and cortisone in high doses.

Conclusions: The exact mechanism of VPA – associated hepatotoxicity has not been clearly established. Major risk factors include age, sex, and concomitant treatment with more than one anticonvulsivant. Other significant risk factors include metabolic or serious neurologic disorders. Older age is a determinant factor for cholestatic DILI with a male predominance, whereas younger age is associated with cytolytic damage and a female predomination.

PPL26-090

HEPATOCELLULAR CARCINOMA: INTEREST OF MICROVASCULAR INVASION AS A FACTOR WITH IMPACT IN PROGNOSIS AFTER SURGICAL TREATMENT

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Introduction: Hepatocellular carcinoma (HCC) is the third cause of cancer-related death, and the incidence is growing worldwide. Survival without surgical treatment does not exceed, in most series, the 10 months. The option between Resection (HR) and Transplantation (HT), the only options with curative potential, remains controversial. The aim of this study is to evaluate the results of HR of HCC in our department and the interest of microvascular invasion as a factor with impact in prognosis after surgical treatment.

Method: 95 patients with medium age of 64 ± 11.7 years (34-85) underwent HR for HCC in our department. 85% were male, 69% had chronic hepatic disease and 90% were classified as Child–Pugh A. Medium size of lesions was 66 ± 48 mm (17-280), 75 were solitary (79%) and 39% of patients were within the Milan Criteria. Five patients underwent hepatic arterial chemoembolization and ten to portal vein embolization before surgery. Forty-three patients underwent major liver resection and 52 a minor. Prognostic factors were evaluated using univariate and multivariate analyses.

Results: Per-operative mortality (3 months) was 5.5% and morbidity 43.1%. Thirty patients underwent new surgical treatment due to recurrence, HT in 4 and HR in 9. Overall survival was 58% (5 years) and 36.4% (10 years); disease free survival was 4.2% (5 years) and 26.4% (10 years). In patients with tumours without microvascular invasion overall survival was respectively at 5 and 10 years 75.9% and 56.4%.

Conclusions: HR of HCC can be performed with acceptable morbi-mortality, increasing significantly survival in these patients; particularly in those with tumours without microvascular invasion, allowing a better selection of patients that can be treated with HR.

PPL26-091

PREOPERATIVE PERIPHERAL BLOOD NEUTROPHIL COUNT PREDICTS LONG-TERM OUTCOMES AFTER HEPATIC RESECTION FOR COLORECTAL LIVER METASTASES

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**Introduction:** Preoperative systemic inflammatory response is associated with a poor long-term prognosis after resection for malignant tumors. Several markers of systemic inflammation were reported to be a predictor of outcomes, but have not been fully investigated. Therefore, we retrospectively investigated the relation between preoperative peripheral blood neutrophil count and disease-free survival as well as overall survival after hepatic resection for colorectal liver metastasis (CRLM).

**Method:** The study comprised 89 patients who had undergone hepatic resection for CRLM between January 2000 and March 2010. We retrospectively investigated the relation between preoperative peripheral blood neutrophil count and disease-free survival as well as overall survival.

**Results:** In multivariate analysis, presence of neo-adjuvant chemotherapy (p = 0.015), bilobar distribution (p = 0.015) and neutrophil count ≥3.300/µL (p = 0.025) were independent and significant predictors of disease-free survival, while significant predictors of overall survival were consisted of more than 4 lymph node metastases (p = 0.001), presence of neo-adjuvant chemotherapy (p = 0.003), bilobar distribution (p = 0.039) and neutrophil count ≥3.500/µL (p = 0.040). Moreover, tumor diameter (p = 0.021) and monocyte count (p < 0.0001) were significantly greater in elevated neutrophil count group.

**Conclusions:** Preoperative peripheral blood neutrophil count is an independent and significant indicator of long-term outcomes in patients with CRLM after hepatic resection.

**PPL26-092**

**PURE LAPAROSCOPIC HEPATECTOMY FOR HCC PATIENTS WITH CHRONIC LIVER DISEASE**

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**Introduction:** The indications of laparoscopic hepatectomy are expanding. We discuss the features of pure laparoscopic hepatectomy for HCC patients with chronic liver disease in present study.

**Method:** 40 patients with HCC and chronic liver disease, including 9 Child B/C patients, underwent pure laparoscopic hepatectomy. The numbers of the tumors are 1–4 and the sizes are in 1.1–7.8 cm. Anatomical resections were applied to 11 patients and 5 underwent resections of 1 or more sectors. 4 patients underwent combined microwave ablation therapy. 10 patients had the history of treatments for HCC and 7 had the history of precedent upper abdominal surgeries (hepatectomy: 3, pancreatectomy: 2, splenectomy: 1, exploration and lithotomy of common bile duct: 1). There is a strong benefit for the patients with colorectal liver metastasis when radiologists and surgeons worked together. Possibility of mistreatment is reduced. Surgical planning on pre-op CAT scans can help in avoid bleeding and can find aditional lesions during the surgery. Volumetry may help in order to avoid a too-small remnant.

**Results:** There is a strong benefit for the patients with colorectal liver metastasis when radiologists and surgeons worked together. Possibility of mistreatment is reduced. Surgical planning on pre-op CAT scans can help in avoid bleeding and can find aditional lesions during the surgery. Volumetry may help in order to avoid a too-small remnant.

**Conclusions:** Radiologists must work very close to surgeons in the setting of colorectal liver metastasis patients. They should help on the diagnosis, but also they can help in: Imaging findings and technical considerations (US, CT, MRI and PET-CT), therapeutic planning, surgical planning, response measurement after chemotherapy, conversion of patients from inop-
erable to operable, selective portal embolization and liver volumetry, ablative therapy, and surveillance of local and systemic relapse.

PPL26-094

AMEBIC ABSCESS OF THE LIVER PENETRATING INTO THE RIGHT HEMITHORAX – A CASE STUDY

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Introduction: This poster shows the interesting case of a young male with amebic disease of the liver.

Method: Case study.

Results: We are describing the case of a 40-year-old male patient presenting himself with increasing dyspnoea after a holiday on the Maldives. He was sent to the department of pneumology. A chest x-ray showed a big pleural effusion on the right side and a Bilau drainage was placed. A CT-scan of the thorax and abdomen revealed a pleural effusion on the right side with complete atelectasis of the right lung and 3 big abscesses in the right lobe of the liver. The patient showed increasing septicemia and had to be intubated. An emergency surgery was performed. We could find big necrotizing abscesses in segments IVa, VI and VIII with penetration into the right thoracal cavity via a perforation of the diaphragm. The abscesses were drained, the pleural empyema – 2 L of pus- was evacuated and the diaphragm which was partially necrotic was sutured. As the patient was cardiorespiratorily instable, a perihepatic packing was done. After stabilization we did return to the OR 2 days later in order to remove the packing. There was no bleeding but most parts of the right lobe were necrotic. Therefore a right hemihepatectomy was performed. Histologic workup of the specimen proved the suspicion of amebiasis. The further history of the patient was complicated by atrial fibrillation, pneumothorax on both sides, pleural effusions and bilateral pneumonia. Nevertheless he survived and could be sent to rehabilitation where he fully recovered.

Conclusions: Amebic disease of the liver is well known in tropic regions such as Asia and uncommon in Middle Europe. In most cases it is treated antibiologically with metronidazole. Rarely surgical treatment is required.

PPL26-095

COMPLICATIONS OF LIVER RESECTIONS OF COLORECTAL METASTASES IN UNIVERSITY HOSPITAL OF PILSEN

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Introduction: Liver resection now means the only possibility of curative treatment for patients with metastases of colorectal carcinoma of liver.

Method: The aim of this work was to evaluate the group of patients in a retrospective way liver resection had been performed in due to metastases of colorectal carcinoma at the Surgery Department of Faculty of Medicine of Charles University and University Hospital in Pilsen between May 2009 and March 2013. Only the patients multistage resection, combined surgeries or RFA had been performed were eliminated.

Results: There were thirty patients altogether having gone through the given resection in this period. The whole morbidity of this group was 63.7%. The mortality of the group was 0%. The most frequent postoperative complication was fluidothorax – 42.9%, loss of blood more than 500 mL was considered to be the most frequent preoperative complication – 3.9%. Collections by the resection area/hematoma, biloma/bilialmo belonging among other frequent postoperative complications – 33.8%. Fortunately, we noticed susceptible liver failure only in two patients, which means 2.6%. In comparison with the same evaluation in the group of patients between 2000 and 2005, we determined the decrease of the occurrence of postoperative bleeding by 4.5% and liver failure by 3.8%. On the contrary, the amount of collections appeared at the resection area increased by almost 6.9%.

Conclusions: Curative liver resections for metastases of colorectal carcinoma mean a high occurrence of postoperative complications for patients but it is necessary to solve only a small percentage of these in an invasive way. The effect of the surgery considerably exceeds possible risks for patients.

PPL26-096

PRIMARY HEPATIC NEUROENDOCRINE TUMOR OF LIVER

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Introduction: Primary hepatic neuroendocrine tumor of the liver is a rare entity with only few case reports in the literature. Its clinical features and treatment outcomes are not well understood.

Method: We retrospectively analyzed the data of three patients diagnosed with primary hepatic neuroendocrine tumors.

Results: Three patients were diagnosed with primary neuroendocrine tumor of liver between 2011 and 2013. Two were males and one female. Mean age was 45.3 years (29–69 years). Pain in abdomen was the presenting complaint in all the patients and physical examination was normal. Diagnosis of primary neuroendocrine tumor of liver was preoperatively made in two patients and in the third patient it was based on postoperative histology of the resected specimen. Serum CEA, CA19.9, AFP, UGI endoscopy and colonoscopy were normal. Serum chromogranin A was elevated in two patients and the DOTANOC PET scan showed disease only in the liver. DOTANOC PET CT done postoperatively in third patient showed no residual disease. One patient underwent right hepatectomy with middle hepatic vein excision. Other patient underwent central hepatectomy and third left hepatectomy with excision of MHV. All the patients had negative margins. Patients had grade 1, 2 and 3 neuroendocrine histology. Patient with grade 1 histology had recurrence in the liver and which was managed by radiofrequency ablation and was put on octreotide analogue. Patient with grade 2 histol-
ogy had recurrence in the nodes and was also treated with octreotide analogue. Patient with the grade 3 histology was given adjuvant chemotherapy. All the patients are alive.

Conclusions: Primary hepatic neuroendocrine tumors are rare. Multimodality treatment involving surgery, chemotherapy and targeted therapy provides best results.

PPL26-097
INDICATION OF HEPATIC RESECTION FOR HEPATOCELLULAR CARCINOMA
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Introduction: As the preoperative index of hepatic resection for hepatocellular carcinoma (HCC), Makuuchi’s criteria which means the presence or absence of ascites, the serum total bilirubin level, and the indocyanine green retention rate at 15 minutes (ICGR-15) has been widely used in Japan. However, we have experienced some cases beyond the criteria in clinical settings.

Method: We examined a total of 50 consecutive patients who underwent hepatic resection for HCC from December 2008 to December 2012, and compared between “Within” or “Beyond” Makuuchi’s criteria group. In our institution, ICG Krem (≧0.05) which is calculated by multiplication of disappearance rate of ICG and remnant liver volume ratio to total liver volume has been adopted for indication of hepatectomy.

Results: Anatomical resection was performed in 39 cases, 16 patients were in beyond group. There were no significant differences in age, operation time, blood loss, tumor size, postoperative complications (Clavien-Dindo Classification: over grade III, 5 in within group and 4 in Beyond group), bile leak, hospital stay, overall survival and disease free survival rates. In Beyond group, ICGR-15, disappearance rate of ICG, and the frequency of posthepatectomy liver failure (ISGFLS Classification: 6 in within group, 8 in Beyond group) were significantly higher, compared to within group.

Conclusions: The possibility to perform hepatectomy exists in cases beyond the criteria, although there is no doubt that Makuchii’s criteria is reliable index. A criteria, ICG Krem≧0.05 may be one of useful indexes for promising safe hepatectomy in patients with HCC.

PPL26-098
IS PRINGLE MANEUVER NEEDED IN THE MODERN ERA OF LIVER RESECTION? 153 CONSECUTIVE LIVER RESECTIONS WITHOUT LIVER INFLOW OCCLUSION USING CUSA AND AQUAMANTYS.
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Introduction: Hemorrhage is undoubtedly one of the main factors of morbidity and mortality in liver resections. Vascular occlusion techniques are effective to control intraoperative bleeding, but they cause liver damage due to ischemia. We evaluated the effectiveness and safety of using a combined technique for hepatic parenchymal transection without liver inflow occlusion.

Method: 153 consecutive patients who underwent liver resection in two Hepato-Pancreato-Biliary (HPB) units. Hepatic parenchymal transection was carried out using a combined technique of saline-linked radiofrequency precocagulation and ultrasonic aspiration without liver inflow occlusion. Endpoints were overall amount of intraoperative blood loss (IBL), amount of blood loss during parenchymal transection (PTBL), parenchymal transection time (PTT), the amount of packed red blood cells (PRBC) transfused, the postoperative morbidity and the 30-day mortality.

Results: During the study period 55 minor and 98 major hepatic resections were performed. The mean amount of intraoperative blood loss was 349 mL (SD 259 mL, range 50–1800 mL) and the blood transfusion rate was 11.1%. The median amount of blood loss during parenchymal transection and parenchymal transection time were 227 mL (SD 211, range 40–1500) and 63 minutes (range 14–146 minutes) respectively. There was one post-operative death (0.65%). Complications occurred in 42 patients (27.45%) and most complications were minor.

Conclusions: Combined technique of saline-link radiofrequency ablation and ultrasonic aspiration appears to be comparable to other techniques and should be considered as an alternative. Crucially, this combined technique eliminates the need for liver inflow occlusion during parenchyma transection.

PPL26-099
EXPRESSION LEVELS OF INSULIN-LIKE GROWTH FACTORS AND RECEPTORS IN HEPATOCELLULAR CARCINOMA
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Introduction: The insulin-like growth factor (IGF) pathway is implicated in the pathogenesis of hepatocellular carcinoma (HCC) and may be particularly important in patients with non-alcoholic fatty liver disease (NAFLD) and the metabolic syndrome, which is associated with insulin resistance and increased levels of bioavailable IGF-1. The aim of this study was to determine expression levels of IGFs and their receptors in patient with NAFLD-associated HCC.

Method: Tissue microarrays were constructed from patients who underwent hepatectomy for HCC. Immunohistochemistry was performed using antibodies for IGF-1, IGF-2 and their receptors, IGF-1R and IGF-2R. Slides were read by a pathologist blinded to clinical data. Median follow-up was 26 months (range, 2–136 months).

Results: Among 27 patients with HCC, the most common underlying liver diseases included NAFLD...
(n = 13, 48%), hepatitis C (n = 7, 26%), and alcoholic hepatitis (n = 2, 7%). Expression levels of IGFs and their receptors were not associated with patients’ underlying liver disease. In all patients, IGF-2 expression was upregulated in both tumor and adjacent non-tumorous liver. IGF-1 expression was low in adjacent non-tumorous liver in 6 of 10 patients (60%) with cirrhosis, compared to 2 of 17 patients (12%) without cirrhosis (p = 0.008). Higher expression of IGF-1 in adjacent liver relative to tumor was associated with significantly poorer median survival of 22 months, compared to 72 months with equal or lower IGF-1 expression in adjacent liver relative to tumor (p = 0.006).

**Conclusions:** Our preliminary results demonstrate significant associations between IGF-1 expression and liver cirrhosis and survival after resection in patients with HCC, independent of their underlying liver disease.

**PPL26-100**

**A NOVEL ALGORITHM FOR HEPATECTOMY BASED ON THE FIBROSIS STAGE**

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**Introduction:** In Japan, Makuchi criteria is widely accepted as a decision tree for hepatectomy. Although the criteria are regulated by only three parameters: presence or absence of uncontrollable ascites, serum bilirubin level, and the indocyanine green retention rate at 15 minutes (ICG15), hepatectomy can be safely performed to several cases outside the criteria. We have previously reported that posthepatectomy liver failure (PHLF) significantly associates with overall and recurrence free survival, and also that the incidence of PHLF concomitantly increased with extent of resection and fibrosis stage. In this study, we searched for the preoperative factor which can assess fibrosis stage most accurately.

**Method:** We retrospectively analyzed 114 consecutive patients who underwent curative hepatectomy for hepatocellular carcinoma from 2010 to 2012. 1) Correlation with preoperative and final fibrosis stage, 2) correlation with preoperative, intraoperative, and final fibrosis stage, and 3) a role of fibrosis stage as an algorithm factor for hepatectomy were evaluated.

**Results:** 1) Preoperative fibrosis stage>2 (p = 0.0094), presence of ascites (p = 0.0458), decrease of the receptor index LHL15 (liver 15/heart 15 + liver 15) measured by TcGSA scintigram (p = 0.0851), and PT<79% (p = 0.0458) significantly associated with final fibrosis stage>2 in univariate analysis. In multivariate analysis, preoperative fibrosis stage>2 was identified as an independent risk factor for final fibrosis stage>2 (p = 0.0336). 2) Sensitivity/specificity of pre and intraoperative fibrosis stage>2 for final fibrosis stage>2 were 100/45% and 92/73% respectively. 3) Combination of PT<79% or presence of ascites and preoperative fibrosis stage>2 increased sensitivity/specificity for final fibrosis stage>2 up to 100/55%.

**Conclusions:** Assessment of fibrosis stage might be a key component to constitute a novel algorithm for hepatectomy which directly associates with lower incidence of PHLF and longer patient survival.

**PPL26-101**

**MASPIN IS A MARKER FOR EARLY RECURRENT IN PRIMARY STAGE III AND IV COLORECTAL CANCER**

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**Introduction:** Little is known about the factors that drive metastasis formation in colorectal cancer (CRC). Here, we set out to identify genes and proteins in patients with colorectal liver metastases that correlate with early disease recurrence. Such factors may predict a propensity for metastasis in earlier stages of CRC.

**Method:** Gene expression profiling and proteomics were used to identify differentially expressed genes/proteins in resected liver metastases that recurred within 6 months following liver surgery versus those that did not recur for >24 months. Expression of the identified genes/proteins in stage II (n = 243) and III (n = 176) tumours was analysed by immunohistochemistry on tissue microarrays. Correlation of protein levels with stage-specific outcome was assessed by uni- and multivariable analyses.

**Results:** Both gene expression profiling and proteomics identified Maspin to be differentially expressed in colorectal liver metastases with early (>6 months) and prolonged (>24 months) time to recurrence. Immunohistochemical analysis of Maspin expression on tumour sections revealed that it was an independent predictor of time to recurrence (log-rank p = 0.004) and CRC-specific survival (p = 0.000) in stage III CRC. High Maspin expression was also correlated with mucinous differentiation. In stage II CRC patients, high Maspin expression did not correlate with survival but was correlated with a right-sided tumour location.

**Conclusions:** High Maspin expression correlates with poor outcome in CRC after spread to the local lymph nodes. Therefore, Maspin may have a stage-specific function possibly related to tumour cell dissemination and/or metastatic outgrowth.
PPL26-102

LAPAROSCOPIC PARTIAL LIVER RESECTION FOR THE TREATMENT OF HEPATOCELLULAR CARCINOMA PATIENTS WITH UNDERLYING CHILD–PUGH B AND C LIVER CIRRHOSIS

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Introduction: Liver resection by open surgery remains the treatment of choice for hepatocellular carcinoma (HCC). Currently, laparoscopic liver resection is preferred to avoid postoperative liver failure and severe ascites in these circumstances. Laparoscopic partial liver resection (LLR) for the treatment hepatocellular carcinoma with Child–Pugh B and C cirrhosis was compared to open partial liver resection (OLR) performed in our institution and examined validity of the LLR.

Method: Seventeen LLRs performed for HCC at the Saitama Medical University International Medical Center from 2007 to 2012 were prospectively analyzed. Seventeen cases LLRs performed included Child-P B 15 and C 2 cases. These data were compared with an equivalent group of 9 consecutive OLRs (C-P B: 9 cases) undertaken immediately prior to the introduction of LLR. Outcomes were evaluated for differences in perioperative morbidity and hospital length of stay.

Results: There were no differences between LLRs and OLRs in demographics, pathology, cirrhosis, tumour location or extent of resection. There were no LLRs underwent conversion to an open approach and no deaths. LLRs had significantly decreased intraoperative blood loss (60 mL vs 553 mL, p < .001), postoperative complications (6% vs 33%, p < .05), and length of stay (7.1 days vs 16.1 days, p < 0.001) compared with OLRs. There were no differences in operating time for LLRs compared to OLRs (199 minutes vs 152 minutes, respectively).

Conclusions: Laparoscopic resection of HCC with underlying Child-Pugh B and C liver cirrhosis is feasible and safe. In patients with severe liver cirrhosis, LLR minimizes the disturbance in collateral blood and lymphatic flow caused by laparotomy and liver mobilization, as well as the mesenchymal injury caused by compression of the liver. It limits complications such as massive ascites, which can lead to severe postoperative liver failure.

PPL26-103

EFFICACY OF NEO-ADJUVANT CHEMOTHERAPY FOR PATIENTS WITH LOCALLY ADVANCED INTRAHEPATIC CHOLANGIOCARCINOMA

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Introduction: The aim of this study was to evaluate efficacy and perioperative outcomes of neo-adjuvant chemotherapy for patients with locally advanced intrahepatic cholangiocarcinoma (ICC).

Method: A retrospective analysis was conducted of 5 patients who were treated with neo-adjuvant chemotherapy prior to surgical resection for initially unresectable locally advanced ICC. Indications for neo-adjuvant chemotherapy included direct invasion to adjacent extrhepatic structures (i.e., abdominal wall, diaphragm, stomach) alone (n = 4) and direct invasion plus paraaortic lymph node involvement (n = 1). The regimens of neo-adjuvant chemotherapy included gemcitabine (GEM) alone (n = 2), Tegafur-Gimeracil-Oteracil Potassium (S-1) alone (n = 1), GEM plus S-1 (n = 1), and GEM plus S-1 converted to GEM plus cisplatin (n = 1). The response to neo-adjuvant chemotherapy was evaluated according to Response Evaluation Criteria in Solid Tumors (RECIST) guidelines.

Results: The response rate was 20% in 5 patients. One patient who received GEM plus S-1 achieved partial response (68% tumor reduction rate). Three patients showed stable disease, and the remaining one patient showed progressive disease (PD). Surgical procedures planned before administration of neo-adjuvant chemotherapy were performed in all 5 patients. All patients underwent R0 resection. According to the UICC TNM classification, one patient had pStage I tumor, 3 had stage IVA, and one had stage IVB. Perioperative complications included intraabdominal abscess (n = 2), rupture of pseudoaneurysm (n = 1), enteritis (n = 1), and lymphorrhrea (n = 1). There was no in-hospital death. Two patients had died of tumor recurrence 9 and 14 months after surgical resection. One patient was alive with recurrent disease, and 2 patients were alive with no evidence of disease. The cumulative 1- and 2-year overall survival rates were 72% and 50%, respectively.

Conclusions: Neo-adjuvant chemotherapy for locally advanced ICC was well tolerated and did not impair planned surgical resections.
PPL26-104

GAS JET LIVER RESECTION. EXPERIMENTAL RESEARCH

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Introduction: There exists a great variety of liver parenchyma dissection techniques. The original method of gas jet dissection was developed in our institute. The objective of this research lies in comparing gas jet dissection technique with the existing ones.

Method: Efficiency comparison of gas-jet (original apparatus “Pneumojet”, Ukraine), ultrasonic («SONOCA 300», Soring, Germany), water-jet («Hydrojet», Erbe, Germany) methods of dissection and Clamp crushing technique was carried out on 24 mini-pigs. Depending on the liver parenchyma dissection technique, the animals have been divided into 4 groups. We did not use Pringle maneuver.

We performed biopsy of the resection surface for examining damage and regeneration on days 7 and 21 after surgery.

Results: The sizes of the resected section of liver and, accordingly, wound surfaces that were formed as a result of operation, did not differ in the investigated groups. The mean blood loss at the resection stage was the smallest in the group of animals that had a gas jet dissection (3.5 ± 0.15 mL/cm²) and the highest in the Clamp crushing technique group – 5.5 ± 0.46 mL/cm² (Indicators have statistically authentic differences p < 0.05). The dissection speed was the highest in the Clamp crushing technique group – 2.9 ± 0.25 cm²/minutes and was credibly higher than in the gas jet (2.4 ± 0.16 cm²/minutes), ultrasonic (2.4 ± 0.13 cm²/minutes) and water-jet (2.5 ± 0.14 cm²/minutes) dissection groups.

Visually empty vacuoles extending necrosis zone are identified in the area of resection surface after gas-jet dissection without being identified in other dissection types. Nonetheless, all inflammation components appear in the wound evolution at any type of dissection. In spite of the high damage depth, healing dynamics and cicatrix size at later stages were the most favorable in gas-jet dissection.

Conclusions: Gas jet dissection is not accompanied by thermal damage of hepatocytes, ensures minimal trauma and fast restoration of hepatocytes. Therefore, it can be recommended for further clinical application.

PPL26-105

ROLE OF SPECTRAL CT IN THE DIFFERENTIAL DIAGNOSIS OF METASTATIC AND REACTIVE LYMPH NODES

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Introduction: To investigate the value of spectral CT imaging in the differential diagnosis of metastatic and reactive lymph nodes.

Method: A total of 25 patients with swelling lymph nodes in the hilar region received spectral CT imaging (Discovery CT750 HD), including 13 hepatocellular carcinoma (HCC), 5 gallbladder carcinoma (GC) and 7 non-neoplastic diseases (NND, containing 3 cirrhosis, 2 intrahepatic calculus, 1 cholecystitis and 1 hepatic haemangioma), which were certified in the postoperative pathology. Normalized iodine concentration (NIC, the ratio of iodine concentration of lymph nodes and aorta from the iodine-based material-decomposition image), and slope of Spectral Curve (SSC, the difference in either NIC or SSC of different lymph nodes) were analyzed.

Results: Both the mean NIC (0.15 ± 0.03) in HCC and the mean NIC (0.16 ± 0.06) in GC were significantly higher than that (0.11 ± 0.03) in NND during AP (p = 0.022, 0.041, respectively). Similarly, both the mean SSC (1.82 ± 0.40) in HCC and the mean SSC (1.83 ± 0.66) in GC were significantly lower than that (2.66 ± 0.38) in NND during AP (p = 0.014, 0.046, respectively). However, there was no significant difference in either NIC or SSC in lymph nodes between HCC and GC (p = 0.991, 0.828). The area under the curve of the NIC and SSC during AP was 0.794 and 0.762, respectively. The combination of NIC and SSC showed high sensitivity (77.8%) and specificity (100%) for distinguishing metastatic lymph nodes from reactive lymph nodes. In addition, there was no significant difference in either NIC or SSC of different lymph nodes during PVP or DP.

Conclusions: Spectral CT provided several quantitative methods and showed a potential value in the differential diagnosis of metastatic and reactive lymph nodes.

PPL26-106

THE CORRELATION STUDY OF POSTOPERATIVE PLATELET COUNTS WITH LIVER FUNCTION RECOVERY AFTER PARTIAL HEPATECTOMY IN PATIENTS WITH HEPATOCELLULAR CARCINOMA

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Introduction: To investigate the correlation of postoperative platelet counts with liver function recovery after partial hepatectomy in patients with hepatocellular carcinoma.

Method: Two hundred and twelve patients with hepatocellular carcinoma were enrolled in this study. The relation between postoperative platelet counts and serum levels of ALT, AST, TB and PT after operation was analyzed.
Results: There were 78 patients with a low (<100 × 10^9/L) immediate postoperative platelet count in this series of 212 patients who underwent partial liver resection for hepatocellular carcinoma, and 134 patients with a normal platelet count (≥100 × 10^9/L). Based on the criteria, 27 patients were categorized as having delayed postoperative liver function recovery. There were no death cases in this study. Postoperatively, peak levels of ALT, AST and TB were significantly higher in the patients with a low postoperative platelet count than patients with normal platelet counts (p < 0.05). Statistical analysis showed that patients with a low immediate postoperative platelet count after partial liver resection for hepatocellular carcinoma had significantly increased risk of delayed postoperative recovery than patients with normal platelet count ($\chi^2=9.112$, p = 0.003).

Conclusions: Low postoperative platelet counts was associated with delayed liver function recovery after partial heptatectomy in patients with hepatocellular carcinoma, suggesting that platelet was a new target for preventing liver function failure after heptatectomy in patients with hepatocellular carcinoma.

PPL26-107
SURGICAL TREATMENT COMBINED LIVER DAMAGED
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Introduction: The purpose: improvement of results of damages of a liver by use of modern technologies of diagnostics and interventions.

Method: Two hundred and seventy-eight victims at the age from 16 till 70 years with a liver trauma are saved up. Wounds were available at 116, the closed damages for 162 patients. Liver damages are divided into five groups. At 153 suffered damages of a liver are carried to light and average. To 83 patients it is made lap exam. At all the diagnosis of damage of a liver is confirmed, thus at 23 patients the diagnostic laparoscopy has passed in surgical operation. In this group combined damages had 14 patients from them 5 persons a craniocerebral trauma; 3 trauma of a chest; 6 fracture bones. At receipt the condition as heavy is regarded at 17. Victims, at whom the diagnostic laparoscopy is finished by surgical operation, had superficial ruptures ii – iii segment – 9; IV seg – 2; V and VI seg – 10 patients. For performance lap operations considered as the indication hemoperitoneum no more than 500 mL absence of intestinal contents, and absence of a proceeding intensive bleeding from a liver wound. At surgical processing it is deleted alien bodies, small scraps of a hepatic fabric, we tie up bleeding vessels. Somtimes produce resection, with heavy damage plaguing for damage control.

Results: Complications were observed at 23 patients, including specific, in connection with damage of the liver 3 patients. 38 patients have died. After a heavy trauma died 24, and wounds – 14. At the isolated damages have died 16, and at combined 22.

Conclusions: Diagnostics improvement, working out of new surgical tactics, introduction of a resection of a liver at a trauma, has allowed to improve results of liver damages.

PPL26-108
COLORECTAL CARCINOMA LIVER METASTASIS WITH BILE DUCT INVOLVEMENT: REPORT OF TWO CASES
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Introduction: Although bile duct involvement is recognized behavior of colorectal carcinoma liver metastasis (CRLM), this behavior may make it difficult to discriminate CRLM from primary intrahepatic cholangiocarcinoma (ICC) by radiological examination.

Method: We herein report two cases of CRLM with bile duct involvement, mimicking ICC, and review of the literature to evaluate the usefulness of immunohistochemical examination for discrimination between CRLM and ICC.

Results: Two patients with a past history of surgical resection for colorectal adenocarcinoma presented with a liver tumor. Computed tomography of both patients depicted a mass with dilatation of the intrahepatic bile ducts. Although past history of colorectal adenocarcinoma suggested the diagnosis of CRLM, primary ICC was not ruled out by radiological findings. The two patients underwent a heptatectomy and histological examination of the resected specimens revealed the tumors involving the intrahepatic bile ducts. In the both patients, immunohistochemical examination showed that the tumors were positive for cytokeratin (CK) 20 and negative for CK7. After confirming the diagnosis of CRLM with bile duct involvement, they received adjuvant chemotherapy, and remain alive and well with no evidence of disease 48 and 4 months after heptatectomy. In reviewing the literature, studies of bile duct involvement in CRLM vary widely with respect to cited incidence from 6.1% to 42%. Several authors demonstrated that CK 7 (specific for biliary epithelium) and CK20 (specific for intestinal epithelium) immunophenotype is useful for discrimination between CRLM and primary ICC. CK20-positive/CK7-negative immunophenotype is highly characteristic for CRLM, whereas CK7-positive/CK20-negative immunophenotype is highly suggestive of ICC.

Conclusions: Immunohistochemical combination of CK7 and CK20 appears to be useful for discriminating between CRLM with bile duct involvement and ICC. To make firm histological diagnosis with knowledge of the clinical details is of importance for making a decision regarding chemotherapy regimen.
PPL26-109
RADIO FREQUENCY ABLEATION FOR HCC RESULTED FROM HEPATITIS B AND LIVER CIRRHOSIS INDUCED INSUFFICIENT CELLULAR IMMUNE RESPONSES TO VIRAL LOAD AND TUMOR RECURRANCE
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Introduction: Radio frequency ablation (RFA) for hepatocellular carcinoma (HCC) can induce tumor-specific immune responses; however, whether the anti-immune responses are sufficient for affecting HCC recurrence remains controversial.

Method: 28 cases with HCC resulted from hepatitis B and liver cirrhosis were included. Each case was with tumor number ≤2, diameter of each tumor ≤3 cm. Serum samples were collected with written consent pre-RFA, and 1, 2 and 3 weeks post-RFA, which subsequently were tested for hepatitis B virus DNA (HBVDNA) load with real time polymerase chain reaction, and CD4+ T cells and natural killer (NK) cells with flow cytometer respectively. All cases were followed up until the end point of HCC recurrence according to tumor markers and contrast-enhanced ultrasound or computed tomography. Student's t-test and Pearson Correlation were used for statistical analysis.

Results: There were 4 cases with no HCC recurrence during 3-year follow-up. The HBVDNA loads of pre-RFA and 1 week, 3 weeks post-RFA were not significantly different (p > 0.05), except for HBVDNA load of 2 weeks post-RFA which was significant lower than that of pre-RFA (p = 0.03). The proportions of CD4+ T cells, NK cells and ratios of CD4+/CD8+ T cells of pre-RFA and 2, 3 weeks post-RFA were significantly different (41.30 ± 6.52 vs 36.32 ± 2.36 for proportions (%) of CD4+ T cells of pre-RFA vs 3 weeks post-RFA, 7.43 ± 4.62 vs 18.42 ± 7.56 for proportions (%) of NK cells, 2.01 ± 0.84 vs 1.75 ± 1.06 for ratios of CD4+/CD8+ T cells). Pearson Correlation revealed that correlation between changes of serum immune cells pre- and 3 weeks post-RFA and disease-free survival time (median: 13 months) was not significant (related coefficient 0.088, p = 0.49).

Conclusions: RFA for HCC can induce cellular immune responses from 2 weeks post-RFA; however, which was insufficient for decreasing HBVDNA load and HCC recurrence.

PPL26-110
EARLY GOAL DIRECTED RESUSCITATION AFTER MAJOR HEPATECTOMY IMPROVES LIVER FUNCTION AND MAY DECREASE HOSPITAL LENGTH OF STAY
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Introduction: The concept of goal directed treatment is well established and applied in critically ill patients. This study evaluates the impact of early goal directed resuscitation after major hepatectomy.

Method: This is a retrospective case control study of 62 consecutive patients who underwent major hepatectomy. Laparoscopic procedures (n = 5) were included, whereas cases with caval reconstruction were excluded. All patients underwent a fast-track recovery pathway. The first 35 patients received standard post-operative resuscitation (control group), whereas the rest 27 (study group) were enrolled to the early goal directed resuscitation protocol. Early goals included (but not restricted to): mean blood pressure (>65 mmHg), central venous pressure (<5 cmH2O), cardiac index (>2.5 L/minutes/m2), urine output (>0.25 mL/kg/minutes), oxygen extraction fraction (<27%) and lactic acid (<20 mg/dL). Primary endpoints included postoperative (30-day) mortality, morbidity and length of hospital stay. Secondary endpoints included lactic acid clearance, liver biochemistry values and coagulation profile during the postoperative period.

Results: Central venous pressure goal was reached by the 6th postoperative hour in 88.9% and 57.1% of the study and control group, respectively (p = 0.006). Lactic acid goal was reached by the 6th postoperative hour in 85.9% and 60.0% of the study and control group, respectively (p = 0.028). There was no postoperative mortality in either group. The SGPT value on the 2nd postoperative day was 221 ± 142 IU/L and 312 ± 160 IU/L for the study and control group, respectively (p = 0.024). The lactic acid value on the 1st postoperative day was 14 ± 6 mg/dL and 18 ± mg/dL for the study and control group, respectively (p = 0.015). Length of hospital stay was 6.9 ± 1.8 and 7.7 ± 1.7 days for the study and control group, respectively (p = 0.091).

Conclusions: Early goal directed resuscitation after major hepatectomy improves liver function and may decrease hospital length of stay.
PPL26-111

RADIOFREQUENCY-ASSISTED LIVER RESECTIONS: COMPARISON OF OPEN AND LAPAROSCOPIC TECHNIQUES
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Introduction: Twenty years after the first reported laparoscopic liver resection (LLR), it is still one of the last areas of resistance to the advancement of laparoscopic surgery. Laparoscopic radiofrequency assisted liver surgery has been recently developed technique for treatment of primary and secondary liver tumors. In this study, we successfully used the radiofrequency device to carry out laparoscopic hand-assisted liver surgery.

Method: Over a 5-year period, a total of 134 laparoscopic and open radiofrequency assisted operations were performed on patients with liver tumors: laparoscopic liver resections or ablations in 47 patients and open liver resections or ablations (OLR) in 87 patients.

Results: The selection criteria for study were met by 134 patients, 14 of whom had benign lesions and the remaining 120 patients had malignant disease. The mean operative time for the LLR was 151 minutes (median 145 minutes), while the mean operative time for the OLR was 167.9 min (median 165 minutes). The mean blood loss for LLR was 68.7 mL, the difference between the groups was significant with lower median of blood loss using laparoscopy (p = 0.046). Of the 134 patients 17 (12.7%) had postoperative complications: 14 complications (16.1%) in the open surgery group (n = 87), and 3 complications (6.4%) in the laparoscopy group (n = 47). The 5-year survival rate was 67.0% after laparoscopic surgery and 63.8% after open surgery. The mean survival time was longer for a laparoscopic approach than for an open approach (49.3 months vs 46.9 months, respectively). None of the statistical tests showed the difference between groups to be significant.

Conclusions: Laparoscopic liver resection is safe and feasible procedure. For selected patients, the hand-assisted radiofrequency technique can be applied safely and effectively to laparoscopic liver surgery. The laparoscopic approach can be recommended for peripheral lesions requiring limited hepatectomy or left lateral sectionectomy.

PPL26-112

THE SIGNIFICANCE OF ANTI-VIRUS TREATMENT FOR PATIENTS OF HEPATOCELLULAR CARCINOMA WITH POSITIVE EXPRESSION OF HBV-DNA
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Introduction: To investigate the effect of anti hepatitis B virus treatment to the prognosis of patients accepted hepatectomy with hepatocellular carcinoma combined positive expression of HBV DNA.

Method: Analysed patients accepted hepatectomy with hepatocellular carcinoma combined positive expression of HBV DNA in General Surgery Department of 1st Affiliated Hospital of Anhui Medical University from January 2007 to December 2012. Totally 68 patients were divided into non-antiviral group (33 cases) and antiviral group (35 cases) which protocol was lamivudine + adefovir or entecavir alone. The clinical/pathological parameters, HBV DNA level in serum, postoperative total and tumor free survival time were compared in these two groups respectively.

Results: The clinical/pathological parameters and postoperative HBV DNA level in two groups didn’t show the significant difference (p > 0.05), while postoperative HBV DNA level in antiviral group was decreased significantly than in non-antiviral group (p < 0.05). The patients in antiviral group had a significantly greater total and tumor free survival time than in non-antiviral group after hepatectomy.

Conclusions: The anti hepatitis B virus treatment can decrease the HBV DNA level in serum and prolong the total and tumor free survival time in patients with hepatocellular carcinoma combined positive expression of HBV DNA after hepatectomy.

PPL26-113

A NEW TECHNIQUE FOR LIVER RESECTION – SEMI-SPHERICAL RADIOFREQUENCY BipOLAR DEVICE: EXPERIMENTAL IN VIVO STUDY
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Introduction: The role of radiofrequency energy in liver surgery has expanded in recent years from simple tumour ablation to its use in the technique of RF-assisted liver
resection. The present study assessed the feasibility and safety of liver resection by a new semi-spherical bipolar radiofrequency device (RONJA). The primary hypothesis of the study was to evaluate whether this new device is able to consistently produce homogeneous and predictable areas of coagulation necrosis without the Pringle maneuver. Performing liver resection using the new semi-spherical device (RONJA), we aim to confirm that this new method is effective and safe.

**Method:** In vivo testing was conducted on a set of 12 pigs (Sus scrofa domestica) randomly divided into two groups. The whole experiment was made up of three parts. During the first part the animals in both groups underwent middle laparotomy and radiofrequency-assisted liver resection under general anaesthesia. The second part of the study followed 14 days after intervention, and it was focused on control laparoscopy. In the last part, 30 days after the operation, all pigs were euthanized and samples were pathologically evaluated.

**Results:** For comparison and statistical evaluation data were collected including results of blood samples, the values recorded during surgery and postoperatively and also the histopathological examination. Examination of thermal changes at the resection margin showed strong thermal alteration in both groups. Statistical analysis using the median test (p-value was computed by Fisher’s exact test) didn’t show significant difference between the groups.

**Conclusions:** This experimental study demonstrated the feasibility and safety of the newly developed semi-spherical bipolar device for liver ablation and resection. RONJA device shows promise in the effort to reduce healthy tissue liver parenchyma resection during liver surgery in a porcine model. Performing liver resection using the new semi-spherical device, we have confirmed this new method is effective and safe.

**PPL26-115**

**LYMPH NODE RATIO AND METACHRONOUS LIVER METASTASES IN COLORECTAL CANCER**

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**Introduction:** The goal of sampling 12 nodes for proper staging colorectal neoplasia is often “uncommon” and the lymph node ratio (LNR), rather than the overall number of lymph nodes, would allow a better selection of patient prognosis. The authors wanted to assess whether the distribution of patients according to the LNR can predict the risk of developing metachronous liver metastases from colorectal cancer.

**Method:** It was retrospectively evaluated a homogeneous group of 280 patients, classified according to the staging of Astler-Coller and followed in follow-up for at least 5 years. In order to highlight the groups at greatest risk of metachronous liver metastases subjects were divided into four quartiles in relation to LNR.

**Results:** The number of lymph nodes sampled in the B1 group was statistically significantly lower than the groups B2 and C2 (p = 0.021 and p = 0.013, respectively). As has not been reached statistical significance between the LNR global and the development of liver metastases, the subdivision into quartiles allowed to highlight that in the more advanced (LNR3 LNR4) was registered a higher incidence of metachronous liver metastases (70% vs 30%, p = 0.028) and that there is a different distribution of patients with or without liver metastasis in function of quartiles (p = 0.010).

**Conclusions:** Considering these data, the LNR allows to prognosticate patients at greater risk of developing metachronous liver metastases.
The lower sampling lymph node staging in the patients with less advanced (B1) and in patients with negative nodes-(B1 B2) who developed liver metastases leads us to believe that some patients with less advanced stages have been understaged. We believe that further studies are needed in order to be able to determine which is the cut-off of LNR that allows to discriminate on the risk of disease relapse.

PPL26-116
COMPARATIVE ANALYSIS OF CLINICAL OUTCOMES IN PATIENTS WITH LIVER RESESECTION FOR COLORECTAL HEPATIC METASTASES AFTER NEOADJUVANT CHEMOTHERAPY
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Introduction: The aim of this study was to identify the incidence of surgical site infections and postoperative complications, as defined by the Clavien-Dindo Classification, after hepatic resection for metastatic colorectal cancer in patients with and without associated neoadjuvant chemotherapy.

Method: A total of 181 patients were studied retrospectively. Patients were divided into two groups: the first composed of patients with associated neoadjuvant chemotherapeutic treatment for liver metastases with a latency time of less than 8 weeks; the second composed of patients without associated chemotherapy.

Results: Variables of duration of liver surgery, length of total hospital stay, and length of post-operative hospital stay seem to be correlated with surgical site infections and post-operative complications, p < 0.005 and <0.0001, respectively. Duration of surgery is a risk factor for surgical site infections, with an odds ratio of 1.15, and an odds ratio of 1.35 for Clavien-Dindo Classification complications.

Conclusions: Neoadjuvant chemotherapy was not a significant risk factor for surgical site infections, while total length of hospital stay, length of post-operative hospital stay, and duration of surgery were independent predictors of surgical site infections and Clavien-Dindo Classification complications.

PPL26-117
ALPPS RESULTS IN GROWTH OF THE FUTURE LIVER REMNANT AFTER FAILED PORTAL VEIN EMBOLIZATION
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Introduction: After the first report describing ALPPS (associating liver partition with portal vein ligation for staged hepatectomy) in 2012 there has been an interest for this surgical technique. However, the technique has also been subjected to critique for high morbidity and mortality, heterogeneous patient diagnosis, different surgery performed and using ALPPS upfront when portal vein embolization (PVE) is a more established method.

Method: This is a phase I study with the aim of including 10 patients (7 included so far since study start in December 2012) with bilobar colorectal liver metastases and previous right-sided PVE without sufficient effect for subsequent safe extended right-sided hemihepatectomy. Stage 1 operation is performed transecting the parenchyma between segment 2/3 and 4, and right portal vein is ligated. The effect is evaluated with CT volumetry on day 6 and stage 2 operation is performed day 7 resecting segments 4–8.

Patients are studied with multimodal liver function tests consisting in repeated: 4-phase CT liver, hepatobiliary scintigraphy with SPECT/CT, ICG and blood samples. In addition bilobar liver biopsies are taken at both operations and blood collected for further study.

Results: All patients underwent the first operation without major intraoperative complications. On CT volumetry day 6 there was an increase of FLR with in median 64% (range 41–105) despite previous PVE. In all cases the effect was considered sufficient (FLR/BW-ratio > 0.5) for completion surgery the day after. No patient developed postoperative liver failure. There was no mortality and no serious complications leading to significant morbidity.

Conclusions: ALPPS seems to be a safe procedure in selected patients, and could be used if previous PVE is unsuccessful. The mechanisms behind the powerful and fast growth of the FLR after ALPPS are unknown, but further analysis of the performed liver function tests and collected tissue samples will hopefully contribute to increased knowledge about this.

PPL26-119
IS HEPATIC RESECTION FOR COLORECTAL LIVER METASTASES IN OVERWEIGHT AND OBESE PATIENTS SAFE? OUR EXPERIENCE
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Introduction: The current increase in incidence of obesity and colorectal liver metastases (CRLM) will soon bring an equal increasing in obese and overweight patient candidates for liver resection (LR). The aim of this study was to clarify the perioperative outcome of hepatectomy in obese (OB) and overweight (OW) patients with CRLM in comparison with normal weight patients (NW).

Method: Complete perioperative parameters were available in 207 LR performed for CRLM between October 2000 and June 2013 by one of the authors and were reviewed; 78 were performed in NW, 96 in OW, and 33 in OB. These groups were comparable for age, sex and distribution of minor LR, major LR and synchronous colorectal resection and hepatectomy. ANOVA and
Student’s t tests were used for statistics; significance was defined as p ≤ 0.05.

**Results:** The demographic data were similar among the three groups. Intraoperative blood transfusions were 328.2 ± 600.9 mL [0–3300], 189.6 ± 400.9 mL [0–2100] and 137.9 ± 396.1 mL [0–1800] in NW, OW and OB, respectively (p = 0.0833). Duration of surgical procedure was 361 ± 154 minutes [115–800], 368 ± 166 minutes [90–820] and 368 ± 152 minutes [180–705] in NW, OW and OB, respectively (p = 0.9542). Postoperative complications were 14.10%, 15.63% and 21.21% in NW, OW and OB, respectively (p = 0.6414). Postoperative mortality was 1.28%, 0% and 3.03% in NW, OW and OB, respectively (p = 0.2883). Postoperative hospital-stay was 11.29 ± 8.06 days [6–68], 10.31 ± 3.63 days [6-29] and 9.64 ± 3.50 days [4–23] in NW, OW and OB, respectively (p = 0.3161).

**Conclusions:** The favorable perioperative outcomes observed in our experience prove that obesity is not a deterrent for liver resection and also for simultaneous colorectal resection and heptectomy; however these patients should be approached cautiously by specialist surgeons in centers with experience in hepatobiliary and bariatric surgery. In this context, surgery should be the treatment of choice also in obese or overweight patients with CRLM.

**PPL26-121**

**LAPAROSCOPIC VERSUS OPEN LIVER RESECTION FOR METASTATIC COLORECTAL CANCER: A META-ANALYSIS OF 610 PATIENTS**

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**Introduction:** The feasibility and safety of laparoscopic liver resection (LLR) have been demonstrated in multiple reports. LLR for malignant pathology has been slower to gain acceptance. The aim of this study was to systematically analyze the clinical evidence for LLR and open liver resection (OLR) in patients with hepatic colorectal metastases (mCRC) and compare perioperative and oncologic outcomes. In addition, we sought to analyze the long-term OS and DFS in these patient cohorts.

**Method:** A PubMed search identified 2,122 articles. When filtered for case-matched articles comparing LLR to OLR for mCRC, 8 articles were identified consisting of 610 total patients (242 LLR matched to 368 OLR patients). A random effects meta-analysis was performed.

**Results:** The two groups were well-matched for age, gender, BMI, ASA score, tumor size, number of CRC hepatic metastases, extent of major heptectomy, and use of neadjuvant/adjuvant chemotherapy. EBL was significantly less in LLR compared to OLR (262 cc vs 385 cc; p = 0.049). Transfusion rate was significantly less in LLR (9.9% vs 19.8%; p = 0.004). There was not a significant difference in operative time (248.7 minutes vs 262.8 minutes; p = 0.85). R1 margin positivity was significantly lower in the LLR (6.5% vs 16%; p = 0.01). LOS was significantly shorter in LLR compared to OLR (6.5 days vs 8.8 days; p = 0.007). The overall complication rate was significantly less in LLR group (20.3% vs 33.2%; p = 0.03). There was no difference in the 1-, 3- and 5-year disease-free survival (DFS) or overall survival (OS) rates.

**Conclusions:** In carefully selected patients with mCRC, LLR provides significant peri-operative benefits without compromising oncologic outcomes or long-term survival. Specifically, LLR offers decreased EBL, need for transfusion, R1 positive margin, LOS, and overall complication rate compared to OLR. 5-year DFS and OS rates are comparable.

**PPL26-122**

**ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS) PROCEDURE – A TRUE BREAKTHROUGH IN HEPATIC SURGERY? – A SYSTEMIC REVIEW.**

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**Introduction:** To induce rapid hepatic hypertrophy and to reduce post-hepatectomy liver failure (Phlf), associating liver partition and portal vein ligation for staged hepatectomy (Alpps) has been recently developed for patients with a limited future liver remnant. The aim of this study was to systematically review the literature to further validate its usefulness.

**Method:** Medline search conducted and studies containing outcome of Alpps procedure were systematically reviewed. primary endpoint was increase in size of future liver remnant (Flr) secondary endpoints were morbidity and mortality associated with this procedure.

**Results:** Total data of 112 patient from 8 studies done until now showed mean percentage increase of 79.15% In Flr (future liver remnant) in mean period of 8.2 days after first stage making second stage resection feasible with adequate Flr (future liver remnant). 38 patients developed grade 3 gade 4 complication. And 5 patients died peiopratively.

**Conclusions:** Alpps is a feasible options for inadequate future remnant liver with acceptable morbidity and mortality.

**PPL26-123**

**SURGICAL TREATMENT FOR HEPATOCELLULAR CARCINOMA WITH PORTAL VEIN TUMOR THROMBUS: A NOVEL CLASSIFICATION**

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**Introduction:** The hepatic resection for hepatocellular carcinoma (HCC) with portal vein tumor thrombus (PVTT) which are not uncommon at clinic are contin-

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cancer (HCC) with portal vein tumor thrombus (PVTT).

**Method:** From January 2008 to December 2012, a total of 56 cases of HCC with portal vein tumor thrombus (PVTT) underwent liver resection combined with thrombectomy. Clinical pathological features and surgical data of these patients were retrospectively studied. The patients were divided into two groups. Group A, tumor thrombi involving the main portal vein trunk or both the left and right portal vein. Group B, tumor thrombi involving only one branch (left or right) of portal vein. Cumulative overall survival curves of patients were compared according to the different groups.

**Results:** 16 patients (28.6%) belong to group A compared to 40 patients (71.4%) belong to group B. The rates of capsular formation and tumor number showed differences between two groups (p = 0.047, p = 0.032). Group A had more liver cirrhosis than group B (p = 0.047). The patients with large blood loss (≥1000) were more in group A, as well. There was no significant difference in complications between two groups except the ascites (p = 0.028). The 1-year overall survival rates of group A after liver resection was 31.5%. The 1-, 3-, 5-year overall survival rates of group B were 62.3%, 16.1%, 5.2% respectively. For further study, group B have the significantly better overall survival than group A (p = 0.033).

**Conclusions:** Liver resection combined with thrombectomy for HCC with PVTT can get better outcome in patients with PVTT involving the main portal vein trunk or both the left and right portal vein, compared to the HCC patients with PVTT involving only one branch (left/right) of portal vein.

**PPL26-125**

MESENCHYMAL STEM CELLS INDUCE THE GENERATION OF A NOVEL TOLEROGENIC DENDRITIC CELLS THROUGH IL-6/STAT3/SOCS1/TLR4 SIGNALING NETWORK

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**Introduction:** Mesenchymal stem cells (MSC) display a striking immunoregulatory property. This property has been used in several clinical settings; particularly, MSC infusion could resolve severe, acute graft-vs-host disease. Most of the data suggest that this property involves secretion of specific cytokines and mechanisms mediated by cell-cell contact. In addition, MSC are also likely to modulate the differentiation and function of dendritic cells (DC). However, the underlying mechanisms are still poorly understood.

**Method:** The MSC from human umbilical cord (hucMSC) was identified by flow cytometric analysis and the differentiation of mesenchymal lineage. After 9 days of coculture, we evaluated the influence of MSC on the morphology and function of DC by FACS analysis, ELISA, and Western blot.

**Results:** We found that huc-MSC induced immature dendritic cells (iDC) to differentiate into a novel tolerogenic DC subset (MSC-DC) with a stable phenotype and function when cocultured. MSC-DC display the low immunogenicity and immune tolerance by triggering a T helper type 2-polarizing program and down-regulating the pro-inflammatory factor production. Further study demonstrates that huc-MSC induce the tolerogenic MSC-DC generation through the IL-6/STAT3/SOCS1/TLR4 signaling network. Huc-MSC induced the higher expression of SOCS1 in MSC-DC, which were activated by secreting a larger number of IL-6 through the JAK–STAT pathway, repressing toll like receptor 4 (TLR4) signaling pathway, and ultimately inducing the generation of novel tolerogenic dendritic cells. Moreover, Huc-MSC could increase phosphorylation of Akt, but inhibit phosphorylation of IRF3.
Conclusions: Our data proposed a new molecular mechanism of MSC in regulating tolerogenic DC production and promote the clinical application of MSC in new and broader immune applications, including treatment of allograft rejection and graft-vs-host disease in organ transplantation and autoimmune liver diseases.

PPL26-126
LOW POWER LASER IRRADIATION IMPROVES REGENERATION OF THE LIVER REMNANT AFTER PARTIAL HEPATECTOMY IN RATS.
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Introduction: A simple, easy, and safe procedure aiming to improve liver regeneration could be of great clinical benefit in critical situations. Efforts are dedicating to improve remnant liver regeneration by changing portal flow. Nevertheless other mechanisms are related to regeneration processes, such as light stimulation. Low-power laser irradiation (LPLI) has been used to regenerate oral mucosa after chemo and radiotherapy, but it has not been tested in the liver remnant yet. The aim of this study was to investigate the main molecular mechanisms involved in liver regeneration of partially hepatectomized rats exposed to LPLI.
Method: We used Wistar male rats, which had their remaining liver irradiated or not with LPLI (wavelength of 632.8 nm and fluence of 65 mW/cm2) for 15 minutes after a 70% hepatectomy. We investigated hepatocyte growth factor (HGF), Met, Akt, and Erk 1/2 signaling pathways through protein expression and phosphorylation analyses along with cell proliferation (proliferating cell nuclear antigen (PCNA) and Ki-67) using immunoblotting and histological studies.
Results: LPLI can improve liver regeneration as shown by increased HGF protein expression and the phosphorylation levels of Met, Akt, and Erk 1/2 accompanied by higher levels of the PCNA and Ki-67 protein in the remnant livers. It might be useful in clinical practice since it is a completely noninvasive method to the liver remnant, and may be applied intraoperatively.
Conclusions: Low power laser irradiation may play a clinical role as a simple, fast, and easy-to-perform strategy in order to enhance the liver regenerative capacity of a small liver remnant after hepatectomy.

PPL26-127
A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL TO COMPARE PRINGLE MANOEUVRE WITH HEMI-HEPATIC VASCULAR INFLOW OCCLUSION IN LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA WITH CIRRHOSIS
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Introduction: The duration of hepatic vascular inflow occlusion and the amount of intraoperative blood loss have significant negative impacts on postoperative morbidity, mortality and long-term survival outcomes of patients who receive partial hepatectomy for hepatocellular carcinoma (HCC) with cirrhosis. This study aimed to compare the perioperative outcomes of partial hepatectomy for HCC superimposed on hepatitis B-related cirrhosis using two different occlusion techniques.
Method: A randomized controlled trial was carried out to evaluate the impact of two different vascular inflow occlusion techniques. The postoperative short-term results were compared.
Results: During the study period, 252 patients received partial hepatectomy for HCC with cirrhosis. Of these patients, 120 were randomized equally into two groups: the Pringle manoeuvre group (n = 60) and the hemi-hepatic vascular inflow occlusion group (n = 60). The number of patients who had poor liver function on postoperative day 5 with ISLGS grade B or worse was 24 and 13, respectively (p = 0.030). The postoperative complication rate was significantly higher in the Pringle manoeuvre group (40% vs 22%, p = 0.030). However, the Pringle manoeuvre group had significantly shorter operating time (116 minutes vs 136 minutes, p = 0.012) although there was no significant difference in intraoperative blood loss between the two groups [200 mL (range 10–500 mL)] vs 300 mL (range 100–1000 mL); p = 0.511]. There was no perioperative mortality.
Conclusions: The results indicated that for patients with HCC with cirrhosis, hemi-hepatic vascular inflow occlusion was a better inflow occlusion method than Pringle manoeuvre.

PPL26-128
MAJOR HEPATIC RESECTION IN HEPATIC HYDATIDOSIS
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Introduction: Echinococcal disease is still a serious problem in certain parts of the world, with liver as the most affected organ. Surgery remains the main stay of
treatment of hydatidosis, but the optimal surgical procedure remains unsettled.

**Method: Objective:** Safety and efficacy of major hepatic resection in multiple and giant hepatic hydatidosis.

**Patients & Methods:** Sixty-three patients had hepatic hydatidosis associated with lung, spleen, and suprarenal hydatidosis were managed between April 2005 to April 2011 at National Liver Institute, Menophyia University. 43 (68%) males and 20 (32%) females, age range 8–56 years. Cysts were found in the liver only in 51 (81%) patients, liver with spleen in 5 (8%), liver, spleen and lung in 2 (3.1%), liver and lung in 4 (6.3%), liver and suprarenal in one patient (1.6%).

**Results:** Multiple cysts were found in 38 (60%) and solitary cyst in 25 (40%) with cysts diameter ≤ 5 cm in 22 (35%), 5–10 cm in 16 (25%), and 10–38 in 25 (40%). Right hepatectomy in 24 (38%), Right trisectionectomy in 2(3.2%), right hepatectomy with segment III in 4 (6.3%), right hepatectomy with segment I in 2 (3.2%), left hepatectomy in 12 (19%), left lateral sectionectomy in 6 (9.5%), left hepatectomy with segment VI in 3 (4.8%), left lateral sectionectomy with Right posterior sectionectomy in 2 (3.2%), right hepatectomy with splenectomy in 7 (11%) and right hepatectomy with right suprarenal in one (1.6%) patient were performed. Hospital stay was 4.2 (3–13 days), there was one mortality and 12 (19%) morbidities. No recurrence on follow up period (8–60 months) was observed.

**Conclusions:** Radical procedure is safe and effective option for hepatic hydatidosis and should be performed when the entire lobe is diffusely involved by large or multiple hydatidosis with little healthy liver tissue.

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**PPL26-129**

**LIVER SURGERY FOR NON-MALIGNANT DIAGNOSES: OUR EXPERIENCE**

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**Introduction:** Advances in surgical technique, anaesthesia, and peri-operative care have led to an increase in the number of patients undergoing liver surgery for non-malignant diagnoses, and cases where malignancy cannot be fully ruled out. We reviewed this patient group at our unit, looking at demographics, pre-operative radiological diagnosis, post-operative diagnosis, outcomes and length of stay to establish current trends in the surgical management of patients with non-malignant liver pathology and to see if this service is feasible.

**Method:** We reviewed our prospectively maintained database to identify patients who had undergone liver surgery for non-malignant pathologies. We then reviewed the case notes to elicit the required information.

**Results:** Between 2003 and 2011, 52 liver resections were carried out for non-malignant conditions, accounting for 16% of liver resections at the unit. 81% of these patients were female, and the mean age was 55. The most common procedure was a formal hemihepatectomy, accounting for 30% of all procedures carried out. The most common pre-operative diagnosis was simple cyst, followed by adenoma. Overall pre-operative diagnosis was accurate in 69% of patients. There was no in hospital mortality. Six percent of patients developed post-operative complications (Clavien-Dindo 3 or more). The median post-operative stay of all patients was 7 days.

**Conclusions:** Liver resection for benign conditions can be performed safely with minimum morbidity. Although it could be argued that liver biopsy will avoid major surgery in these patients, it can make the condition inoperable if the biopsy turns out to show malignancy. There is a high rate of needle tract seeding. Also, a core biopsy may not give a clear diagnosis. We would strongly recommend, based on our outcomes and the literature that all patients with incidental masses in the liver are referred to the liver unit for further assessment.